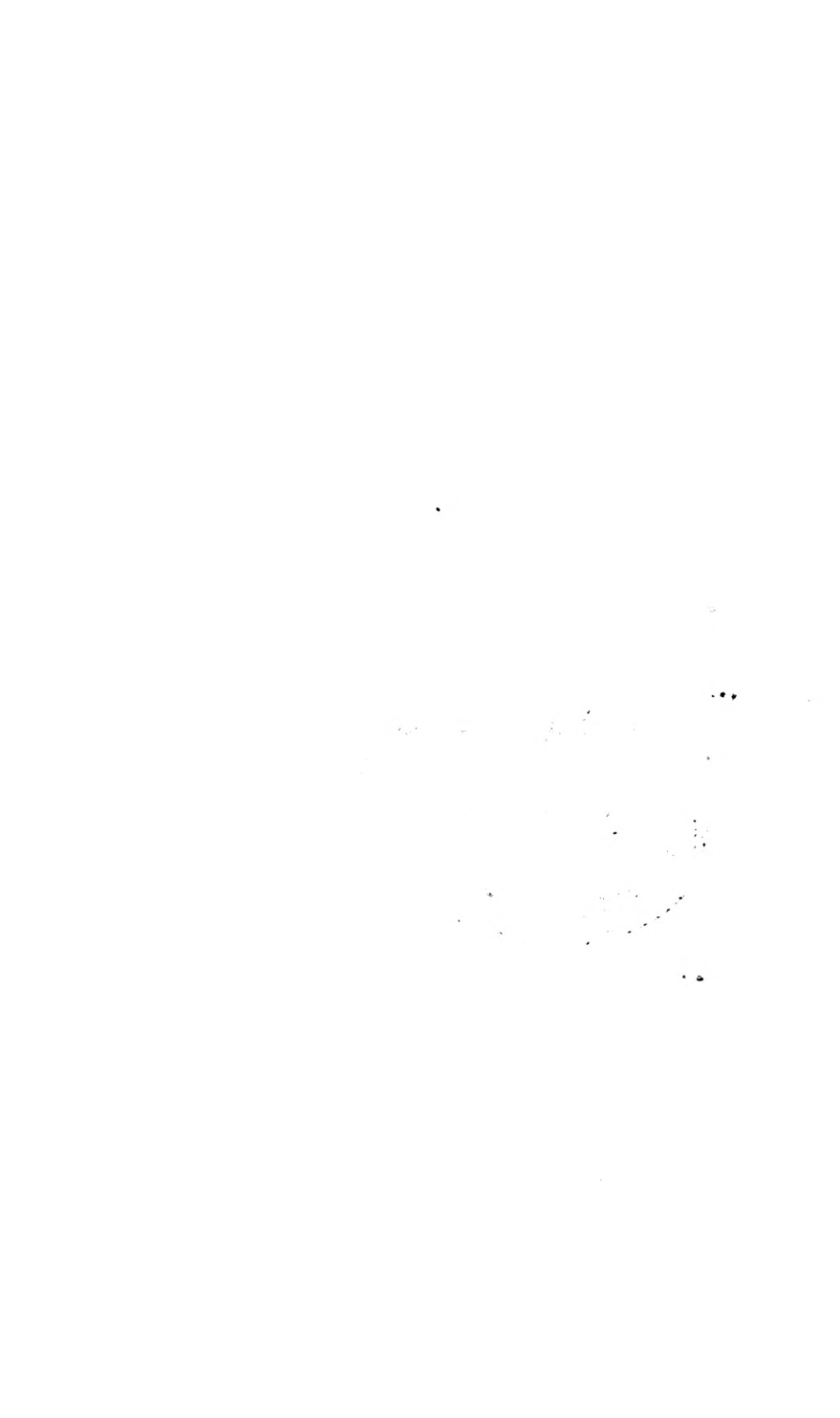
A DICTIONARY OF TREATMENT



A DICTIONARY

OF

TREATMENT

INCLUDING MEDICAL AND SURGICAL THERAPEUTICS

BY

SIR WILLIAM WHITLA, M.A., M.D., LL.D., M.P.

LATE PROFESSOR OF MATERIA MEDICA AND THERAPEUTICS IN QUEEN'S UNIVERSITY, BELFAST
CONSULTING PHYSICIAN TO ROYAL VICTORIA, BELFAST OPHTHALMIC, AND THE ULSTER HOSPITALS FOR WOMEN AND CHILDREN
AUTHOR OF "PHARMACY, MATERIA MEDICA, AND THERAPEUTICS" (TENTH EDITION)
"PRACTICE AND THEORY OF MEDICINE" (2 VOLS.)
ETC., ETC., ETC.

TORONTO
J. F. HARTZ CO., LTD.
1920

Printed in Great Britain

To

SIR RICHARD HAVELOCK CHARLES

M.D., F.R.C.S.I., G.C.V.O., F.Z.S.

PRESIDENT OF THE MEDICAL BOARD, INDIA OFFICE, AND MEDICAL ADVISER TO THE SECRETARY OF STATE FOR INDIA
SERJEANT SURGEON TO H.M. KING GEORGE V

A GREAT IRISHMAN WHOSE DISTINGUISHED SERVICES
TO MEDICINE AND SURGERY IN THE
EMPIRE OF INDIA HAVE
WON FOR HIM THE GRATITUDE AND ESTEEM OF THE
PROFESSION AT HOME AND ABROAD
THIS VOLUME IS DEDICATED BY HIS FRIEND
THE AUTHOR

PREFACE TO THE SIXTH EDITION

THE last edition has long since been exhausted, but the author felt no inclination to settle down to the work of revision whilst the fate of the Empire and human civilisation was hanging in the balance during the anxious years of the late terrible war.

It was, however, an intense satisfaction to him to learn from several sources that the fifth edition was often consulted by many a member of the brave and devoted R.A.M.C. on the different fronts of our far-flung battle-line.

The present volume has been as far as possible brought up to date. The surgical articles formerly written by Mr. A. B. Mitchell have been carefully revised and added to by Mr. S. T. Irwin, surgeon to the Royal Victoria Hospital; whilst Dr. R. J. Johnstone has brought up to date his original monographs on the gynæcological section. He is indebted to Dr. Wiclif McCready for correcting the proof-sheets of the ophthalmic subjects, and to Col. G. S. Thomson for many corrections and suggestions made on the sheets of the last edition.

He can scarcely hope that the present volume will be found to be as free from typographical errors as were its predecessors, since most of the proof-sheets were corrected in the Library or the Lobbies at Westminster during the intervals of debate.

LENNOXVALE,
BELFAST,
November, 1919.

PREFACE TO THE FIRST EDITION

THE issue of each edition of the writer's work on Pharmacy, Materia Medica and Therapeutics, brought suggestions from many members of the profession, both teachers and practitioners, upon the necessity of appending to it a Therapeutic Index, or Index of Diseases, for reference. With the view of acting upon these suggestions, and of furnishing the practitioner and student with a complete list of drugs suitable for the treatment of the various diseases, a Therapeutic Index, such as forms a portion of nearly every modern work on Materia Medica, was commenced. It soon, however, became evident that the practitioner or student would be assisted but little by a mere enumeration of the drugs suitable to the treatment of each affection, unless the list was accompanied by some expression of opinion regarding the relative value of each drug, and of the different methods by which it might be employed.

What was at first undertaken with the intention of being compressed into 50 or 60 pages, has gradually grown into a volume of 1,000 pages, and the greatest difficulty was experienced at every point in keeping it within its present limits. The necessary condensation prohibited the discussion of pharmacological questions, and necessitated the briefest reference to authorities, the writer having to remain content with giving the results of his own practical experience before mentioning the various methods of treatment pursued successfully by others.

Surgical questions are treated for the most part briefly, but the writer has frequently expressed his own opinions, formed during several years of practice, when surgical methods formed the major part of his daily work, in conjunction with the late Professor Gordon.

8, COLLEGE SQUARE NORTH,
BELFAST,
December, 1891.

A DICTIONARY OF TREATMENT

ABDOMEN, Gunshot Wounds of.

Whilst the treatment of gunshot wounds of the abdomen is essentially surgical, the success or otherwise of operative measures often depends more on the early management of the case than on the operation. In considering the treatment of such wounds we find the main causes of death to be (1) Shock, (2) Hæmorrhage, and (3) Infection. Let us take each of these in turn.

(1) *Shock*.—This can best be combated by (*a*) the application of warmth in the form of hot blankets, hot bottles, etc., around the patient. In the treatment of shock, according to Cuthbert Wallace, " the application of warmth greatly transcends the administration of stimulants. (*b*) The relief of pain by the hypodermic injection of $\frac{1}{4}$ gr. of morphia combined with $\frac{1}{150}$-$\frac{1}{100}$ gr. of atropine. It is better to repeat a small dose than to give one large one. This allays anxiety as well as pain and promotes sleep. (*c*) The relief of thirst by the introduction of fluids by the mouth, by the rectum (if uninjured), subcutaneously or intravenously. (*d*) The relaxation of the abdominal muscles by putting the patient in the semi-sitting posture—a posture which must be maintained if the patient is to be moved for operation. Under this treatment a patient's general condition will usually improve, and often cases hitherto hopeless recover sufficiently to allow of operation.

(2) *Hæmorrhage* may arise either from large vessels or from solid organs. In the former case the vessels must be tied at open operation; in the latter, though bleeding will usually stop of its own accord, a condition which may be recognised by a slowing of the pulse and an increase in its volume, an operation will also be necessary for the clearing out of clot to prevent sepsis or adhesions.

(3) *Infection* is due either to external contamination or extravasation of bowel contents. In the former case bowel will usually have been prolapsed; this should at once be protected by a large towel rung out of hot normal saline solution, unless surgical assistance is not forthcoming, when a complete toilet of the abdomen and thorough douching of the gut should take place before it is reduced. In any case, if the patient's general condition admits of it a laparotomy should be performed as soon as possible for the purpose of dealing with bleeding, closing perforations of gut by purse-string suture, and providing for free drainage of material already extravasated.—S. T. I.

ABORTION.

Threatened Abortion.—When a woman in the first few months of her pregnancy begins to lose blood or Liq. Amnii, she should at once be put to bed. So long as the loss is moderate in amount—*i.e.*, not much exceeding the average menstrual flow—and so long as there are no signs of death or decomposition of the ovum, the case should be treated on expectant principles. An examination with the speculum should be made to ascertain the source of the bleeding, as it may be coming from a granular or eroded cervix, from a polypus or from a cancer, and may not be due to a threatened abortion. The possibility of hydatidiform mole should also be kept in mind. Should the patient's general health begin to suffer from the amount or continuance of the hæmorrhage, should large or numerous clots be passed, or fragments of the ovum or decidua, or should fœtor or rise of temperature be noted, it is well to hasten the clearing out of the uterus.

Complete rest in bed is the most important of the expectant measures. It should be insisted on, no matter how slight the hæmorrhage, and should be maintained until a week after bleeding has ceased. While the patient is in bed she should have light diet, avoiding all highly seasoned dishes and stimulants of any kind. Purgatives should not be given, but a gentle aperient, such as Liquid Cascara and Glycerin, to be followed in the morning by a saline draught if required, may be administered to prevent constipation. As to drug treatment, it is advisable to give Morphia, ⅓ gr., on first seeing the patient if the hæmorrhage is considerable in amount, and if it continues the dose may be repeated at intervals of three hours until a grain has been given. It is doubtful whether any drug will save an ovum if rest in bed fails. Ergot in 10-min. doses and Quinine in 5-gr. doses three times a day have been recommended, and have the advantage that if abortion is inevitable matters are brought to a head in a shorter time. Ext. Viburni Prunifolii in 20-min. doses or Liquor Sedans (Parke Davis) in 1-dr. doses is unlikely to precipitate the catastrophe, and may have a sedative effect.

When the urgent symptoms have passed off, and the patient is convalescent, she should be warned against any extra exertion, against constipation, coitus, strong purgatives, and hot vaginal douches. Should the loss have occurred at the time when menstruation would have taken place in the ordinary course of events, she should keep her bed for four or five days at the next recurrence of that epoch, and she should be warned of the importance of taking to bed on the first sign of a return of the hæmorrhage or of pain in the back.

Should the hæmorrhage last several days, and be accompanied by the retention of clots in the vagina, it is well to wash out the vagina with a very gentle lukewarm douche of creolin or lysol, 1 dr. to the pint.

Inevitable Abortion.—When the progress of events has shown that a threatened abortion has become inevitable, or when the initial symptoms have been copious hæmorrhage accompanied by strong uterine contractions and pain in the back, when the case is already septic on his first

visit, or when he has reason to suspect a criminal abortion, which almost invariably results in sepsis, the practitioner's object should be to accomplish the safe, rapid, and complete emptying of the uterus. When this object has been achieved, the hæmorrhage stops, the uterus contracts firmly, and unless the case is septic recovery rapidly ensues.

If the practitioner finds on arrival that the hæmorrhage has ceased and the uterus has firmly contracted, he has presumptive evidence that the ovum has been expelled. This presumption becomes a certainty should he find the ovum in the vagina or should he be able to satisfy himself of its presence in the clots passed *per vaginam*. When this is the case, there is nothing to do but to enforce rest in bed for a few days, and to see that the patient's vulva is sponged with an antiseptic and covered by a sterile pad.

Should the ovum be contained in the cervical canal, the patient should be placed in the left lateral or preferably in the cross-bed position, the vulva should be washed with sterilised liquid soap, and redundant hair removed with scissors or razor, a vaginal douche given of 1 in 4,000 perchloride of mercury or of 1 dr. to the pint creolin, lysol, or other coal-tar derivative, and the ovum removed by the fingers. This can be easily done if the external os is open. If it be closed, and the cervical tissues stretched over the ovum, a slight snick at two or three points on the margin will allow the enucleation to be effected. A douche should then be given and a sterile pad applied.

Incomplete Abortion.—If the ovum in whole or part is still in the uterus, the procedure to be adopted will largely depend on whether the cervical canal is fully open or partially closed, and also on the answer to the question whether pregnancy has advanced beyond the third month, as after that date the risk of a serious and alarming hæmorrhage is much increased.

If the canal is not yet fully dilated, or if it has closed again after the expulsion of a part of the ovum, the practitioner will do no harm by plugging the vagina. The vulva is first washed and sterilised as already described, and a vaginal douche administered. The posterior vaginal wall is then held back by a speculum or by the first two fingers of the left hand. The plugging material may be iodoform gauze, which can be bought in tins ready sterilised, or bismuth gauze, or pledgets of cotton-wool rolled up and fastened with a piece of stout thread or string. The gauze or wool should be wrung out of 1 dr. to the pint solution of lysol or creolin before being introduced into the vagina. Whatever material is used should be introduced in a methodical manner; the posterior fornix should first be filled, then each lateral fornix, and lastly the vagina in front of the cervix. The plug should be left in place for from 8 to 12 hours, and a small dose of morphia may be administered to quiet the patient during the interval. The results of the plug are often very satisfactory. On removing it dilatation of the cervix will be found to have taken place, and in very many cases the ovum will have been expelled, and will be found in the upper end of the vagina, or protruding through

the cervix. Should this not have occurred, the treatment of the case will fall under that detailed in the next paragraph.

When the os is fully dilated, the practitioner should proceed to empty the uterus. The strictest antiseptic precautions should be taken, the vulva washed again and sterilised, and an antiseptic vaginal douche given. The cross-bed position will be found the most satisfactory, although the operation may be done with the patient lying on her left side. If the pregnancy is an early one, say before the third month, I think the best way to empty the uterus is with the curette. Many distinguished authorities advise the finger, but I have serious doubts if it is possible at this early stage to peel the ovum completely off the uterine wall with the finger, and although it may be possible to shell the ovum out of the cervical canal when it has left the uterine cavity, it is certainly not possible to hook it out of the uterus and through the cervical canal with only the tip of one or at most two fingers as a tractor. If the finger alone is used, there is, therefore, considerable risk of leaving part—it may be a small part—of the ovum behind, and as it is undoubtedly more difficult to provide an aseptic finger than a sterilised curette, there is risk of sepsis. I advise the practitioner to boil his speculum, tenaculum, and curette, and to place them in a basin of lysol or creolin solution. Pass the speculum, seize the cervix with the tenaculum, and pass the curette carefully into the body of the uterus up to the fundus. Remember that only a very light touch is necessary to detach the ovum from the uterine wall, and go carefully and thoroughly over the whole of its interior. When detachment of the placenta has been effected at one point, it is usually rapidly and easily completed, the uterus begins to contract, and the secundines present at the os, where delivery may be facilitated by grasping them with a pair of ovum or tongue forceps and pulling on the mass. If the fœtus is still in the uterus, it may be grasped and extracted with forceps; this will be done more easily if the head be perforated with the curette. The operation is completed by an intra-uterine douche given through a Bozemann's catheter. Before douching it is advisable to pass the finger up to the fundus to make sure that no tags of placenta have been left adhering to the uterine wall. There is little risk of perforating the uterus if the operator will remember that perforations are caused by pushing the end of the instrument too far or by scraping too vigorously, and if these points are remembered the risk is, if anything, rather less with a sharp than with a blunt curette. The aborting uterus sometimes dilates suddenly, and the cessation of resistance gives exactly the sensation of the instrument having passed through the wall, but it rapidly regains its tone and relieves the operator's mind. If a perforation actually occurs, no harm will be done provided strict antisepsis has been observed and a flushing curette is not being used. After the third month it is more expeditious, and probably safer, to use the fingers. The uterine cavity is now larger; it is therefore more difficult to be sure of dealing with the whole surface with the curette, and at the same time it affords more room for the skilful manipulation of the fingers. As many fingers

as possible should be introduced through the os, and should be used to peel off the placenta, while the other hand grasps the fundus through the abdominal wall and makes pressure on it, so as to bring every part of the wall within reach of the internal hand. Complete removal should be verified by examination, and an intra-uterine douche then given. If desired, the whole operation of clearing out the uterus may be performed at one sitting, even when the cervix is not dilated, by dilating up to 14 Hegar in the case of a pregnancy of three months or less, or by dilatation and incision of the cervix in a pregnancy which has advanced farther.

In the after-treatment of a case of abortion there is little to call for attention if strict antisepsis has been observed, and the case follows an aseptic course. Many operators prefer to pack the uterine cavity lightly with gauze after clearing it out, with the object of preventing any further hæmorrhage. Should this have been done the gauze should be withdrawn at the end of 24 hours, and a daily douche administered for a week, during which the patient should be kept in bed. After that time has elapsed, she may be allowed to get up and go about. Should the case be septic from the first, or become so in process of treatment, it should be treated on the same lines as a case of Puerperal Sepsis (*q.v.*).

Habitual Abortion.—When a woman aborts more than once an endeavour should be made to discover and to remedy the cause of the repeated failure to carry the ovum to term. The first thing to do is to make sure that the abortions are not caused instrumentally or by drugs, a practice which is on the increase to an alarming extent, especially among town-dwellers. Such a practice may be suspected when the doctor is only called in after the loss has lasted for some time and the uterus is perhaps already septic, when the patient is quite unconcerned about the untimely fate of her offspring, or is even undisguisedly relieved by it. Some diplomacy in questioning must be observed if the practitioner does not want to lose his patient, but if the diagnosis be once made, a faithful warning should be given of the dangers and the criminality of the practice. It was an old observation that one abortion was often followed by a second, and that a "habit of abortion" was likely to be set up. In most cases this so-called habit is due to the inefficient treatment of the first abortion, part of the secundines being left adherent to the endometrium, and setting up a localised endometritis sufficient to form the starting-point of a second miscarriage. The remedy is obvious, and in the case of a healthy woman, with no malposition of the uterus, repeated abortion should be the strongest indication for a careful curetting, which will usually put a stop to the trouble.

A pelvic examination will often show some gross lesion of the uterus, which may act as a predisposing cause. Such are retroversion, extensive cervical laceration with endometritis, and fibroid of the uterus. The appropriate treatment for these troubles will often be effectual in enabling the patient to carry her child to term.

In other cases the symptoms of a systemic or general disease will be found. Of these, a very common cause of abortion is syphilis. The

possibility of syphilis being at the bottom of the trouble should always be remembered by the practitioner, as the mother may show practically no symptom of the disease except the tendency to abort. It is well to have a private conversation with the husband, and to learn his previous sexual history, and if there is any doubt as to the diagnosis a sample of blood should be taken and Wassermann's test performed. Cases which are established as syphilitic should be given a careful and thorough course of treatment with salvarsan and mercury, and the Wassermann test again applied at the termination of the course (see Syphilis). When the patient becomes pregnant again, she should be put on 1 gr. of grey powder three times a day for three weeks, then a week's interval should be allowed, then the mercury again for three weeks, and so on till term.

The other general diseases which lead to abortion are renal and cardiac trouble. For the treatment of these see appropriate headings. It should be remembered that certain drugs may cause or predispose to abortion. Chief among these are phosphorus, lead, and alcohol, and the possibility of poisoning by one of these should be inquired into in a doubtful case. Aloes, senna, savin, pennyroyal, ergot and cottonroot have the reputation of abortifacients, and probably in a sensitive patient and in large doses may justify it.

Lastly, in a patient who has shown a tendency to abortion, care should be taken to warn her as to the advisability of exercising precaution during pregnancy, especially at the time when the menstrual flow should come on in the ordinary course. She should then keep her bed for a day or two, live on light diet, keep the bowels relaxed but avoid purgation, and sexual intercourse should be strictly forbidden. Bromides may be given in small doses, or 20 mins. of the fluid extract of viburnum prunifolium every 4 hours, or 1-3 grs. of quinine with 10-15 mins. of ext. ergot. liq. three times a day. She should be warned to take to bed on the first sign of pains or hæmorrhage.

Missed Abortion.—This name is given to those rare cases in which signs of abortion come on and pass off, leaving a dead ovum contained in the uterine cavity it may be for months. The proper treatment is to dilate up the cervix and clear out the uterus.—R. J. J.

ABSCESS.

In the great majority of cases of *acute* and *chronic* abscess the presence of pyogenic organisms is the causal factor, and all treatment must be directed by this consideration. The localised inflammation which is so liable to eventuate in suppuration may under certain favourable conditions resolve itself without reaching the stage of pus formation; thus the vital resistance afforded by the patient's tissues or blood may be sufficient to neutralise the destructive action of the chemical poison secreted by the cocci or bacilli. Formerly the surgeon attempted to increase this resistance by large doses of Quinine, Iron, Belladonna, Sulphides, etc., administered by the mouth, a practice which is rapidly falling into disuse. The Vaccine method has been frequently employed

with success in many conditions, as in boils, acne, and erysipelas, by hypodermic injections of graduated doses of the sterilised organisms causing the disease.

The *Preventive* measures are—(1) In gunshot wounds, excision of the tissues immediately surrounding the tract of the missile must be carefully carried out. (2) Absolute rest to the affected part. (3) Elevation of the limb, in order to restore the disturbed circulation and to prevent congestion and œdema, which by increasing tension endanger the vitality of the tissues. (4) Moist warmth acts in a similar manner by causing their relaxation, hence the value of poultices in the early stage when the skin is still unbroken. (5) *Cold,* by causing contraction of the small vessels, effects the same purpose when continuously employed. With these latter measures may be combined—(6) The use of local anodynes, such as the old green B.P. extract of Belladonna or Ichthyol, diluted with glycerin. (7) Counter-irritants of a mild type, as strong tincture of Iodine, may sometimes be found to prevent the suppuration of superficial lymphatic glands. (8) When, notwithstanding the use of the above agents, tension continues to rise and threaten the integrity of the affected tissues, a number of small incisions or deep punctures may be made, so as to drain the part of its increased blood and lymph supply, and the effect may be intensified by the application of a cupping-glass or by Bier's method of applying an elastic ligature at a distance above the seat of inflammation so as to cause venous congestion without interfering with the arterial circulation.

Where pus has already formed, and an acute abscess has resulted, the above agents are inadmissible, and no time should be lost in waiting for the pointing of the pent-up collection towards the surface, for by delaying its evacuation further necrotic action in the surrounding zone is encouraged. A free incision should be made, therefore, without delay by a sharp-pointed bistoury, without waiting for unequivocal signs of obvious fluctuation. In deeper abscesses, where the surgeon is in doubt, a hypodermic or grooved needle may be inserted to clear up the diagnosis. For the evacuation of superficial small collections of pus, the application of a spray of Ether or Ethyl Chloride will establish the necessary degree of local anæsthesia; and sometimes it may be found sufficient to touch the skin with the stopper of the Carbolic Acid bottle, which causes numbness and materially lessens the pain of the incision, or Cocaine may be injected.

For the opening of deep abscess a higher degree of anæsthesia is usually necessary, and chloroform narcosis may be employed. The skin having been washed with any antiseptic solution, a free and deep incision should be made with due regard to the configuration of the surface markings, so as to minimise the deformity of the resulting scar and to insure drainage. After the evacuation of the pus, the wall of the abscess cavity should be gently rubbed with sterile gauze, and swilled with weak antiseptic solution. Where there has been any evidence of burrowing, and especially in abscesses situated in the neighbourhood of large vessels, as in the neck or axilla, Hilton's plan consists in inserting through a deep skin wound the

closed blades of a pair of dressing forceps, which can be forcibly opened so as to separate the deeper tissues and insure thorough evacuation without endangering arteries or important nerves. In very large abscesses, especially where the necessary line of incision does not afford efficient drainage, a counter opening at the most dependent part may be required, and a drainage-tube inserted. The old plan of a small puncture through which the abscess contents were forcibly squeezed, and then a fine drainage-tube inserted, has given way to the free incision, swabbing of the wall of the cavity, and the packing of the sac loosely with dry sterilised gauze, after thorough irrigation. In large abscesses with much necrotic tissue, which cannot be safely extracted at the time of incision, a wide drainage-tube must be inserted, and the cavity flushed out daily with weak antiseptic till all sloughs are removed. Hydrogen Peroxide, when cautiously used, affords excellent results.

As the cavity shrinks in size and becomes lined with granulations, the gauze can be removed; in the meantime dry dressings are all that are required.

Chronic Abscesses are in the great majority of cases of tuberculous origin, and must be treated differently from the acute form. The aim of the surgeon should be not only to effect evacuation of the purulent or cheesy contents, but to remove every trace of the tuberculous tissue by scraping, curetting, or dissecting out the walls of the cavity under an anæsthetic. It is needless to say that as the contents of most chronic abscesses are sterile, strict antiseptic precautions should be maintained to prevent the introduction of pyogenic organisms. After the thorough removal of the cavity walls and of all necrotic tissue by irrigation, the space is to be lightly packed with sterilised gauze, no drainage-tube being used when possibly avoided. In some instances gauze can be dispensed with, the lips of the incision being sutured, and a layer of dry dressing laid over the part. In the more extensive chronic abscesses after the removal of the gauze secondary sutures may be applied as granulation has become established; absolute rest to the limb or part involved is also essential.

Where inflammatory pain and œdema have already spread into the neighbouring tissues the best procedure is to apply a boric acid compress. Layers of lint soaked in warm saturated boric acid solution and covered by oiled silk procure, without danger of secondary infection, all the benefits that could be obtained from the older septic applications, as linseed poultices. Carbolic Lotion (1 in 40), Spirit Lotion (1 in 3), weak Permanganate or Corrosive Sublimate Solution may be used in a similar manner either as a poultice or, if uncovered by impervious dressing, as an evaporating lotion.

In order to avoid the dangers of an infection of the healthy, freshly incised skin wound by the bacilli, which sometimes are found active in old tuberculous abscesses, some surgeons recommend aspiration of the cavity, followed by flushing with Hydrogen Peroxide, etc., and the injection of Iodoform Emulsion, or a solution of this drug in ether; but better results

are obtainable by free incision, removal of the cavity lining, and suturing without drainage.

Where a shrunken cavity remains connected with the surface by a sinus splendid results are obtained by forcibly injecting through the sinus a warmed mixture of Bismuth Carbonate 33 parts, and Vaseline 67 parts, and permitting it to be slowly expelled by the contraction of the tissues. The injections should be repeated every few days, and sinuses of tuberculous origin which have remained discharging for many years may be completely healed up in a few weeks or months by this method.

Beck accepts the rules laid down by Calot for the treatment of chronic abscesses: (1) That it is not permissible to open such abscesses when they are not easily accessible; (2) that it is a pressing duty to open chronic abscesses when there is danger of spontaneous rupture. As regards Calot's third rule—(3) that it is permissible to open those chronic abscesses which are easily accessible, even if spontaneous rupture is not threatening, Beck urges the necessity of putting off the operation so long as the patient has little pain and no high fever, provided that there is no steady deterioration in the general health.

When the chronic abscess threatens to rupture, Beck's method is to make an incision of rather more or less than half an inch into the cavity, empty it of its contents, after which not more than 100 grms. ($3\frac{1}{2}$ oz.) of a 10 per cent. Bismuth-Vaseline paste is then injected through the incision; gentle massage is applied over the whole neighbourhood of the abscess in order to insure if possible the complete penetration of the paste into every recess of the abscess cavity. A fresh sterile gauze bandage is applied daily, and as the walls of the abscess tend to shrink, the paste is expelled constantly in small amounts through the original wound; should the latter heal it must be opened by a fresh incision, but re-injection of the paste is not necessary.

The consistency of the paste, which should be injected in a warm condition and of creamy fluidity, permits the egress of all secretion, whilst at the same time it acts as an efficient barrier to the introduction of all organisms from without. One injection sometimes suffices to effect a cure. It is devoid of pain or irritation, though a marked local leucocytosis supervenes, and there is very little danger of bismuth-poisoning. The method is very suitable for the treatment of suppurating glands, pararectal abscesses, and all chronic abscesses connected with bone disease.

Recurring acute or chronic abscesses should always call for *Vaccine* treatment to supplement the surgical measures, the vaccine being prepared from cultures obtained from the seat of suppuration; in the case of tuberculous abscesses the vaccine is prepared from Tuberculin.

The special treatment of abscesses in different parts of the body will be described under their separate headings. See also the article on Lymphadenitis.

ACHYLIA GASTRICA.

This form of dyspepsia, characterised by absence of the acid stomach secretion, is best treated as a gastric neurosis, as will be referred to under

Dyspepsia, but it must be remembered that achylia may be the only symptom of a true atrophy of the secretory elements in the gastric mucous membrane, and it may be in other cases the secondary result of cancer or of a profound dyscrasia, as pernicious anæmia. The diet should be such as will readily pass through the atonic stomach for intestinal digestion, as in cases after gastro-enterostomy. Whilst, as in hypochlorhydria, much benefit may be derived from the administration of predigested foods in small amounts at short intervals, the best results are obtainable from a combination like the following, which takes the place of the absent secretion and improves at the same time the motor power of the stomach—

℞. *Acid. Hydrochlor. Dil.* ℥vj.
Liquor. Strychninæ ℥ij.
Glycerin. Pepsinæ ad ℥iv. *Misce.*

Sumat ℥j. *ex* ℥ii. *aquæ statim post cibum.*

ACIDITY, Gastric.

This is but a sign or symptom of various pathological or functional conditions, and much confusion exists regarding its treatment—a confusion which has become intensified by the temptation of conveniently labelling every form of functional stomach ailment as a gastric neurosis. In many instances the regurgitation of the acid liquid, which comes on at the middle or late stage of the digestive process in the stomach, causing much pain and distress, has no connection with the condition known as hyperchlorhydria or excess of HCl in the stomach, but on the contrary is too often a result of deficient acid secretion, which permits of fermentation, ending in a large production of lactic, acetic, and butyric acids.

Preventive measures consist (1) in a diminution in the amount of farinaceous and fatty foods, especially of fat meats baked in the oven, of beer, acid wines, badly made pastry, etc., and the administration of under-cooked red meat; (2) the establishment of oral asepsis by the removal of decayed teeth, and the use of such dental appliances as will insure thorough and slow mastication of the food, which should be given at regular intervals of 4 to 6 hours in order to insure the complete emptying of the stomach before the next meal is eaten. One large dose of Bicarbonate of Sodium (℈i.), freely diluted, generally gives immediate relief, and in chronic cases the combination of 3 grs. Papain with the alkali will cause neutralisation of the organic acids without hindering the digestive process, which is hastened by the papain. In severe acute cases following the ingestion of baked pork and bad pastry, it may be necessary to cause emesis, but a large dose of alkali is a wise preliminary, since the stomach contents may be so highly acid as to cause irritation about the epiglottis during the act of vomiting, or lavage may be employed. This latter measure will be indicated in all cases where there is impaired motility or obstruction at the pylorus, when the fluid employed may

advantageously be charged with antiseptics like Creosote or Permanganate Solution to insure neutralisation or destruction of abnormal ferments before fresh food is introduced.

Creosote in 2 or 3 min. capsules, an equivalent amount of Carbolic Acid in pill, ℥i. doses of Sulphurous Acid freely diluted, teaspoonful doses of freshly dried Charcoal, given in wafer paper, or 5 min. doses of the Oil of Peppermint may be administered about 1 hour after each meal. Occasionally a large dose (10 grs.) of Pepsin gives relief, but it is inferior in most respects to the following combination:

℞ *Bismuthi Carb.* *gr.* x.
Magnesii Carb. Pon. *gr.* xx.
Papaini *gr.* iii.
Sodii Bicarb. *gr.* xxx.
Morphiæ Hydrochlor. *gr.* ¼. *Misce.*

Fiat pulvis. *Mitte tales* xviii. *St.* i. *ter in die post cibos.*

The mistake is too commonly made of prescribing a cut-and-dried regimen, which is liable to depress the gastric function by its routine sameness. Farinaceous foods and fats should be restricted, and fish, poultry, tripe, and carefully made soups may be freely partaken of, the patient being left to his own judgment to abstain from all articles of diet which he knows, by previous experience, increase his acid discomfort. He can, however, be assured that by taking his alkaline powder he may often eat without risk such articles of diet as lean chops and roast meat, fresh vegetables, milk, etc., when these were before inadmissible. Beer, wines, pastry, pork, and fresh fruits are, however, better left alone, as are also all hashes, stews, goose, duck, and *re-cooked dishes* of every description. Some patients do well for a time upon large quantities of raw meat, as in the Salisbury treatment. Where the acidity is due to a true gastric neurosis—gastrosuccorrhœa (Reichmann's disease), or gastroxynsis (Rossbach's disease)—the underlying neurotic condition will require primary attention. The hyperchlorhydria of ulcer, both gastric and duodenal, as described under its own heading, must be treated by rest and the free administration of alkalies and suitable diet. Asnis has recently shown that Olive Oil has the power of very markedly diminishing the formation of gastric acidity due to the excessive formation of HCl.

ACIDOSIS.

As pointed out by J. Thomson and Langmead, the terms Acidosis, Acetonæmia, and Acid-Intoxication have led to much confusion. The mere presence of acetone in the blood or urine is only of significance because of the nearly constant accompanying presence of diacetic and β-oxybutyric acids which constitute the real danger to life. Hence the terms acetonæmia and acidosis, indicating a condition which may be

symptomless, may well give way to the more distinctive term Acid-intoxication, with its characteristic acetone breath, abnormal respiration, air hunger, bright red lips, cyclical vomiting, and restlessness passing into coma.

Whether the condition arises during the course of diabetes, poisoning by salicylates or phosphorus, or follows chloroform or ether anæsthesia, or supervenes during the final stages of prolonged septicæmic states, the principle of the treatment is the same and may be summed up in the word Alkalies. After the administration of a smart saline purgative, Bicarbonate of Soda in one dose of 100 grs., repeated in half this amount every hour or every two hours, should be given in plenty of water. If vomiting be present, ½ oz. of the alkali in ½ pint water should be administered by the bowel and repeated in half this amount every four hours. Where the symptoms do not yield speedily to these measures resort must be had to intravenous injection of large doses of the soda salt. Lepine recommended 600 grs. dissolved in 8 oz. water to be injected into a vein slowly during half an hour. Citrate of Potash formed by giving Bicarbonate with lemon juice may advantageously be substituted at a later stage. The diet should consist of skimmed milk and carbohydrates. These latter, even in diabetic cases, may be used during the danger period. Fats should be avoided.

The cyclical or recurrent vomiting of infancy or childhood is often a grave or fatal form of acid-intoxication. The cause being some perversion of the normal metabolic processes due to errors probably in feeding, the correction of the diet is of primary importance. Barley water to which one-third of its bulk of skimmed milk is added, the whole being well sweetened with Lactose, should be given at short intervals alternating with 10 to 30 gr. doses of Sodium Bicarbonate according to age. Rectal administration of the alkali where the stomach fails to retain it and in severe cases large hypodermic doses of a 1 in 50 solution may be lodged in the loose cellular tissue, or in extremity 10 per cent., Dextrose or 4 per cent. solution of the soda salt may be given by the veins. In older children Göppert's plan of making the patient distend his stomach by drinking as large a quantity as possible of weak alkaline aërated water sweetened with sugar often arrests vomiting; even when it fails to accomplish this the procedure acts like a lavage of the stomach. In all cases minute doses of Calomel in a little powdered sugar laid on the tongue and washed down with a teaspoonful of weak barley water are beneficial through the antiseptic action of the drug upon the bowel contents. Morphia may be given in the presence of great restlessness, but it must be always used with caution.

ACNE.

Acne vulgaris often, but not always, arises from the comedone formations (*acne punctata*), which involve the plugging by retained secretion of the sebaceous glands on the face and upper portions of the trunk. These so-called "black heads" are only affected by local treatment; this con-

sists in daily vigorous scrubbing of the parts with a coarse towel after the liberal use of soap and warm water, followed by the expression of the sebaceous matter by a suitable instrument formed like the end of a watch-key, which is forcibly pressed against the skin surrounding the comedones. After the emptying of these, any antiseptic ointment should be firmly rubbed in so as to reach the interior of the dilated follicles, the best application being Sulphur ointment 10 per cent., or Resorcin 5 per cent. Where greasy applications are objectionable to the patient the skin may be freely swabbed by the sulphur lotion given below.

A true inflammatory condition is present in and around the sebaceous glands when *acne vulgaris* has become already established, and a less vigorous friction is indicated; nevertheless, thorough cleansing twice a day of the skin by steaming or washing with hot water and soap and rubbing dry with a coarse linen towel are essential. After this has been accomplished each pustule should be incised with a sharp-pointed, narrow-bladed abscess-knife, and the contents gently squeezed out. The next step in the treatment should be directed to the local destruction of the acne bacillus along with the staphylococcus, which almost invariably accompanies it. This is best achieved by rubbing in the following ointment of Unna:

℞ *Hydrargyri Perchlor.* *gr.* iij.
Resorcin. Purif. *gr.* xxx.
Pulv. Amyli (Oryzæ) ℥v.
Ungt. Zinci Benz. *ad* ℥ij. *Misce.*

The novice is bewildered with the number of formulæ recommended for the treatment of acne, and is tempted to try one after another without due regard to the principle upon which the success of all of them depends —viz., the evacuation of the sebaceous pustules and the thorough disinfection of the greasy skin and follicles. Lotions are valueless until the oily secretion has been thoroughly removed by a superfatted basis soap, or by Crocker's Alkaline Liquid Soap, which consists of equal parts of Soft Soap and Spirit to which 6 per cent. of Thymol is added. Sometimes powdered Borax mixed with water more thoroughly removes the seborrhœic secretion. After the use of these detergents, should there be much irritation remaining, the following lotion may be freely applied with advantage and allowed to dry upon the face:

℞ *Sulphur. Præcip.* ℥vj.
Calaminæ Præpar. ℥ss.
Eau de Cologne ℥iv.
Aquæ Rosæ ℥v.
Aquæ Calcis *ad* ℥xij. *Misce.*

After the cleansing and evacuation of the pustules a weak Sublimate solution—Hyd. Perchlor., gr. x.; Spt. Rectif., ℥j.; Glycerin., ℥j.; and Mist.

Amygdal. ad ℥xij.—may be applied two or three times a day, but this should not be used at the same time as the sulphur lotion. It is a good plan to use ointments at night such as Unna's above-described or Sulphur 1 part, Resorcin 1 part, and Lard 10 parts, or Unna's Sulphur Paste—Sulph. Præcip., ℥iv.; Terræ Siliceæ ℥j.; Zinc. Ox., ℥iij.; Adeps Benz., ℥ij.; or Hypochloride of Sulphur 1 dr. to 1 oz. Lard. In the daytime the sublimate or sulphur lotions may be applied several times after the complete removal of all traces of the previous night's ointment by steaming the face and washing with soap and borax.

When the eruption is of limited extent a very successful plan is to insert into each incised pustule a small pointed piece of wood dipped in pure Carbolic Acid. Walter Smith touches the summit of each pustule with strong Carbolic Acid, and covers over the spot with a layer of collodion.

Vlemingkx's solution may be applied as in the treatment of scabies where there is much seborrhœa. When great induration is present, after steaming and washing, Diluted Citrinè Ointment may be forcibly rubbed in or Hebra's Solution—Green Soap—diluted with half its weight of strong spirit may be applied. Sometimes benefit in such cases follows a short series of exposure to the X rays, and this plan is especially suitable in *acne scrofulosorum;* Chromotherapy has been successful in ordinary acne, violet or green light being used in acute cases. The best results are obtainable from the use of ultra-violet rays, which, moreover, are much less liable to cause irritation. In the rare tuberculide form known as *Acnitis,* little good is to be expected from any local applications; the papules should be incised and then curetted by a suitable instrument, after which intestinal antiseptics may be given with advantage.

Vaccine treatment gives excellent results in cases which have resisted all local measures; the best method is to prepare a culture of the acne bacillus extracted from a pustule on the patient's face. In a few days this will be found to flourish on Fleming's oleic acid agar medium, and a weekly dose of 10 million killed bacilli may be injected. When pustulation and induration are very prominent features in the case 250 million of staphylococci (also originally obtained from the patient's own lesion) may be injected along with the acne bacilli. In most inveterate cases complete disappearance of comedones and pustules has been observed after from twelve to twenty inoculations, but relapses are not uncommon.

Gilchrist affirms that a stock vaccine is quite as valuable as one prepared from the patient's pustules when given in doses of 10 to 20 million every week, and when much pustulation is present he injects a stock vaccine of *S. albus.*

Towle has modified the vaccine treatment by using a fluid ointment with a liquid cold cream basis, each 100 mils (about 4 oz.) of which is made to contain 100 million acne and 400 million staphylococci applied with gentle friction every second or every day for short periods.

The internal drug treatment of acne is unsatisfactory, but many observers believe that suppuration can be checked by $\frac{1}{8}$-gr. doses of Cal-

cium Sulphide in pilules, whilst some put their faith in teaspoonful doses of Yeast or 10 grs. Yeast Nuclein. Precipitated Sulphur in ½-dr. doses may be tried, but Arsenic is of very doubtful value. Ichthyol (½-dr. capsules) seems to act beneficially where there is much erythematous redness surrounding the sebaceous glands, and Calcium salts often modify or correct this condition.

Menstrual or gastric derangements should receive close attention; plethoric patients are decidedly benefited by Saline Purgatives, and debilitated subjects improve as regards the severity of the eruption under large doses of Cod-Liver Oil. Fermented liquors almost invariably increase the malady, and every article of diet liable to induce dyspeptic symptoms, as pastry, pork, and re-cooked dishes, should be avoided.

ACROMEGALY.

Nothing can be expected from the administration of drugs in this progressive malady; the early hopes raised by the premature reports of cures under the use of Pituitary Gland Substance have been abandoned. Thyroid Extract does for a time appear to retard the progress of the deformity, but soon loses its efficacy, and the same can be said of large doses of Iodides.

Intense headache may be partially relieved by large doses of Exalgin, Antipyrin, or Phenacetin, and when these fail the excruciating agony caused by the greatly increased intracranial pressure may be relieved by trephining the skull. The operation of removing the pituitary tumour has been performed successfully by Frazier, but this radical treatment is only justified by the presence of blindness and intolerable headache.

ACTINOMYCOSIS.

On the detection of the tumour with its characteristic granules a free incision should be made, and after the evacuation of the contents every trace of infected tissue should be excised, curetted by a firm dry swab or destroyed by the cautery, and the surrounding structures flushed by antiseptic solutions. Where the lower jaw or the hollow facial bones are involved the gouge, chisel, and saw may be brought into requisition, and after the removal of all infected osseous tissue a strong caustic, Iodine solution or Hydrogen Peroxide should be applied, the cavity being finally firmly packed with iodoform gauze so as to insure healing from the bottom.

Iodides possess a strong selective action over the fungus, and should invariably be administered at the same time for considerable periods as in tertiary syphilis, 30-60 grs. of the sodium salt being given thrice daily. Where the fungus cannot be reached by surgical methods, this drug has often proved efficacious when given for months in the above dosage with short intermissions. The intravenous injection of Colloid Silver or Collargol in 2 per cent. solution has been advocated in pulmonary and abdominal cases. The X rays have also proved valuable in some cases,

but their use should not be depended upon except as an adjuvant to surgical methods and iodide treatment. The iodide has been injected into the nodules in the tongue and in facial cases, and the method of cataphoresis has been employed afterwards with success, no deformity being produced.

Much can be said for the method of injecting Iodides into the tumour and afterwards exposing this to the X rays or Radium. This latter agent has been introduced into the lung tumour for 24 hours in the dose of 47 mgrms.

Vaccine treatment has proved decidedly beneficial, beginning with a dose of half a million fragments of a stock or autogenous vaccine, the amount being cautiously increased according to the severity of the reaction up to 30 or 40 million at intervals of 4 to 8 days. Supplemental injections are required of the other organisms present in the secretions, hence the greater value of autogenous vaccines. Injections of sterilised Milk in the gluteal region have recently been advocated in doses of 5 c.c. by Dziembowski; these are followed by a smart rise of temperature.

ADDISON'S DISEASE.

At best only treatment of symptoms is indicated; very often the administration of Suprarenal Gland Extract produces no effect whatever upon the progress of this disease; nevertheless, since there is no other agent which exerts any specific action, it always should be given as a routine procedure, because undoubtedly, in a small percentage of cases, marked permanent benefit has been obtained. In the late stages of the affection it nearly always fails to raise the blood-pressure, but when the disease is recognised at an early stage better results may be expected. The dried extract may be given in 1-gr. tablets, each of which corresponds to 15 grs. of the fresh gland; 4 of these may be given in the 24 hours. The writer believes that the drug should be commenced in smaller doses at shorter intervals—*i.e.*, half a tablet every 2 or 3 hours, and the dose increased steadily till up to 2½ grs. of the dried substance be taken every 3 hours. Hypodermic injection of Adrenalin (2 mgrms.) may be resorted to when the gastric irritability is very prominent, or 1 dr. of the raw or partially cooked medullary portion of the sheep's gland may be administered, as its efficacy is but slightly diminished by the action of the gastric juice; it is readily absorbed by the rectal mucous membrane. Tyramine 0·05 may be injected in desperate conditions caused by low blood-pressure.

Much may be achieved by symptomatic treatment in other directions, and the life of the patient may be prolonged by complete rest in the horizontal position, and the use of Bismuth combined with small doses of Morphia or Hydrocyanic Acid, or 1 min. capsules of Creosote to check the exhausting vomiting which is usually a prominent feature in the later stages of the disease. The profound anæmia is sometimes relieved by Cacodylate of Sodium given *per rectum*, and the tendency to syncope is lessened by small hypodermic doses of Strychnine or Digitalin. The

best article of diet at this stage is buttermilk diluted with an equal quantity of effervescing kali water in small and frequently repeated amounts. Constipation is best combated by enemata of tepid water. Open-air treatment, when practicable, is beneficial in all cases.

ADENOIDS.

Notwithstanding their tendency to wither or atrophy as the child grows older, the presence of these hypertrophied masses of lymphoid tissue should be regarded as an indication for surgical interference, since, by waiting, incurable deafness, post-nasal catarrh, chest deformity, and alteration of the normal voice may supervene, although some authorities consider that operation is too frequently resorted to. Doubtless many of the cases which show symptoms during the first three months of life are due to syphilis and will yield speedily to mercurials. Hypertrophy of the Inferior Turbinals should be looked for in adenoid cases. Owing to blockage of the nares from this cause, removal of the adenoids alone may fail to afford relief. If necessary the turbinals must also be dealt with by electro-cautery or reduction.

The choice of an anæsthetic is of primary importance; Chloride of Ethyl is sometimes used. Chloroform in the hands of a skilful anæsthetist or the A.C.E. mixture is perhaps the most convenient and safe agent if only a moderate degree of anæsthesia be induced. Where the tonsils do not require removal, gas with oxygen is admissible. Many operators prefer to dispense with general anæsthesia and rely upon Cocaine, or large doses of Bromides given for several days before the operation so as to induce anæsthesia of the pharynx, and some prefer to operate without any form of narcosis being induced.

The patient's head should be made to project just beyond the edge of the operating-table, so that on depressing the forehead the blood may flow into the buccal cavity and out through the angle of the mouth. Anæsthesia being produced, short of not quite abolishing the palatal reflex, and a gag having been introduced between the teeth, the operator's left forefinger is passed into the naso-pharynx, its palmar surface being kept upwards and the soft palate hooked forwards by it. Some form of curette, such as Gottstein's, is then introduced, which enables the operator to sweep the roof of the cavity. The operation may be completed by Meyer's ring knife, which removes all abnormal tissue in proximity to the entrances of the Eustachian tubes. Some operators still rely upon the use of the sterilised finger-nail for the removal of remnants. After the complete removal of the lymphoid tissue, as ascertained by the finger-tip, the tonsils should be next excised when these are markedly enlarged. The less swabbing and syringing the better, the after-treatment of the case being left to nature unless when excessive hæmorrhage should occur, which may be arrested by the local application of Adrenalin or Coagulen.

Breathing exercises should be afterwards systematically carried out so as to cause full expansion of the thoracic walls by taking deep inspirations through the nostrils with the mouth closed, assisted by pressure

upon the lower ribs in the expiratory effort. This after-treatment is of vital importance.

During convalescence removal to the seaside with a course of open-air life and Syrup of Iodide of Iron is beneficial.

AIR PASSAGES, Foreign Bodies in.

No time should be lost in removing any body lodged in the larynx through waiting for its exact location, by the X rays, owing to the danger of direct suffocation or the probable advent of reflex spasm. When time permits thoroughly cocainise the pharynx and larynx, then pass the index-finger into the throat, and if the substance is lodged about the entrance of the larynx it may be removed by forceps or fingers. Where the foreign body has entered the larynx, in the absence of spasm it may be removed by forceps guided through the aid of the laryngeal mirror. Where these attempts fail, *laryngotomy* must be immediately performed when the symptoms are acute, and this can be readily accomplished with any cutting instrument at hand by making a vertical incision about 1 inch long in the middle line between the sterno-hyoid muscles, and a transverse incision through the crico-thyroid membrane, which can be easily felt through the skin; subhyoid pharyngotomy, thyrotomy, or tracheotomy may be performed.

When the impacted body cannot be extracted through the wound, it may be pushed up into the pharynx and removed through the mouth.

Where the foreign body has passed into the trachea or bronchi the first step is to try inversion, but this should never be done unless everything is in readiness for opening the trachea, as there is great danger of the body becoming lodged in the glottis and causing sudden death, and when this fails, as is generally the case, the surgeon should perform *tracheotomy*, making an unusually free incision through the tracheal walls, which should be held widely separate by hooks to facilitate the expulsion of the offending substance. This may be hastened by inverting the body and applying a smart slap with the open hand between the shoulders.

When the foreign substance does not come through the tracheal wound or through the glottis, gentle efforts may be made to remove it by a loop of fine wire passed into the trachea, or by forceps. Should this fail, the tracheal wound must be kept open by silk threads passed through its edges and tied round the neck, when the surgeon can afford to wait a few days, since the opening in the trachea removes any immediate danger of suffocation. Afterwards forceps may be introduced through a Killian's tracheal tube passed into the tracheal wound.

In the hands of the specialist, the improved methods of suspension laryngoscopy with suitable tubes and forceps have revolutionised the older plans for locating and removing foreign bodies. Direct bronchoscopy—by inserting a Killian's tube through the glottis—affords the safest and speediest method, when the object can be then grasped by Paterson's forceps.

ALBUMINURIA.

Usually the treatment of this condition resolves itself into the management of Bright's Disease. In those cases where albumin appears in the urine, apparently independent of renal disease, it may (speaking generally) be said to be in such small amount as not to call for any special treatment. Where, however, more than a trace is pretty constantly detected, the physician should determine the *cause* and treat it. If, as is common, the albumin appears as the result of defective assimilation of albuminoids, attention should be at once directed to the state of the digestive organs, and especially the liver; and there is no more potent remedy in such cases than a strictly milk diet, with or without Pepsin. Home-made Koumiss, prepared by mixing ½ pint of water, ½ pint of Irish buttermilk, and 4 pints of Fresh Milk, and 1 oz. Loaf Sugar, leaving in a warm place and shaking occasionally for 36 hours, will make a palatable food, very suitable in many cases. Albuminuria occurring during febrile attacks, zymotic diseases, inflammatory affections, etc., will yield to the remedies suitable for the primary disorder. When depending upon obstruction to the circulation, as in valvular affections or cirrhosis, the albumin will disappear upon the removal of the cause when possible. Cardiac tonics and diuretics, by strengthening the heart muscle and stimulating the renal bloodvessels, may cause its disappearance. The wet pack is very serviceable in such cases.

Iron, especially in the form of acetate, is of great value in the treatment of chronic albuminuria, especially when the drain of albumin has produced a marked effect upon the blood, and it affords the best results in albuminuria depending upon a morbid state of the blood, as in scurvy, pyæmia, and hospital gangrene.

The *albuminuria of adolescence*, or so-called *intermittent, cyclic, orthostatic*, or *functional* albuminuria, generally yields readily to rest in bed and a strict milk diet for a few weeks. In those cases where the albumin appears after physical exercise, Yeo lays stress upon the importance of limiting this to several very short walks, and forbids all athletics and animal food. Sexual excesses, smoking, overfeeding, brain-worry, exposure to cold, and other possible causes must be guarded against.

The broad statement may be accepted as true that no drug possesses the specific power of markedly causing diminution in the quantity of albumin, and it is better for the physician to attack the cause than to lose time in administering the usual list of mineral and vegetable astringents, which are always injurious. Lactate or Chloride of Calcium sometimes, however, appears to lessen slightly the amount of albumin in cyclic and anæmic cases, and it may always have a trial, but the long list of drugs vaunted for this purpose, including strontium, gold, silver, and lead salts, may be ignored.

The albuminuria of pregnancy, when slight or transient, does not call for medication; when persisting and copious, it may be safely dealt with as if occurring in Bright's Disease (which see).

So-called *War Albuminuria* has recently attracted much attention, and

confusion exists regarding the two distinct types of the condition. Thus a considerable percentage of the troops on active service and those undergoing intensive training exhibit a transient albuminuria due obviously to fatigue. This type, which in the group of men undergoing severe drilling may be as high as 10 per cent., is to be distinguished from the commonly recognised form of albuminuria occurring in trench warfare, which must be regarded as a true nephritis.

ALCOHOLISM.

Under the heading of Poisoning the treatment of Acute Alcoholism will be described. The *preventive* treatment of drunkenness is a wide and serious question; and, notwithstanding the heroic attempts of philanthropists and the activity of temperance reformers, the exhaustless literature of the subject, and the introduction of costly and cumbrous State machinery, little or nothing seems to have been accomplished, when one considers the terrible importance of the issues. Though the writer is very conscious that a great problem like this cannot be discussed in a Handbook of Treatment, nevertheless he cannot refrain from stating his conviction—the result of years of observation upon the action of alcohol—that it is possible for vast and far-reaching results to be obtained by a State regulation of the strength of all distilled alcoholic liquids to be used as beverages.

If distilled spirits could only be procurable in alcoholic strength, say, of sherry (15 per cent.), or, better still, of claret, more progress would be made in the amelioration of the evils of the drink curse than in all the temperance legislation of the last century. The benefits would be at once obvious in the great manufacturing centres, where alcohol is largely consumed in a concentrated form. The writer is satisfied that the consumption of spirits in a strong or only slightly diluted condition *enormously increases the danger of the establishment of the alcohol habit* in its worst forms, and enormously increases the injury to the tissues and glands of the body. The difficulty in carrying out such a law would be great at first, and would seriously interfere with Exchequer returns, but the gain to the nation would be obvious. The increase in the productive power of labour would be immediate, and the diminution in the expense of the maintenance of the huge army of useless victims of alcoholic excess would in some years be no less certain. It is true that such a measure would probably increase the evils of beer and wine drinking, but the gain to Ireland, Scotland, and many manufacturing centres in England of the diminution in drunkenness would be certainly very great.

Temperance reformers are watching with interest the results of the working out of restrictive legislation affecting the cost and sale of alcoholic beverages during the late war. Much good might be done in the way of reclamation of the confirmed inebriate by a thorough and whole-hearted administration of the 1898 Inebriate Act, if only a clause could be added to this Act which would make it applicable to habitual drunkards who had not committed any other indictable offence. As the law at present

stands, the blessing of a three years' compulsory sojourn in an inebriate reformatory can only be purchased by the habitual drunkard who becomes a criminal or one who has been convicted of drunkenness four times within the year. The moral treatment during a prolonged detention of at least one year in a well-conducted inebriate asylum would give a vastly higher percentage of recoveries than can be expected from asylum treatment of the ordinary insane, and it must also be remembered that a fair proportion of the worst types of hopeless insanity arises from alcoholism. The ridiculously short sentences passed upon the ordinary drunkard who commits misdemeanours and minor crimes permit of no real improvement of his moral condition during the brief term of his imprisonment, and often eventuate in changing the occasional into a confirmed habitual alcoholic.

In the acute stage of drunkenness, falling short of alcoholic poisoning, the physician may be called upon to administer a remedy to counteract rapidly the symptoms of alcohol. The Solution of Acetate of Ammonia, in doses of a wineglassful every 15 minutes, will often cause the uproarious or maudlin stage of drunkenness to give place to a condition of perfect sobriety in a surprisingly short time; 1 dr. of Carbonate of Ammonia, dissolved in 2 oz. Vinegar, makes an efficient substitute.

The hypodermic injection of $\frac{1}{4}$-$\frac{1}{3}$ gr. Pilocarpine will act with equal rapidity, and it can be administered when the patient refuses, or even when he is unable, to swallow the bulky, unpleasant solution. Cocaine, Kola Nut, Caffeine, and very strong Coffee, produce somewhat similar results, but much more slowly and less satisfactorily.

Acute gastritis following a debauch, and leading to serious vomiting, is best met by a large blister over the stomach, and by the administration of small quantities of ice by the mouth, and Morphia hypodermically, or by the following mixture:

℞. *Bismuthi Carb.* ʒiij.
Acid. Hydrocyan. Dil. min. xlv.
Mucilag. Recentis ʒiss.
Liquor. Morphinæ Hyd. ʒij.
Aquæ Chloroformi ad ʒiv. *Misce.*

Fiat mistura. Capiat cochleare min. omni hora, p.p.a.

Lavage may be resorted to if there be no collapse or severe pain, the stomach being washed out with 40 oz. water in which 5-10 mins. of Creosote have been dissolved. In the chronic vomiting, Creosote capsules, $\frac{1}{16}$ gr. of Morphia in minute pill, or 1 min. doses of Fowler's Solution, or 10 grs. Bismuth and 5 grs. Heavy Magnesia, may be given. The writer has often seen vomiting stop after 10-15 min. doses of Tincture of Capsicum, which had been given to allay the craving. By far the best food at this stage is good acid buttermilk neutralised with kali water, and this combination may stop vomiting which has resisted all treatment;

moreover, it is the best agent for the relief of the intense thirst. (The fluid known in Ireland as buttermilk differs widely from the compound known by the same name in most parts of England, where only the cream and not the entire bulk of the cow's milk is churned.)

The chronic dyspepsia of drunkards is a troublesome affection, in which drugs are of little value. The great difficulty experienced by the physician is to select some form of liquid nourishment which can be taken copiously by the patient at short intervals, which will be easily digested and acceptable to the vitiated palate. There is nothing better than the buttermilk just mentioned, which may be given in unlimited amount. It may be administered every 15 or 30 minutes, either alone or mixed in equal quantity with fresh milk or kali water. The formula mentioned upon p. 19 for preparing artificial koumiss will make a palatable and nutritious liquid. The writer has been informed by a medical man who had successfully overcome the alcohol habit in his own person, and has had considerable experience in treating others, that he found great assistance from the variety of the "Hop Bitters" which contains no alcohol. Carefully prepared beef tea and chicken soup, either of which can be thickened with barley water, and fortified with Liebig's Extract of Meat, or ordinary clear or thick soup of any kind that the patient may fancy, can be freely given. If there be great weakness or prostration, and the stomach refuses to accept any nourishment, except in very small quantity, Bovril, Valentine's Meat Juice in drachm doses every half-hour, or Brand's Beef Jelly, with ice every hour, affords the best chance of tiding over the difficulty.

Associated with gastric symptoms is the intense craving for alcohol in some form. This should be stoutly withheld. The physician generally sees the patient after he has been indulging freely for a considerable period, and alarm has been excited by the depression produced by continuous vomiting or by the dread of delirium tremens. The serious difficulty which at once confronts the attendant is the responsibility of cutting off the stimulant. There is a deeply rooted prejudice against this line of action, held both by the unfortunate victim and his friends, and, if such a step be taken, any mishap occurring is sure to be attributed to this point in the treatment.

In the vast majority of cases this is the correct course to pursue. The experience of gaol surgeons proves how constantly immediate improvement sets in, and *how exceedingly rarely does any mischief follow the abrupt withdrawal of stimulants, even in the brokendown patients committed to prison for some act perpetrated during their prolonged debauch.*

This prejudice has, to a large extent, arisen from the aversion to alcohol often noticed in patients just before symptoms of delirium tremens set in at the end of a drinking bout. The supervention of the delirium is attributed to the cessation of stimulation, whilst, in reality, it is but a symptom of the disease. The prejudice is also traceable to the memory of the horror and depression caused by the cutting off of the stimulant

in former attacks, and the patient is generally loud in his protestations that death will follow the sudden withdrawal of his liquor.

Though the physician should act firmly in insisting upon this complete withdrawal, he will be wise to postpone it for a short time if he has good reason to suspect that symptoms of delirium tremens are about to immediately declare themselves.

Exception should be made in those very much debilitated from disease, especially in those suffering from heart affections, and in the aged. If the pulse should exhibit marked signs of weakness and irregularity, if there has been prolonged insomnia, or if the history of the patient shows clearly that he has for years been taking alcohol in moderate doses daily before his recent excess, then small regulated doses of alcohol should be administered to him at stated intervals, the dose to be proportional to his habits. Generally speaking, 12 oz. of whiskey should be rarely permitted during the 24 hours, and 6 oz. for all cases may be said to be a fair allowance during the first few days, though the patient may have been in the habit of taking much larger quantities.

If there is much gastric irritability Champagne may be given, but all other wines should be forbidden. Good whiskey alone being selected as the stimulant, the rule should be laid down that it must be taken by the patient mixed with his soup or milk by a reliable nurse.

In the great majority of instances, however, the physician when called to treat a case of chronic alcoholic poisoning will be safe in fearlessly acting as he would in any other case of poisoning—by immediately stopping the administration of the poison. Much can be done with the assistance of a firm nurse, who should administer liquid nourishment every 15 or 30 minutes.

The following may be given with benefit to allay the craving for alcohol, and to some extent it takes its place:

℞. *Tinct. Cinchonæ* ℥ij.
Liquor. Strychninæ Hyd. ♏j.
Tinct. Capsici ℥j.
Spt. Ammon. Aromat. ad ℥iv. *Misce.*

Fiat mistura. Sig.—"A large teaspoonful in half a tumblerful of effervescing potash water every hour."

Or the following may be tried:—Ext. Cocæ Liq., 1 oz.; Tinct. Card. Co., 2 oz.; Tinct. Cinnamom., 1 oz.—one teaspoonful every hour in water.

Or the following:—Tinct. Jaborandi, 3 drs.; Tinct. Chiratæ, 2 oz.; Aquæ ad 10 oz.—one dessertspoonful every quarter of an hour.

Attention has of late years been directed to the value of Strychnine and Nux Vomica in the treatment of alcoholism and delirium tremens. The author first pointed out in 1882 the striking effects of alcohol in Strychnine poisoning, and published a case where recovery followed after the failure of the recognised remedies. He is satisfied that strychnine

is a remedy of great value, acting as an antagonist to alcohol, and he finds that it affords the best results of all drug treatments in diminishing the craving for alcohol and preventing the depression following its withdrawal. In all cases it should be pushed, and though relapses occur as a rule, the physician can depend upon it in helping the patient till moral influences have time to operate in his reform. The drug may be given hypodermically ($\frac{1}{25}$ gr.), while smaller doses are administered by the mouth. Many permanently successful results follow the methodic injection of Strychnine along with Atropine in regulated doses for a couple of weeks, but this treatment can only be properly carried out in combination with restraint in a fully equipped sanatorium under the personal supervision of a skilled physician. Many so-called "Alcohol Cures" contain Strychnine, some contain Brucine, Gold Salts, and Atropine, but the majority contain large percentages of Alcohol.

Coca leaves and Quassia chips may be chewed during the intervals between food and medicine.

Alexander Lambert, in the treatment of over 1,000 cases with 80 per cent. successes, begins with smart mercurial purgation, and gradually diminishing doses of alcohol. He uses a mixture consisting of Tincturæ Belladonnæ (15 per cent.), 2 oz.; Fl. Extract. Xanthoxyli, 1 oz.; Fl. Extract. Hyoscyami, 1 oz. Of this, 6 *drops* are given every hour for six hours, afterwards increased by 2 drops every six hours until 16 drops are taken hourly day and night till symptoms of belladonna action appear. Vigorous Catharsis is repeated at intervals of 10, 18 and 24 hours, as the principle of the treatment is the rapid elimination of the poison.

After the relief of the more acute symptoms, tonics, as Quinine with a Mineral Acid and Gentian and Calumba, may be given. If the gastric symptoms continue after the disappearance of the craving, Bismuth or Oxide of Zinc, with a minute dose of Morphine, $\frac{1}{20}$ gr., may be given; or Pot. Bicarb., 1 oz.; Aquæ Laurocerasi, 6 drs.; Aquæ to 12 oz.—a tablespoonful, with an equal quantity of fresh lemon juice, every 2 hours.

For the persistent loss of appetite and want of energy, associated with restlessness and disturbed sleep, sometimes with traces of hallucinations following long after prolonged alcoholic excess, there is no better remedy than the following:

℞ *Quininæ Hydroch.* gr. xx.
Acid. Nitro-Hyd. Dil. ℥vj.
Ext. Cinchonæ Liq. ℥iv.
Aquæ Destillatæ ad ℥x. *Misce.*

Fiat mistura. Capt. coch. mag. ter die ex aqua ante cib.

For the *insomnia* of chronic alcoholism, Opium should be sparingly employed. Bromides may be freely and continuously administered, and 10 to 30 grs. may be given in conjunction with any of the above combinations. It is a good plan to give the Bromide of Potassium in doses, say,

of 20 grs. every 4 or 6 hours, alternating with the Sal Volatile and Capsicum Mixture. Trional, Sulphonal, Paraldehyde, and Hyoscine are all safe and useful. Chloral should never be trusted, owing to its dangerous depressing action upon the heart. (For the treatment of insomnia in delirium tremens, see under Delirium Tremens and Insomnia.) Long after alcoholic excess has terminated in the condition requiring the treatment mentioned in the previous pages, the patient should be seriously cautioned, and, if necessary, placed under mild restraint, and if the craving continues, and the will be unable to resist it, restraint should be insisted upon, and a residence in a good inebriate asylum be strongly advised for as long a period as possible. Hypnotism has been extolled, but the writer has no experience of its use. In the later stages muscular exercises to the extent of inducing fatigue are invaluable.

Dipsomania or *Oinomania* must not be confused with ordinary inebriety. The mental or psychic element must be always before the mind of the physician when dealing with this disorder, and its victim must be treated and assisted as if he were the subject of a neurosis or degeneration either inherited or acquired. The treatment between the attacks will resolve itself into such alteration in the environment of the patient, his habits, exercise, food, and morals as will tend to improve his physical condition, strengthen his will power, and elevate his moral sense. The management of the case during or immediately after the drinking bout will be that indicated in ordinary acute drunkenness. The plan of tapering down gradually the quantity of alcohol or of mixing it with nauseating expectorants is to be condemned. In the hands of Dr. M. Bramwell hypnotic suggestion in these cases has given marked and satisfactory results, but the greatest care must be exercised to prevent this subtle agent being employed to the extent of causing diminution of will power or loss of the patient's sense of self-respect. In every case permanent total abstinence from all forms of alcoholic beverage must be rigidly insisted upon.

ALOPECIA—see Baldness.

AMBLYOPIA, Toxic.

The most common cause of this condition, which is also known amongst ophthalmic surgeons as Central Scotoma, is *tobacco*. As soon as the first symptom (which is commonly that of a sudden and progressive dimness of vision) leads the patient to seek advice, and the diagnosis being clear, total abstinence from the use of tobacco in every form must be rigidly insisted upon. This in most cases will effect a speedy cure without resorting to drugs, but where the disease has been of long standing patient treatment prolonged over many weeks may be necessary. If, on examination of the disc in such cases, it is found to be already blanched and atrophied, drugs can only be expected to restore the acuity of the periphery, the central vision remaining permanently damaged in both eyes. Strychnine hypodermically is the only reliable drug; $\frac{1}{20}$ gr. should be injected daily into the temple region till symptoms of improvement begin

to manifest themselves, after which the alkaloid can be given by the mouth. Iodide of Potassium assists its action, and should be administered three or four times a day whilst the hypodermic treatment is being carried out. Where the condition fails to respond to these measures, Pilocarpine may be injected, and Phosphorus in small doses administered at the same time by the mouth. Eliminatory treatment consisting in large draughts of water and free open-air exercises is also to be recommended, but they are only of use in recent cases.

The patient, if a confirmed slave to the smoking habit, may be aided in his abstinence by being allowed to chew small fragments of Quassia, Calumba, Gentian or Cascarilla when the craving for a smoke is acutely felt.

Alcohol is not an uncommon cause of amblyopia, but it is rarely met with alone, being frequently an aggravating factor in tobacco scotoma; hence in every case of the latter the use of alcohol must be strictly prohibited, and often no improvement in treatment results till this is given up completely.

Sometimes good results may be obtained in acute severe cases of the combined toxæmia by leeching the temples, and in very chronic cases by the administration of Chloride of Gold.

Quinine, Bisulphide of Carbon, Arsenic, Lead, Dinitro-benzol, Filix Mas, Indian Hemp, Stramonium, Iodoform, and Purified Wood Alcohol also produce the condition, and must be treated on the same lines. The worst type of toxic amblyopia has unfortunately become common through the introduction of the craze for treating syphilis hypodermically by large doses of the new arsenical compounds, especially Atoxyl or Arsamin. In this type the amblyopia is prone to pass into total blindness or amaurosis, a condition also often seen in sleeping sickness when these drugs have been administered.

The amblyopia of pregnancy and acute Bright's disease should be treated vigorously by hot baths, Pilocarpine, and saline purgatives.

AMENORRHŒA.

It should always be remembered that amenorrhœa is a *symptom*, and not a *disease*, and that it is useless, and may be harmful, to give drugs for the purpose of evoking a menstrual flow, unless the cause which is responsible for its non-appearance or suppression is discovered and dealt with if need be.

Delay in the first appearance of menstruation need excite no alarm unless a periodic malaise has been noted without any corresponding discharge from the vagina. It is in many cases due to constitutional causes which defy analysis, and the anxious mother may be reassured, while the patient, if of weakly habit and poor development, should be given a tonic such as

℞. *Ferri et Quinin. Cit.* ʒj.
Inf. Calumbæ ad ℥vj. *Misce.*

Ft. mistura. Cpt. ℥ss. *ter in die post cibos.*

or

℞. *Mist. Ferri Co.*
Decoct. Aloes Co. āā ℥iv.
Ft. mistura. Cpt. ℥ss. *ter in die post cib. ex aquâ.*

Attention should be paid to personal hygiene. Warm clothing and abundant plain, nutritious food should be insisted on, and the patient should be instructed to go to bed early, to have at least ten hours sleep, with plenty of fresh air and not too much exercise. In cases where thyroid insufficiency can be diagnosed, the tablets of the dried gland may be prescribed, commencing with 5 grs. once a day and carefully increasing the dose. The drug should be stopped on the appearance of unpleasant symptoms, such as loss of weight, headaches, and flushings. If examination of the young patient reveals the presence of a disease such as tubercle, cardiac or renal trouble, the treatment appropriate to the affection is of course indicated.

Should the patient give a history of periodical abdominal pains and malaise, although no menstrual flow has ever been noted, it is advisable that she should be examined as soon as possible, preferably under an anæsthetic, as there is a strong presumption that some form of genital atresia is present, which will require operative interference.

The most usual form of atresia found is *occlusion of the hymen*. The operation for the relief of this obstruction is simple of performance, but the results are likely to be so disastrous, owing to the liability to sepsis, that unless the practitioner is fully persuaded of his ability to perform the operation aseptically, and to keep the parts aseptic afterwards, he will be wise in calling in the assistance of a specialist. The vulva should be washed and shaved, and plentifully douched with an antiseptic lotion of 1 in 4,000 perchloride, or drachm to the pint lysol, cyllin, or other coal-tar antiseptic. A crucial incision should be made in the bulging hymeneal membrane. The freer the incision the better, as a small opening allows of the retained menstrual fluid becoming septic while it hinders it flowing away. The tarry fluid should be washed out of the vagina with an antiseptic fluid through a double current catheter (Bozemann's). When the vagina has been emptied, it should be packed lightly with iodoform gauze, wrung out of an antiseptic solution. The gauze may be left in place for three or four days, and after its removal an antiseptic vaginal douche should be administered twice a day for a week.

Should atresia of the *vagina* or *cervix* be discovered on examination, the operation necessary to relieve the condition requires a more difficult and consequently more dangerous dissection, during which the same antiseptic precautions must be observed. In such cases the after-treatment presents the difficulty that there is a great tendency for the artificial passage to contract, and the passage of suitable dilators is therefore almost a necessity.

In rare instances it will be found that the delay in the onset of menstruation is due to a failure of development of the genital organs. Should

the entire genital apparatus, including the ovaries, be rudimentary, nothing can of course be done. In the more common form, where the ovaries are present but the uterus, or uterus and vagina are rudimentary, dysmenorrhœa, or rather attacks of periodical pain without a menstrual discharge, is likely to ensue, and to become worse as time goes on; such cases often require ultimately the removal of the ovaries to relieve the pain.

When the young patient has menstruated a few times in the ordinary way, and the menses have then ceased to appear, the facies of the girl will in many cases lead the physician to the diagnosis and to the appropriate treatment. The vast majority of such patients suffer from *chlorosis*, and the main lines of treatment may be summed up as *iron, rest,* and *feeding*. For such a condition Blaud's pill is of course an old favourite. It is perhaps best administered as a "Bipalatinoid," which insures the administration of a fresh iron salt to the patient. I have much faith in a combination of Iron and Arsenic, such as the following:

℞. *Ferri et Ammon. Cit.* ℥j.
Liq. Fowleri ℥ss.
Inf. Calumbæ ad ℥vj. *Misce.*

Ft. mistura. Cpt. ℥ss. *ter die post cibos.*

The combined citrates of Iron and Manganese may be given in 5-gr. doses, or the mixture of Decoct. Aloes and Mist. Ferri mentioned above may be prescribed. No treatment of chlorosis which does not take account of the constipation almost invariably present can be considered satisfactory. In my experience the best routine prescription is some form of saline. This may take the form of a wineglassful of Apenta or other aperient mineral in a tumbler of warm water half an hour before breakfast, or of Krüschen or any other fashionable salt, or of what is equally efficacious and much cheaper, 1 or 2 teaspoonfuls of Epsom or Rochelle salts in a tumbler of warm water. Saline aperients should be prescribed with due regard to the result, and the patient should be instructed to gauge her dose so as to obtain one free motion in the day, the amount taken being regulated to this end.

It is a mistake to prescribe much exercise for chlorotic girls. They should have plenty of open air and of sun whenever it can be got, but they should be encouraged not only to spend a ten-hours' night in bed, but to rest during the day as well. It is wiser to drop all active employment; if the patient is at school she should be given six months' or a year's holiday. Her clothing should be warm, and she should have abundant plain, wholesome food. Fresh meat, ripe fruit, and green vegetables should be insisted on. Further suggestions as to treatment will be found in the section on Anæmia.

A careful physical examination may disclose the presence of tuberculous disease, or cardiac or renal trouble, and the treatment appropriate to the

affection should be instituted. Thyroid insufficiency is a cause of Amenorrhœa not at all uncommon in young and middle-aged women, and should be met by the administration of Thyroid gland in 5-gr. doses at bedtime. When a patient who appears otherwise healthy comes to a physician with a history of amenorrhœa after menstruation has once become established, the possibility of pregnancy should never be forgotten, no matter what her social position. It is not necessary to insist on a vaginal examination to determine this point, as after the third month the uterus can be made out as an abdominal tumour, and the breasts afford corroborative evidence. Unless the diagnosis is unequivocal, it is best to give a placebo, and ask for a re-examination in the course of a month, when the increased size of the uterus, if pregnant, will place the matter beyond a doubt.

It should not be forgotten that before the menstrual function has become fully established, a good deal of irregularity may occur without any abnormal condition being present. Thus it is very common to find a temporary amenorrhœa following on any considerable change in the patient's mode of life, such as the leaving of home to go to a boarding-school or to enter business. Such cases, of course, require a minimum of treatment.

Later on in life the causes of amenorrhœa, and consequently the treatment, vary. Most prominent is the amenorrhœa of pregnancy and lactation, and it should not be forgotten that even after the cessation of lactation menstruation may fail to become re-established for some months. Sometimes after labour the normal involution of the uterus goes too far, and the uterus becomes smaller than normal, with complete cessation of the menstrual flow (hyperinvolution). For this condition there is unfortunately no cure.

Any loss of blood profuse enough to cause a secondary anæmia may be followed by amenorrhœa, which will be cured when appropriate measures are taken to restore the blood to the normal.

Sometimes the presence of an ovarian tumour or tumours leads to scanty menstruation, or even to amenorrhœa, but the absence of the menstrual flow is of small account compared to the more important disease present.

The menopause in rare cases comes on before the fortieth year. Nothing can be done to retard it, and the treatment appropriate for that time of life should be instituted.

I have entirely omitted to give a list of emmenagogues. Such drugs can find no place in the modern physician's armamentarium. Amenorrhœa is a symptom; its cause should be found and treated, and a drug which is professedly used merely to induce a menstrual flow should be regarded as at best superfluous, and at the worst as distinctly harmful and possibly criminal when used indiscriminately.—R. J. J.

ANÆMIA.

In acute anæmia the result of loss of blood through injury of veins or arteries caused by wounds or by diseased processes (as in duodenal

ulceration) the diminished bulk of blood must be made up before the blood-pressure falls to a degree incompatible with life. Often the urgency of the case can be met by the hypodermic, intraperitoneal, rectal or intravenous injection of Normal Saline in large doses; ½ oz. Sodium Chloride dissolved in 60 oz. sterilised water may be injected by means of a fine canula to which is attached a rubber tube ending in a funnel. The canula may be inserted into an opened vein or into the loose areolar tissue, or made to penetrate the peritoneal cavity, the degree of pressure being secured by the elevation of the funnel and the temperature being kept at about 104° F. Isotonic Glucose Solution 5 per cent. or Trunecek's Serum—sodium chloride 492, sodium carbonate 21, potassium sulphate 40, and water 10,000 parts—may be used, and 20-30 mins. adrenal solution may be added to the normal saline or injected hypodermically.

Hurwitz adds 5 per cent. Gum Acacia to Locke's Solution, which increases the viscosity of the blood and prevents its escape from the vascular walls.

In grave cases of injury causing extensive loss of blood the operation of blood transfusion must be performed. This procedure, hitherto rarely resorted to, has been employed many thousands of times during the late war, and is becoming a common agent in the treatment of pernicious and other forms of chronic anæmia.

When time permits, the dangers of any incompatibility between the blood of the donor and the patient must be eliminated by the tests for agglutination and hæmolysis. Whether the direct or indirect methods be employed, the danger of clotting, air, sepsis, &c., must be scrupulously guarded against. The indirect method possesses the great advantage of the certainty of the exact dose administered, whilst the direct plan reduces to a minimum the exposure of the blood to air and the foreign materials constituting the walls of the tubes, canulæ, &c., and these should always be coated over with a layer of paraffin wax. The technique is most varied, and is constantly changing as improvements in detail suggest themselves, so that the simple operation is being encumbered with apparently endless minutiæ. In emergency the blood may be recevied into a sterilised glass vessel from a vein in the donor's forearm at the front of the elbow. The addition of 2 per cent. sodium citrate in such amount that the entire bulk of the blood shall contain 0·2 per cent. of the salt (blood 180 c.c., sodium citrate solution, 2 per cent., 20 c.c.) will prevent clotting. Some operators dispense with the citrate by defibrinating the blood, or by adding a small amount of leech extract, or by using the Kimpton-Brown tube.

The blood so treated is slowly injected by a syringe, or by a canula attached to rubber tubing with funnel; 500-1,000 c.c. may be given as a moderate dose, but in acute hæmorrhages an attempt should be made to approximately replace the lost blood.

Many appliances are employed in the direct method; the simplest of these is the one introduced by Col. Fullerton, Major Dreyer and Capt.

Bazett. It consists simply of two silver canulæ connected by transparent rubber tubing; the ends of the canulæ, being bulbous, require no ligatures to retain them in the vessels. One is inserted into the incised artery of the donor and the other into the vein of the patient, the flow being controlled by clips placed on the vessels. Before use the appliance is coated over externally and internally with a layer of paraffin congealing at a temperature of 113° F. The sterilisation and the application of the paraffin coating is effected by heating on a bath. The dose may be guessed at by the first symptoms of faintness, pallor, and thirst in the donor, which usually occur after the loss of about 1,000 c.c. The employment of syringe appliances in direct transfusion does away with the necessity of opening an artery. The chills which supervene (especially after the use of the citrate method) pass off in a few hours.

In acute anæmias following gastric, intestinal or duodenal ulcers, epistaxis, &c., to prevent recurrence, the patient should be put upon Calcium Chloride or Lactate.

In the treatment of all secondary hæmorrhages an obvious principle is to search out and correct the primary factor causing the drain on the blood, after which the management should follow such general lines as—absolute rest, the administration of highly nutritious liquid foods at short intervals, and a most liberal supply of pure and fresh air. Necessary modifications in feeding are obvious when the anæmia arises from hæmatemesis, when rectal feeding will be required. Defibrinated human blood administered hypodermically has been recommended by Ziemssen, and ox blood may be given by the rectum.

Iron is to be given freely in all cases, its best effects being seen in the later stages after acute hæmorrhages. Notwithstanding the trumpeting of the host of new organic iron compounds, the older inorganic preparations continue to hold their place. When it is necessary to saturate the blood rapidly with iron in all cases of acute anæmia due to hæmorrhage, the best preparation is the B.P. Tincture, the only exception being when the bleeding has been caused by gastric erosion.

As a simple chalybeate for this purpose the following is suitable:

℞. *Tinct. Ferri Perchlor.* ℥v.
Calcii Chloridi ℥iv.
Syrupi Simplicis ℨiss.
Aquæ Chlorof. ad ℨxij. *Misce.*

Fiat mistura. Cpt. ℨss. *ex* ℨii. *aquæ ter die p.c.*

In less acute cases where the tongue is coated it will be advisable to administer one or more saline purges, and substitute for the above, Tr. Ferri Perchlor., ℥v.; Quininæ Hydrochlor., gr. xl.; Glycerin., ℥j.; Aquæ ad ℨiv. ℥j. ter die p.c. ex ℨij. aquæ, or the Citrate of Iron and Quinine may be given in 5-gr. doses in combination with 15 mins. of Tincture of Nux Vomica in 1 oz. water.

In all chronic anæmias, for saturating the blood with iron during prolonged periods there is no preparation more suitable than Blaud's Pill, which may be given to the extent of 12 pills in the day, 3 being administered after each meal, and as a rule no constipation follows, and the discoloration of the teeth which is caused by the liquid preparations is avoided. The system can be also rapidly saturated by iron given in the form of pills containing 5 grs. Reduced Iron, which in gastric troubles may be coated with Keratin, so as to avoid stomach irritation; absorption of the metal takes place in the duodenum, its elimination occurring by the rectal mucosa. Though the daily normal intake of iron does not exceed $\frac{1}{8}$ gr., and the total amount in the body is under 40 grs., the best results can only be obtained by giving much larger doses than can possibly be assimilated.

The importance of oral and intestinal sepsis, overwork in every form, errors in digestion, improper food, impure air, and the action of poisons like lead need not be emphasised further. Intestinal parasites as ankylostoma produce a profound secondary anæmia, and must be destroyed by large doses of Thymol.

Malarial anæmia is intractable, and often fails to be remedied by iron. It is in this form that Arsenic proves so valuable, and it may to advantage be combined with Iron and Quinine, as in the following pill: Ferri Arsen., gr. $\frac{1}{8}$; Quiniæ Sulph., gr. ij.; Ferri Redact., gr. ij. Misce. St. i. ter die p.c. Arsenic may, in the later stages of most secondary anæmias, and even in chlorosis, be advantageously combined with iron, though it cannot be said to possess the same specific action upon the hæmoglobin of the blood. The injection of Cacodylate compounds should be reserved for the pernicious and leukæmic types of anæmia.

In bloodlessness associated with neuralgia or nerve troubles the combination of quinine in large doses with small amounts of iron and arsenic is invaluable, or a teaspoonful of Easton or Fellows' Syrup may be administered thrice daily.

The best routine preparation in the secondary anæmias of childhood is Parrish's Syrup in drachm doses, and where scrofula is present there is no agent so uniformly useful as the B.P. Syrup of Iodide of Iron.

The chronic anæmia of Bright's disease is generally markedly relieved by the administration of the Acetate of Iron, and this can be conveniently prescribed by combining 20 mins. of the Tincture of the Perchloride with each drachm of Mindererus spirit and some glycerin in 1 oz. water. The anæmia so constantly present in chronic heart affections can be combated by the addition of Reduced Iron to Digitalis in pill form.

When anæmia is associated with obstinate constipation, the Pill of Aloes and Iron may be given in 5-gr. doses night and morning.

Where the irritable stomach objects to any of these preparations, an elegant combination is the Citrate of Iron and Ammonia given in effervescence with Citric Acid or lemon juice :

℞. *Ferri et Ammon. Cit.* ℥ij.
Acid. Citric. ℥iij.
Aquæ ℥viij. *Misce.*

St. coch. mag. c. coch. mag. Mist. Alkalin. ter die post cib.

The Alkaline Mixture contains Pot. Bicarb. ℥vj., *Aquæ* ℥viij.

When headache follows the administration of iron, saline purgatives may enable the physician to continue its use, and he may give 5 grs. of the sulphate with 30 grs. of Sulphate of Magnesia in aerated water with advantage. The treatment of anæmia need not, however, be confined to the official preparations of iron if these do not soon prove satisfactory. The natural iron waters of Buxton, Bath, Altwasser, Harrogate, &c., may be tried with advantage, or any of the newer organic iron preparations may have a trial.

Glycerophosphates, Cod-Liver Oil, Lactophosphates, Malt Extract, sea bathing, bracing air, and sometimes a short sea voyage and rest from mental work, often work wonders. Massage is also a powerful remedy in improving nutrition and influencing metabolism, and water charged with oxygen has often proved serviceable.

The treatment of chlorosis, though identical with that of all secondary anæmias, will be dealt with under its own heading.

ANÆMIA, Pernicious.

In the absence of definite knowledge of the true etiology and pathology of this grave blood condition the treatment must remain chiefly empiric, though the theory is gaining strength that this type of anæmia is due to hæmolysis, the result of toxins set free in the mouth, stomach, or intestines There is reason to believe that the disease is not so invariably fatal as was formerly believed provided that treatment is vigorously taken in hand at *an early stage*, though pessimists affirm that when a cure results there was necessarily a mistake made in the diagnosis.

Once the condition has been recognised, Arsenical treatment should be commenced without delay; the administration of iron in most cases is not only futile but harmful, since it almost invariably increases the gastric irritability so constantly present. Hunter believes in small doses of arsenic, 6-9 mins. Fowler's Solution in the day; most authorities regard such dosage as useless, and commence boldly with hypodermic doses of 1 gr. of Cacodylate of Sodium. The writer can testify to the striking temporary success of the agent, especially when administered *per rectum*, as carried out by Dr. R. W. Leslie, even when every allowance is made for the natural tendency of the disease to assume an unexpected improvement from time to time. The usual method is to inject ½ gr. of the soda salt in 2 oz. water daily for 10 days, and resume the treatment after weekly intervals. Arsycodile acts in a similar manner, and Soamin, Arrhenal, and Arsamin have their advocates. Byrom Bramwell still

reports satisfactory results from the original Salvarsan administered by the intramuscular method.

Two methods of treatment have been extensively practised during the last decade—these are Blood Transfusion and Splenectomy. The former agent in doses of 500 c.c. administered by the direct or indirect methods already described is always beneficial, and though evidence is conclusive of its value as a palliative and prolonger of life in severe cases evidence of its curative power is still lacking.

Splenectomy has been frequently resorted to, and though a fatal result follows in a small number of cases, the operation is generally followed by a remarkable improvement in the blood picture; already signs are obvious that even amongst its own advocates this radical procedure is becoming recognised as only a palliative, though a few observers maintain that there is a fair hope of cure if repeated blood transfusions be made to follow the splenic excision. X rays to the splenic region may be tried.

The arsenical treatment having been started as a routine, the physician should proceed to meet other important indications present in every case, otherwise arsenic administration will certainly fail.

Thus the febrile condition so constantly found in all severe cases must be met by *absolute rest in bed*, with the cessation of all mental exertion. The condition of the gastric function should next require attention, and the dietary must be closely supervised. As a rule small quantities of liquid food should be administered frequently, and milk with an effervescing water may be the only nourishment retained, and peptonisation may be tried. Soups, beef juices, and meat jellies are advantageous. Owing, however, to the remarkable capriciousness of the appetite in the disease, it is a mistake to insist upon a stereotyped dietary, and as the irritability of the stomach subsides a considerable degree of latitude may be permitted to the patient's instinctive longings for any particular article of diet. The writer finds Koumiss or acid buttermilk a valuable routine, and in the presence of actual vomiting this may be freely administered when mixed with Kali water. At a later stage, fish, chicken, and underdone fillet of beef may be permitted. *Bone Marrow*, raw or slightly cooked, should be freely given when the patient can tolerate it, or the tablets of this substance, highly recommended by Fraser, may be administered along with the food.

Concurrent with arsenical treatment, rest and dietetic regulations, antiseptic measures must be vigorously undertaken. The condition of the tongue, teeth and gums should be minutely investigated; all carious teeth must be extracted; gold crowns often conceal culture grounds, and where there is the least suspicion of this, their removal should be insisted upon. Frequent use of antiseptic mouth-washes is essential.

Gastric sepsis is less easily dealt with. When the catarrhal symptoms indicate its presence, nothing is so efficacious as repeated *lavage;* but this is contra-indicated often by the general debility existing. A compromise is usually practicable when vomiting persists. This may be carried out by inducing the patient after emesis has occurred to drink several tumbler-

fuls of tepid water containing small amounts of Potassium Permanganate in solution, which are soon rejected, and the operation may be repeated several times in the day, where lavage could only be attempted once in the 24 hours. Creosote, in the capsular form (2-5 mins.), is convenient and efficacious. Hunter extols Salicylic Acid, but the writer has found it too irritating. Capsules of freshly dried Charcoal are often of use. Hydrochloric Acid is beneficial in large doses, and may be advantageously combined with arsenical treatment.

Intestinal sepsis should be combated, but here antiseptics are at the best a weak reed to lean upon. Salol and Beta-Naphthol are recommended, though their utility is doubtful; better results will be obtained by small doses of Calomel given at short intervals, though obviously this treatment cannot be persevered in for any length of time. Undoubtedly a morning smart saline purge will be beneficial, and this may be followed by a large evening enema to wash out the entire colon; constipation must be always avoided. Some authorities depend upon a strict milk diet for the disinfection of the bowel. Large doses of Salicylate of Bismuth are harmless and may be tried.

After the disappearance of fever and the removal of acute gastric irritation the above combination of arsenical and antiseptic treatment with Red Bone Marrow may be continued, whilst the patient is permitted to move about and take advantage of open air and change of scene. The advent of febrile attacks should be always a clear indication for complete rest, and in the later stages of the disease, cardiac weakness may demand hypodermic medication by strychnine, and sometimes oxygen inhalations may be advantageously employed. Hunter strongly advocates the necessity of supplementing the above routine by Serum Therapy with the view of neutralising the poison in the blood, and so preventing the active hæmolysis; for this purpose he injects Antistreptococcic Serum (5-10 c.c.) at intervals of three or four days for as many weeks, excellent results following when only 3 or 4 injections were employed. It is needless to state that all hæmorrhages from the mucous membranes should receive prompt attention, local astringents being applied when the bleeding is from the mouth or anus, and Chloride of Calcium administered for short periods in full doses. It is in this condition that Iron may sometimes be advantageously combined with the arsenic administered. Periodical blood examinations afford a reliable means of determining the results of treatment, and should never be omitted.

ANÆMIA, Splenic.

The enlargement of the spleen without marked leucocytosis, which is characterised by progressive anæmia of the secondary type, is little benefited as a rule by the treatment which is sometimes successful in pernicious anæmia. The only remedy in this uniformly fatal condition is Splenectomy, which has been successful in a small number of cases. The splenic anæmia of infants (von Jaksch's anæmia) is often associated with rickets, and is not necessarily fatal, though there be extensive

leucocytosis, and the best procedure is splenectomy. In the condition known as Banti's Disease, where in addition to the primary splenomegaly and anæmia a cirrhotic state of the liver has been superimposed, the operation of Splenectomy is a serious one. All that can be done for the patient consists in the relief of his discomfort by tapping the ascites and the administration of Chloride of Calcium to lessen the tendency towards hæmorrhages from the stomach, bowel, or elsewhere.

ANCHYLOSTOMIASIS.

Preventive measures consist in absolute cleanliness of the skin and the sterilisation of all water and possibly contaminated food and the destruction of fæces. The parasite should be vigorously attacked by an anthelmintic administered after a smart purge has cleared out the contents of the intestines, and 8 or 10 hours after any food has been swallowed. Thymol has been the routine agent; 30 grs. should be given in a cachet to the fasting patient, and this dose repeated twice at intervals of 2 hours each (90 grs. in all). Some authorities recommend one colossal dose of 60 grs. As a precaution against the absorption of the drug it is advisable to avoid the administration of any oily or fatty substance, though a small dose of Castor Oil can safely be administered 6 or 8 hours afterwards in order to expel the killed parasite, but upon the whole 5 grs. Calomel will prove more efficacious. If, within a week or two, ova are detected in the fæces, the doses must be repeated as before. Daniels recommends the administration of 15 mins. Oil of Eucalyptus and 20 mins. Chloroform dissolved in 5 drs. Castor Oil after fasting, the dose to be repeated in one hour. Beta-Naphthol is believed to be less toxic than thymol, and may be given in similar dosage. Manson reports favourably of Filix Mas in combination with Ether. Recently better results than those following thymol have been obtained by Oil of Chenopodium in doses of 6 mins., repeated three times at intervals of 2 hours each, the last being followed in 2 hours by 5 drs. Castor Oil and ½ dr. Chloroform, and this followed again in half an hour by a 1 oz. dose of plain Castor Oil as advocated by Billings and Hickey.

The after-treatment will embrace the administration of Iron, alone, or in combination with Arsenic, to combat the profound anæmia so constantly present.

ANEURISM.

The treatment of this affection is a wide subject, and since surgical methods, when these are admissible, should be undertaken only by experienced operators, their detailed discussion in a work like the present is unnecessary. The most radical and satisfactory surgical procedure which is suitable for nearly all small aneurisms, and in some cases carotid ones, is to make an incision over the sac for its entire length, apply a ligature to the proximal artery, which is then cut across and the sac dissected out, the distal vessel and any branches arising from the sac being securely tied at the same time, and the wound treated on the

recognised antiseptic principles after the complete excision of the pulsating tumour.

A less formidable operation is by ligature: this may be applied to the *proximal* side of the vessel close to the sac (Anel's operation), or at a distance on the proximal side (Hunter's method). Brasdor's plan of only ligaturing the *distal* trunk and Wardrop's practice of applying the ligature to one or more of the distal branches are still sometimes adopted with the view of causing coagulation in the distal end of the artery, which may finally lead to the solidification of the entire contents of the sac. In the plan of Antyllus the vessel is ligatured both above and below the sac in ruptured or bleeding aneurisms. The method of Matas by suturing the artery after opening the sac is a suitable one in arterio-venous tumours. It has the advantage of interfering least with the already established collateral circulation. In regard to the operative treatment of aneurism, two important facts have recently been established: (1) That it is safer, in ligaturing above and below an aneurism, to ligature the vein at the same time; and (2) that it is often possible to do an end-to-end anastomosis of the artery when the vessel is of the same size and the sac small after complete excision.

The introduction of coagulating agents like perchloride of iron directly into the sac has been abandoned owing to the danger of embolism and suppuration. Silver or gold wire, catgut and horsehair have been inserted in coils of considerable length with the same intention, and though not so dangerous as chemical coagulants this practice is not to be lightly undertaken, as already many mishaps have occurred. The method by Galvano-puncture has been pursued in cases of otherwise inoperable aneurisms, but with unpromising results. Two needles, with insulated stems, being inserted into the sac, the current is allowed to flow between their free points till coagulation is started.

Macewen's plan of treating large aneurisms, as those arising at the base of the neck and from the aorta in the chest and abdomen, gives somewhat more hopeful results than the latter-mentioned methods, and is less dangerous. It consists in the introduction deeply into the sac under strictest antiseptic precautions of a needle whose free point is then made to systematically touch and irritate the internal wall on the opposite side at many points so as to cause the deposition of white clot on the slightly inflamed or irritated surface. The needle being withdrawn and inserted into the opposite side of the sac, the operation is repeated till the whole interior has been scratched. Pressure exercised by the fingers placed on the artery above the sac by relays of trained assistants, by tourniquets, padded splints, Esmarch's bandage, &c., has been practically abandoned; it is applicable to aneurisms in the limbs, which can be more safely and satisfactorily treated by other surgical methods under better control, and never shou'd be undertaken except in the surgical wards of well-equipped institutions. It has sometimes been employed in the treatment of aneurisms of the abdominal aorta. Injections of Ergotin into the tissues around the sac with the view of causing condensation of

the aneurismal walls is at best a most unsatisfactory plan and is liable to excite suppuration.

Injections of Gelatin into the subcutaneous tissue in some part of the body independent of the locality of the sac has in some cases effected the cure of large internal aneurisms beyond the reach of direct surgical measures. The rationale of the treatment consists in the power of the drug to increase the coagulability of the blood so as to favour lamination on the inner surface of the sac walls, especially in saccular aneurisms of the thoracic aorta where the current is languid. The only danger of this new method lies in the possibility of tetanus arising from the great difficulty inherent in the efficient sterilisation of gelatin solutions; 5 oz. (2 per cent.) solution may be injected anywhere into the loose areolar tissue every 4 or 6 days, or double this amount of a 1 per cent. solution may be employed. Poggio publishes three successful cases of aortic aneurisms by the intramuscular injections of Sclavo's Iodo-gelatin in combination with mouth administration; 2 c.c. was injected daily for 30 days. One great advantage of these plans is that they may be combined with the following dietetic and rest method:

Tufnell's method, or the combined plan of Tufnell and Bellingham, commonly spoken of as the Medical treatment of aneurisms, first introduced by Valsalva, is often the only means of dealing with inoperable internal cases, though it has been successfully employed also in external cases. The chief element in this treatment consists in absolute rest in bed for a period varying from 3 to 6 months, the patient not being permitted to leave the horizontal position for a moment if possible, though he may be allowed to turn occasionally from side to side with slow determination, the object being, by mild starvation and rest, to so reduce the total amount of blood in his vessels and the force and frequency of the ventricular systole that the sac walls are less distended and the deposition of fibrinous lamination is encouraged on their internal surface. Afterwards, by judiciously feeding, the blood is to be slowly enriched with the view of still further causing deposition of firm fibrin and of producing complete and permanent obliteration of the aneurismal dilatation. In plethoric subjects small quantities of blood were formerly extracted by repeated bleedings. The total allowance of solid food should not exceed 10 oz. daily, consisting of well-cooked meat or fish and biscuit, a similar weight of liquids being permitted. Bellingham's dietary consisted of bread and butter for breakfast 2 oz., meat and bread for dinner 2 oz. each, bread for supper 2 oz., with 2 oz. milk at each meal. Alcoholic stimulants as a rule are prohibited, though light claret was permitted by Tufnell. The writer has found that the greatest practical difficulty in carrying out this method of treatment is the use of the bedpan, especially as the small amount of food ingested tends to constipation, in order to avoid which laxatives or mild salines should be frequently administered, or enemata may be skilfully employed, otherwise the pressure exercised in the expulsion of small masses of firm scybala will vitiate the entire treatment. After a period of 6 or 8 weeks the dietary should be gradually

improved, and in cases of aortic regurgitation or where tertiary syphilitic manifestations have reduced the patient to a state of debility a less sparing dietary must be substituted from the start. The best nursing skill will be necessary in all cases, and a large bed with a firm hair mattress should be selected, so that the patient may be occasionally gently moved from one side of it to the other to minimise the danger of bedsores and discomfort.

An essential in the modern method of carrying out this plan of treatment consists in the administration of full doses of Iodides throughout the period of rest. No real scientific explanation of the action of iodides in aneurism is yet forthcoming, but there is not the shadow of a doubt that they are always highly beneficial. The Iodide of Sodium or Potassium (the former is preferable) should be given in doses of at least 20-30 grs. thrice daily after food. The drug almost invariably relieves the wearying nocturnal pains even of eroding aneurismal tumours, and it is believed to improve the tone of the cardiac muscle without increasing the pulse-rate or raising the general blood-pressure, whilst at the same time there are good reasons for believing that the deposition of firm fibrinous deposit is facilitated. Considering the large proportion of cases in which tertiary syphilis plays such a prominent part, one explanation of its beneficial action may be guessed at, since we know that it causes the absorption of the low-celled formations causing thickening and partial occlusion of the small arteries which are a factor in the general peripheral resistance; it is, however, difficult to conceive that its administration leads to thickening of the walls of the sac, as Drummond and others believe.

As already stated, the Gelatin injections may be used as an adjuvant to Tufnell's treatment, and in suitable cases Macewen's method may also have a trial when the physician thinks it advisable to summon the aid of the skilled surgeon to supplement the medical treatment. In many cases anodynes or hypnotics must be administered to induce sleep, even when pain is entirely relieved by iodides, since in many patients extreme restlessness often is created by the enforced horizontal posture. All unnecessary coughing, which is often a distressing symptom, must be met by Morphia, and not by drenching the patient with expectorant agents. Cyanosis and urgent dyspnœa, when not relievable by Amyl, may be met by venesection; tracheotomy is generally useless. The dangers arising from a too prolonged course of the above starvation and rest cure must not be lost sight of; these were brought home to the writer many years ago in making a post-mortem on a subject in whom the treatment had been successfully carried out to the extent of complete solidification and absolute occlusion of a sacculated aneurism of the arch of the aorta. The debility following the treatment in the apparently otherwise healthy patient ended in the establishment of tuberculosis, which caused death within 6 months of the cure of the aneurism.

In cases where Tufnell's or Bellingham's dietary is obviously insufficient to support life without an intolerable degree of discomfort being induced the physician will do well to try a less sparing regimen which

can be increased or diminished according to the requirements of the case. Sometimes a patient who rebels during the first week may be gradually brought into line by commencing anew with rest in bed and ordinary diet, which is gradually reduced to the minimum upon which his health and comfort can be maintained. It is in such cases that Gelatin and the following agent should have a fair trial.

Chloride of Calcium has been strongly advocated by Wright, with the view of causing coagulation of the blood in the sac, and the writer had once under his care the case of a large abdominal aneurism, in which Sir Almroth had commenced this treatment in the patient. After some few months of rest and the further use of the lime salt he passed from observation with the aneurism apparently completely obliterated.

Abrams of California claims to have discovered a "specific" for aortic aneurisms. This consists in forcibly percussing the seventh cervical spine by means of a special apparatus, or in the absence of such appliance by a pleximeter of wood or ivory, the strokes being continued for 15 minutes daily. The rationale of this treatment lies in the theory that "the subsidiary centre of the vaso-constrictor nerves of the aorta is in the spinal cord in proximity to the spinous process of the seventh cervical vertebra, and by stimulation of the centre by percussion the aorta is made to contract." He states that a cure follows in a few weeks, and he reports three such.

No mention need be made of Lecithin, Nuclein, Strontium, and the Iodide substitutes—Iodipin, Iodival, Iodol, &c.—which have from time to time been advocated as specifics, though the newer iodine compounds may be substituted for the older salts when these latter cannot be tolerated, which is not often.

ANGINA PECTORIS.

During an acute paroxysm treatment must be prompt and decisive to be of use, and as the sudden nature of the attack and its often brief duration prevents the services of the physician being obtained in time, the patient must be instructed how to act as soon as he feels the spasm and pain approaching.

Nitrite of Amyl is the only drug to be relied upon once the paroxysm has occurred. The glass capsules enveloped in cotton-wool surrounded by a covering of silk, and each containing say 5 mins., afford the most convenient form for the administration of the remedy, and should be always carried by the patient in a pocket easily reached in emergencies. By pinching the fragile capsule is readily broken and the highly volatile contents can be inhaled through the nose. If inhalation through the open mouth be attempted the effect is not so rapid, as the indrawn air does not become so highly saturated with the vapour of the drug as when a prolonged sniff is taken. As a rule some relief is marked in a few seconds, even in those cases where the arterial tension is not apparently high. In severe and prolonged attacks a second or third capsule may be used and the effect may be intensified or prolonged by a full dose of alcohol,

which acts also as a powerful vaso-dilator, and at the same time stimulates the over-burdened and weakened left ventricle, or the effect may be prolonged by a hypodermic dose of Morphia combined with Atropine, which is the next best remedy, or Chloroform inhalation for a brief period may be tried, alcohol having been given preferably immediately before. A ½-oz. dose of Spirit of Nitrous Ether in hot water has a powerful and prompt vaso-dilating effect. In those constantly recurring attacks where the patient has warning that the seizure is about to take place Trinitrin in tablet form is better than amyl. One B.P. tablet should be broken up in the mouth and swallowed as soon as the premonitory symptoms are experienced, and by this procedure the threatening attack may often be completely prevented. Mannitol and Tetranitrate of Erythrol, though powerful and prolonged in their action, are too slow in the presence of an impending seizure to be relied upon.

Constable reports a case where all pain was immediately relieved by making the erect patient grasp the rail of his bed with both hands behind his back, bending his body forwards at an angle of 60° with the head thrown well backwards stretching the arm and thoracic muscles.

During the attack all constriction should be removed from the neck and chest; it is a mistake to insist that the patient should assume the horizontal posture; he must be advised to keep his body at rest, but he may safely be permitted to remain in the position which he feels most comfortable. If the attack has come on after a very heavy meal, and especially when ineffectual attempts at vomiting are present, the fauces may be tickled or an emetic of Zinc Sulphate should be given, but apomorphine had better be avoided. After a severe seizure has entirely passed away the patient should be compelled to rest in bed for 1 or 2 days, in order to enable the cardiac muscle to regain its normal tonicity.

In attacks of *pseudo angina* Amyl has often little or no action, but in first seizures, the diagnosis not being established, it should always be employed; its failure, too, is a valuable diagnostic point. A full dose of an active carminative, as ʒj. Tincture of Ginger with the same amount of Sal Volatile diluted, or 5 mins. Oil of Peppermint should be given. Where acute gastric distress is present, a promptly acting emetic is beneficial, and the same treatment is indicated in *Tobacco angina*. Often a large sinapism applied over the heart and pit of the stomach affords speedy relief.

During the intervals between the attacks of true angina pectoris there is great scope for the practical physician's skill in the management of the case. The patient's dietary, habits, temperament, and environment must be carefully investigated.

All excessive brain work must be abandoned, and violent muscular exertion of every kind interdicted. The pressure of life must be reduced to a minimum, as in arterio-sclerosis. Stock Exchange speculations, literary and professional ambitions, business undertakings involving mental worry and prolonged anxiety or strain, must go by the board, and if life is to be prolonged, the arena of politics and controversy must

be deserted, and every source of emotional excitement avoided. This should not mean the condemnation of the patient to an existence of listless inanity and slothfulness; new channels of tranquil usefulness should be opened up and interests awakened in which the current of a well-regulated life may continue to flow as far as possible in placid domestic enjoyment and healthful, altruistic activity when his means permit of such partial retirement from the active battle of life. Regulation will probably be requisite of the hours of rest and exertion, which latter may be freely extended to liberal walking exercises on the level.

The dietetic problem is sometimes a serious one; in many cases it is made a serious one by the inexperience of the physician. When the exciting cause of the attack can be traced to errors in eating improper or in assimilating unobjectionable food, prompt steps must be taken to place the dietary upon a correct basis or to aid the weakened digestion by medicinal agents.

Perhaps the most important point is to insist upon extreme regularity in the hours of eating, next is to arrange that the amount of food ingested should be as evenly spread over the day as possible. For this purpose three meals, with intervals of about 5 hours between each, is a good rule to follow. The practice of a late heavy dinner after a long fast is especially to be avoided.

As a rule farinaceous or carbohydrate food should be permitted only in small amounts, as these tend to the production of flatulent distension of the stomach and bowels, which is unquestionably an exciting cause of the seizures—a factor only second in importance to severe muscular exertion and emotional excitement. Animal food in such moderate quantities as will meet with the requirements of normal nutrition should form the staple basis of the dietary, and it will be advisable that the greater proportion or the whole of this should consist of light soups, white fish and poultry. The Karell diet consists of $1\frac{3}{4}$ pints of milk in the 24 hours whilst resting in bed 7 days.

Well-cooked vegetables and digestible fresh ripe fruits should have a prominent place in the dietary, especially as constipation must be carefully guarded against, the passage of difficult motions containing dry scybala being especially liable to induce disturbances in the general blood-pressure. Tea as an article of diet must be sparingly indulged in; the infusion should be weak and freshly prepared. Cocoa is, however, preferable. China leaf, prepared as Russian Tea, may be safely allowed between luncheon and dinner. Butter and fats are only to be permitted in small amount; pastry, baked meats, stews, and recooked dishes must be strictly forbidden. Alcoholic liquors—beer and wines—are better to be avoided; when the special requirements of the case demand alcohol, a little good whiskey in a small quantity of effervescing water may be permitted at dinner.

The patient should rest after each meal for a short time before undertaking any mental or physical exercise. Tobacco should be given up entirely, but when such a rule seriously interferes with the comfort of a

patient he may be permitted under protest to indulge in an occasional cigarette.

Drug Treatment between the Attacks.—In accordance with his theory of causation, Allbutt's routine in order to protect the heart from inhibitive shock consists in the more or less continuous use of Atropine, a method of treatment difficult to carry out, especially in old patients. The best routine is Iodide of Sodium, and this is true regardless of any suspicion of syphilis being a causal factor. The drug should be administered in courses of at least a month's duration, with a break of 8 days at the end of each before restarting, and such treatment may be safely continued for many months, especially in those cases associated with aortic regurgitation or signs of general arterio-sclerosis.

The iodide treatment may be advantageously combined with the use of vaso-dilators, and the following is a good formula:

℞. *Sodii Iodidi gr.* clxxx.
Spirit. Ammon. Aromat. ℥j.
Liquor. Nitroglycerini min. xx.
Aquæ Chloroformi ad ℥viij. *Misce.*

Capiat ℥ss. *ter in die post cibos ex aqua.*

A half-dose of the above mixture taken at 3-hourly intervals will produce better results than a full dose every 6 hours.

Many authorities condemn dosing with nitrites unless during the attack, probably because they are ignorant of the harmlessness of nitrites. Trinitrin can be taken in enormous amounts and for long periods without injury.

Arsenic is of value in the type of case where there is evidence of a distinct neuralgic basis for the pain, and it may be safely combined with the other ingredients in the above mixture to the extent of 3 or 4 mins. Fowler's Solution in each dose, but it should not be given for as long periods as the iodides.

Where the attacks are frequent, and especially where the patient is constantly conscious of some premonition of a seizure, the writer's plan of keeping the high tension in check by the administration of small and oft-repeated doses of Nitroglycerin is most beneficial. This may be carried out by dividing each B.P. tablet into 6 or 8 fragments, and carrying them in the vest pocket, one being slipped into the mouth every half-hour, so that the full daily dose be so divided as to produce no symptoms of flushing of the face, throbbing of the vessels, or headache. By this method of using the drug attacks may often be entirely prevented for long periods, especially if a larger dose be given at bed hour, with a full dose of alcohol after lying down for the night.

Cardiac Tonics are often indicated, as symptoms of failing compensation may be present, but Digitalis should be avoided as a rule. It is a mistake to count upon the combination of a vaso-dilator with the digitalis as

sufficient to counteract the peripheral resistance, since the action of the former is rapid and comparatively evanescent, whilst the digitalis is slow and continuous in its effect. Strophanthus is therefore preferable as a routine in such cases, and it may be combined with Strychnine and Trinitrin, as in the following:

℞. *Tinct. Strophanthi* *min.* xlviij.
Tinct. Nucis Vom. ʒiij.
Liquor. Trinitrini *min.* xvj.
Aquæ Camphoræ *ad* ʒviij. *Misce.*

Fiat mistura. *Cpt.* ʒss. *quater in die ex paululo aquæ.*

During the day the above dose would fall due about every 4 hours, and when the patient is confined to the house it is a good rule to encourage him to pour out his dose into the medicine measure and take the half of it every 2 hours, by which plan a more continuous action of the vasodilator is procured and headache is avoided. Theobromine or its salts are of value even when there is no diminution in the amount of urine passed. Mercury in the form of Blue Pill or short courses of not longer than a week of a daily ½-gr. dose of Calomel are decidedly beneficial.

Sanatogen as an adjuvant to the diet may be advantageously employed where Phosphorus is indicated, as in many cases arising from prolonged brain exhaustion.

High-frequency currents have been employed with advantage when arterio-sclerosis has been a prominent feature, but their use should be left in the hands of the electric specialist. Baths of Sun Light, Arc Light and CO_2 have been advocated, as also graduated gymnastic exercises and hydrotherapy.

ANKYLOSTOMIASIS—see Anchylostomiasis.

ANOREXIA NERVOSA.

This neurosis of the stomach must be treated by remedies indicated by the general neurotic condition—hysteria and neurasthenia—of which the complete loss of appetite is but a local symptom. Little benefit is to be expected from the administration of gastric tonics, but as a routine the treatment may commence with a vegetable bitter (not strychnine or nux vomica), combined with Dilute HCl and Glycerin of Pepsin. Where the affection has already caused emaciation to any great extent, rigid isolation in a well-officered nursing-home and Weir Mitchell treatment may be urgently demanded. In the early stages the passage of the soft rubber tube and slight irrigation of the stomach, followed by the introduction of a liquid meal, has a powerful moral effect, which compels some patients to swallow food through the dread of the repetition of the operation of forced feeding. This plan may be combined with the administration of nutrient enemata.

ANOSMIA.

The removal of chronic inflammatory thickening of the mucous membrane of the middle turbinated bone or of polypi may effect a speedy cure of the lost sensation of smell. In organic brain lesions, such as syphilitic gummata within the cranium, the sensation of smell may sometimes be found to return after the administration of large doses of Iodides given continuously for long periods. Anosmia, occurring in hysterical patients, may yield suddenly to the local application of the induced current, as in functional aphonia.

Most instances of the affection met by the physician will be found to follow influenza and shell-shock. The majority of these will get well without treatment, but Strychnine affords a reliable means of hastening the natural cure, or effecting restoration of the lost sense when nature fails. The drug may be administered by the mouth in combination with small doses of Antipyrine, which seems to neutralise the influenzal toxins, but better results are obtainable by hypodermic dosage. The writer finds that a hypodermic tablet of strychnine ($\frac{1}{25}$ gr.) placed beneath the tip of the tongue twice a day meets all requirements.

ANTHRAX—see **Malignant Pustule.**

ANUS, Abscess of.

The site of the suppuration is one of the cutaneous creases, or folds, close to the anal margin and originating in an inflamed sebaceous gland. Incision under cocaine followed by Boric Acid fomentations or antiseptic poultices is all that is necessary, along with a few days' absolute rest. For the treatment of acute ischio-rectal abscess a free and deep crucial incision should be made under general or local anæsthesia, and the sooner this is done the better in order to avoid the abscess bursting into the rectum and the permanent establishment of a fistula. The contents of such abscesses are always most fetid, owing to the presence of the colon bacillus. In some an injury or an actual perforation of the bowel by fish-bones or small foreign bodies has originated the infection, hence the necessity of a deep and free incision, through which the finger should be inserted to aid the removal of sloughs or shreds of gangrenous tissue, after which the cavity should be packed with Iodoform gauze frequently renewed, in order to insure healing from the bottom. Where a fistulous opening is found to exist between the bowel and the abscess sac, the external sphincter must be divided at the same time.

Chronic ischio-rectal abscess as a rule is of tuberculous origin, and in addition to the free incision curetting of the sac will be necessary, after which the treatment described under Abscess is to be carried out, injections of Bismuth Paste being repeatedly used to facilitate the closing of the fistulous tracts which are so liable to remain.

ANUS, Fissure of.

If the ulcer or fissure is deep and of long standing, the surgeon, under local anæsthesia, should proceed at once, after the bowels have been

cleared out, to make an incision across its entire length and deep enough to divide about one-third of the fibres of the external sphincter. The small sentinel pile, which is nearly always present at its distal end, should be removed at the same time. Ball finds that removal of the latter alone is sufficient to induce healing in the ulcer. The after-treatment consists in keeping the lips of the incision apart with a strand of gauze inserted daily so as to procure healing from the bottom. Some surgeons treat the affection by forcible dilatation of the sphincter under Chloroform. Touching of the ulcer with the thermo- or galvano-cautery is often quite sufficient to effect rapid healing, and Donner finds that a few insertions of one electrode within the sphincter and the other placed over the fissure while a mild continuous current is turned on act equally satisfactorily. In more recent cases the application of a mild caustic like strong Carbolic Acid suffices and causes little pain if cocaine be previously used. If by any means the reflex spasm of the sphincter can be controlled, the fissure heals spontaneously, and by regulating the bowels this may be sometimes easily accomplished. Purgatives are injurious, and their action usually causes as much pain in defecation as if constipation were present; the physician should administer a laxative like Olive Oil, Sulphur, or Tamar Indien, which will produce a copious *softened* motion, often voided without pain. The distress and pruritus accompanying the affection cannot satisfactorily be relieved with cocaine or morphia, and the writer finds nothing so successful as the old B.P. Ungt. Conii made of double strength combined with Ichthyol. This must be inserted well within the sphincter. He believes that the conium paralyses the ends of the motor nerves distributed to the fine muscular layer under the surface of the mucous membrane, and prevents the reflex twitching which keeps up the incessant pain and uneasiness after the patient retires to rest, and after the act of defecation. The conium ointment alone, or with ichthyol, can be made into a suppository and used with advantage. If eczema is also present, Tar can be added to the ointment, and where an astringent is required to arrest bleeding, Cripps adds 10 grs. Persulphate of Iron to each ounce.

ANUS, Fistula of.

In *blind external* fistula, an attempt may be made to induce healing before resorting to incision by applying a strong solution of Zinc Chloride on a probe coated with a thin layer of wool, or strong Carbolic Acid may be used in the same manner. Beck's warm Bismuth Paste may be injected. The writer has seen healing occur after repeated injections of undiluted Tinct. Benzoin. Co. When these fail, as they usually do, a free T-shaped incision may be made, and sometimes this is all that is necessary, though usually the sphincter will require division at the same time, and the thorough scraping of the tract, which must be exposed and dissected bit by bit in search of a hidden internal opening.

In *complete* fistula a probe-pointed director is inserted into the skin orifice, and gently made to enter the bowel through its internal opening. The point is then hooked down by the finger in the rectum, and brought

through the anus. The next step is to pass a curved bistoury along the groove, and divide at one stroke the intervening tissue—mucous membrane, sphincter and skin. The *cul-de-sac* above its internal opening is next divided from the internal surface, after which the entire fistulous tract should be dissected out; and where this is not possible it must be thoroughly scraped, so as to completely destroy its internal lining. The incised surfaces should be minutely examined for evidences of secondary tracts or tunnels, and these must be excised or scraped, but the sphincter is only to be divided by the one clean incision across the direction of its fibres. The wound is finally packed firmly with Iodoform or Sublimate gauze, over which a pad of absorbent tissue is bound by means of a T bandage. At each daily dressing the fresh gauze should be inserted to the very bottom of the wound, so as to encourage granulation from below, and prevent union of the lips of the wound near the surface. It will be evident that upon this careful after-treatment, which often falls to the patient's ordinary medical attendant, depends the prevention of relapses or return of the fistula. The bowel should be empty at the time of operation, and a motion by the use of Castor Oil or enemata should be effected upon the second day, and all through the rest in bed, in order to avoid hard scybala.

Blind internal fistula is treated in practically the same way as complete fistula. The inner opening being detected by the finger just inside the sphincter, a probe-pointed director is passed into it, and the point made to bulge or project through the attenuated cutaneous roof of the tunnel, after which all the tissues between the skin and the director are to be divided by a curved bistoury as just described, and the fistulous tract excised or scraped before the wound is packed with Iodoform gauze.

Where any of the varieties of fistula are found in patients far advanced in debility by phthisis, diabetes, or hepatic cirrhosis, the use of the knife must be avoided, save to incise the boggy skin over the roof of a blind internal fistula; the best method of treatment will then lie in injecting Beck's Bismuth Paste (liquefied by heat) through a fine-nozzled syringe daily into the fistulous tract.

ANUS, Imperforate.

A free crucial incision is sufficient to relieve the condition where only a thin membrane bulging forwards shows that there is no deficiency or arrest of development in the rectum. In the absence of any sign of an anus a free deep incision should be made in the middle line, and the tissues dissected up for an inch or more in the direction of the sacrum, till the distended bowel is reached, when this may be opened freely, and dilated daily by the passage of the finger or a large bougie. It is usually unnecessary to attempt to pull down the bowel and suture it to the margins of the skin wound as was formerly done.

Where the dissection fails to reach the lower end of the rectum, Mayo Robson advises opening the peritoneum from below in order to find the lower end of the bowel, which is then seized, brought down and fastened

to the margins of the skin wound. Failing this, the only alternative is to open the colon by Littre's method in the left groin, and this is the only method of procedure when the bowel opens into the bladder. Where the bowel communicates with the urethra or vagina, a careful dissection from the perineum may remedy the condition, and after a time the vaginal opening may require suturing.

ANUS, Prolapse of.

This is usually easily reduced when the protrusion is of recent origin by smearing the mass with vaseline and making firm pressure by the fingers so as to gently push it back within the grasp of the internal sphincter. If reduction does not speedily follow, owing to the struggling of the patient (who is generally a child), he may be placed in the lap of a nurse, with his head depressed as thoroughly as possible, when the greased right forefinger is inserted into the lumen of the bowel as if making a high rectal examination, when the prolapse will usually be easily reduced. Cripps after oiling the finger wraps a layer or two of dry lint round it before inserting it into the bowel. After reduction the finger is slipped through the lint, which is left behind as a support to the relaxed walls.

A conical piece of Ice enveloped by Iodoform Gauze may be introduced instead of the forefinger into the opening, when gentle pressure causes the protruded mass to pass above the internal sphincter carrying the gauze and ice along with it, where they are then left *in situ*, the operation being repeated after each evacuation of the bowel contents.

In long-standing prolapses the blood must be gently and patiently expelled by the pressure of the fingers, after which the forefinger inserted into the opening and pressure applied by the adjoining portion of the metacarpal prominence will effect reduction after some minutes. A firm pad of dry lint kept in its place over the anus by broad strips of adhesive plaster, securing the nates firmly together, or a Γ bandage, should then be applied till next defecation.

Brodie's plan was to wash out the rectum with warm water whilst the patient was lying upon his side, after which a small enema of cold water was left in the bowel. This treatment is better suited to adults than children.

The cause of the prolapse should be sought for after reduction; thread-worms, polypi, a long or adherent prepuce, hæmorrhoids, urethral stricture, vesical calculus and prostatic troubles will demand relief. Emaciation is a common cause, and, as insisted upon by Cripps, permanent cure may be expected when the absorbed fatty tissue is replaced in the pads in the ischio-rectal fossæ. Constipation must be remedied by laxatives, purgatives often aggravating the condition. Irreducible prolapses, when small in extent, may be treated like a ring of hæmorrhoidal growths by removal, but in larger masses excision must be very carefully performed in order to avoid injury to the peritoneum, and sometimes it may be necessary to allow the irreducible mass to slough.

Astringents may be applied locally to the relaxed mucous membrane

with the view of permanently increasing its tone and preventing future prolapses. Tannin, solutions of Alum, Nitrate of Silver, Perchloride of Iron, and astringent decoctions such as those of Krameria, Logwood, Oak Bark, &c., may be used, or these drugs may be administered in suppository or ointment form. Occasionally the Continuous Current has produced good effects, and Ice is often useful.

Vidal has reported successes by injecting 1-3 grs. Ergotin in solution into the prolapsed mass, even when the rectum was involved in the prolapse.

If the above measures fail to prevent recurrences, the prolapsed surface may be painted over with strong solution of Nitrate of Silver, or, if small in extent, Nitric Acid may be brushed on it at several spots. Passing lightly the actual or thermo-cautery over the surface of small anal prolapses and at the same time causing it to destroy completely any pendulous folds of skin existing about the anus often effects a complete cure.

Cripps in chronic intractable cases puts the patient into the lithotomy position, and with the actual cautery sears the mucous membrane by drawing it in the direction of the axis of the gut, forming four lines, each ¼ inch in breadth, commencing at the highest portion of the prolapse and running down to the anal margin, one line being on the anterior surface, one behind and one on each side. The prolapsed mass is then reduced and the rectum packed with iodoform gauze, leaving a tube of rubber in the centre of the packing in order to relieve flatus. The rationale of the treatment is the production of such a degree of inflammation as will fuse together the mucous and muscular coats of the rectum so as to prevent slipping or invagination.

It will be necessary to remove one or more flaps of mucous membrane and bring the edges of the gaps together in order to diminish the calibre of the bowel where a considerable amount of rectum is included in the prolapse. This operation is sometimes attended by alarming hæmorrhage, and some surgeons prefer to make a complete circular resection of the prolapsed portion of the rectum.

Curling's plan of narrowing the anal aperture by powerful caustics is less satisfactory than Kelsey's ingenious method of carrying a curved threaded needle round the lower end of the bowel, through the submucous tissue, and tying a catgut ligature over the finger-tip inserted in the anus. Formalin catgut persists 2-3 weeks, and by this time the tendency to prolapse will have disappeared by general treatment.

McLeod performs *recto-* or *procto-pexy* through an abdominal incision to permit the rectum being drawn up and fastened permanently to the inner aspect of the abdominal wall, and Peters advises that the sutures should be so inserted as to cause narrowing of the lumen of the gut in order to prevent the colon descending into the rectum.

In complete rectal prolapse the aim of surgical treatment should be to obliterate Douglas's pouch, and the operation of colopexy should be combined with it; a subsequent perineorrhaphy should be performed if permanent cure is to be effected.

ANUS, Pruritus of.

The removal of the cause usually effects a speedy cure when this troublesome affection arises from the irritation of anal fissure, fistula, piles, polypi, condylomata or threadworms. Where much eczema is present, the treatment of this disease should be closely attended to, and Tarry compounds are indicated in combination with remedies used to allay the incessant itching.

The pruritus may be the local manifestation of a general neurosis. Such patients often suffer from insomnia, and the slightest scratching of the skin about the anus is sufficient to bring on a severe nocturnal attack of pruritus. The general neurotic condition, often the result of prolonged mental strain, anxiety, or grief, demands constitutional treatment, as change of scene, brain rest, tonics—like sea-bathing—Phosphorus, Zinc, Arsenic, Quinine and Iron. Valerianates and Antipyrine in small doses, by lessening the irritability of the peripheral sensory nerves, are of great value.

The Ungt. Conii, which may be made of double the old B.P. strength, is the best local application. It should be inserted with the finger after defecation and upon retiring to rest. The proprietary ointment known as Resinol is also valuable, and it may be used mixed with an equal weight of the hemlock compound, or the latter may be made into a suppository alone or with Ichthyol. Cocaine, Morphia, Belladonna and Menthol relieve the itching for a time, but often cause in the long run aggravation of the symptoms by inducing a hypersensitive condition of the sensory terminals.

An application containing 30 mins. Creosote or Carbolic Acid and 30 grs. Camphor in 1 oz. Lard is often useful, but Ungt. Conii will make a better basis than the lard. Where greasy compounds fail, the part, after a small cold-water enema and free ablution with cold or tepid water, may be freely dusted over with Bismuth Carbonate, Fuller's Earth, Zinc Oxide, or Calamina, and this form of treatment is valuable in women, where the anal pruritus is sometimes caused by a small quantity of vaginal discharge trickling over the anal region, even when there may be no prominent vulvar irritation complained of. Lotions are seldom efficacious; the parts may, however, be advantageously sponged over with Borax or Boric Acid solution, which effectually removes the remnants of the greasy applications before renewing them again. Solution of Chloral Hydrate, 1 dr. to 5 oz. water, may be tried. Sometimes the introduction of a pledget of lint soaked in Liq. Calc. Chlorinatæ within the anus affords relief till the patient falls asleep.

In long-established cases no relief need be expected until the patient has been taught to avoid scratching the anal region, and it is a practical point of great value in the treatment to inform him that he may relieve the itching of the anus by *vigorously scratching the skin over the buttocks*, and this will not do any harm.

Banks's plan of searing the anal margin by the thermo-cautery often affords relief, but the writer has seen it produce afterwards an intolerable

aggravation of the condition owing to the formation of scar tissue and thickening of the skin in the anal folds.

In intractable cases defying all local applications Ball's method of dissecting up a flap of skin on each side of the anus, after which all the underlying cutaneous nerves are to be severed, should be resorted to.

APHASIA.

This speech difficulty need receive no attention till the treatment of the cerebral lesion causing it has demonstrated that the hæmorrhage, embolism, or thrombosis is no longer active or has ceased to extend. In functional cases, as in hysteria and post-epileptic aphasia, treatment is seldom necessary, the speech centres soon regaining their power spontaneously. It is different where permanent damage has occurred, and the hope of articulation being restored must lie in efforts being made to call into action the dormant speech centres in the sound cerebral hemisphere (usually the right one); but if the commissural fibres are destroyed there is little or no result to be expected.

In *motor* aphasia, where the patient remains perfectly conscious of all that is said to him, but is only able to reply in meaningless, short ejaculations, he should be educated to write with his left hand by copying printed or written sentences when the power of writing remains with him. The simplest speech movements are to be taught patiently several times a day, beginning, as in the case of a child, with the spelling and articulation of letters and short monosyllables, his oral education being supplemented by exercises in writing and reading short sentences. (In left-handed patients the right speech centres are in daily operation, and these, of course, escape when the damage is confined to the left side of the brain.) In young subjects by persistent education of the right speech centres articulation may be entirely restored, and even in older patients the same result is sometimes witnessed when the callosal fibres have completely escaped in the primary lesion, and industrious perseverance in copying and speech exercises has been conscientiously carried out and the use of his left hand encouraged in every way possible.

In *sensory* aphasia from cortical lesions the difficulty of treatment is greater. If this be of the *auditory* type the patient is word-deaf and unable to write from dictation; though he hears the sounds of the words spoken to him they appear as in a foreign tongue, and as his power of articulation may be good he uses the wrong words, unconscious of his mistakes. The only method of treatment in this condition consists in repeated exercises of pronouncing words which are written or printed when the eye of the patient is kept fastened upon the word; afterwards the object represented by the word may be shown to him, as a cat, dog, pin, &c., and he should be encouraged to repeat its name frequently.

In subcortical or pure word-deafness the auditory speech centre remains intact, internal speech is unimpaired, and the patient can express himself perfectly in writing or vocally, and though he is unable to understand or repeat spoken language he can read aloud perfectly.

When sensory aphasia is of the *visual* type (alexia), the patient is capable of spontaneous speech, and comprehends spoken words, but he fails to understand written and printed language, and he cannot write or copy intelligently, though his central vision is perfect, and he cannot read aloud. In this condition the only treatment is such as is employed in education of the blind, supplemented by training the patient to write with his eyes closed, or to write in the air with his index-finger, and to trace over each letter with a pencil or by means of his finger, by which latter method he is only able to understand or read his own writing.

The *mutism* which follows shell-shock yields usually to time, encouragement and in severe cases to hypnotic suggestion. When the inhibition has been more profound the patient may have lost the meaning of words which he hears or sees in writing or print. The treatment in these severe cases must be carried out on the lines indicated above.

APHONIA.

This comes under the eye of the physician commonly as a manifestation of hysteria, and its cure is rapid and satisfactory. A *strong induced* current is the remedy for this affection. One wire of the battery is attached to a flat electrode, which is made to rest upon the outer surface of the larynx, whilst the other wire is attached to a laryngeal electrode mounted on a handle, containing a small contact-breaker. This electrode is inserted into the space between the cords, and the current turned on by pressing the button in the handle so as to produce a painful and a severe shock. At the same moment the patient should be commanded to pronounce some word, which she frequently accomplishes in a loud cry. Occasionally the application of the shock must be repeated. The continuous current is useless, and so also is a *weak* induced current. Sometimes the passing of a smart induced or interrupted current across the larynx, by applying a pole to each side of the external surface of the larynx, is enough to restore voice. Often all that is necessary is to introduce a laryngeal mirror into the pharynx, and firmly command the patient to utter a particular word, the "suggestion" being sufficient to arouse the dormant will-power, but relapses are more likely to follow this plan of treatment.

The treatment of hysterical aphonia by intoxicating doses of Alcohol is a most objectionable and unjustifiable proceeding. Atropine and Belladonna, pushed to the extent of producing their physiological actions, have been employed, but Electricity fulfils every indication. Strong solution of Nitrate of Silver, 1 dr. to 1 oz., has been applied with a brush to the larynx with rapid improvement. Hunt recommends the training and systematic exercise of the vocal cords by singing the vowels and numerals. Crouch states that in relapsing and very chronic cases of aphonia, isolation of the patient should be insisted upon, after which exercises in singing the musical scale should be practised, commencing with some high note, which may be elicited by making her attempt to phonate. Afterwards the intonation of words and of poetry, and finally

the reading aloud of prose and frequent use of the voice in singing, are to be daily practised. The aphonia following shell-shock yields to time after removal from the scene of war. The aphonia resulting from laryngeal lesions can only be met by appropriate local measures.

APOPLEXY.

Restricting the term to the more or less sudden loss of consciousness and motor power arising from a vascular lesion inside the cranium, due either to the rupture of an artery in the cerebral tissue, with the extravasated blood ploughing up the brain substance, or to the lodgment of an embolus from the heart, or to thrombotic occlusion occurring in a diseased cerebral vessel, the treatment of these three conditions in theory is widely different; nevertheless, owing to the difficulty of diagnosis, which is in many instances insuperable, the physician will be wise in the absence of differentiating factors to regard all cases as due to cerebral hæmorrhage.

It may be safely said that there are few conditions in whose presence the physician feels so powerless, but there are also few in which so much harm can be done by active meddling and unwise attempts at heroic treatment. The first duty of the attendant is to insure absolute rest regardless of the wishes of the patient's friends, who are often anxious to have him removed from the place in which the seizure has taken place. He should be placed upon his back on a sofa, or on a bed extemporised in the room in which he has fallen by laying a mattress upon the floor. His head and shoulders should be elevated slightly, all constrictions about the neck being removed. If there be any urgent necessity for the removal of his clothing this should be effected in the most gentle and cautious manner by cutting up the seams and removing the garments piecemeal, whilst a reliable assistant takes charge of the head to prevent its being shaken. The next step is to turn his face to one side in order to prevent the tongue falling directly backwards, and to permit of the saliva dribbling from the angle of the mouth.

Attempts should not be made to arouse consciousness by shouting into the ear, shaking the body, or flapping with towels or other methods of stimulation, and certainly nothing should be administered by the mouth of the nature of food or stimulating drinks. Rubber bottles, filled partially with warm water, should be placed at his feet and along each side of the trunk. In their absence warm blankets may be used, but friction or massage of the cold limbs had better be avoided. Ice, when available, should be applied to the head, or an evaporating lotion to the forehead and temples. Counter-irritants, used with the view of determining a flow of blood to the surface of the body, are as a rule to be avoided. The best of these agents would be a sinapism applied to the nape of the neck, but, especially in heavy and muscular subjects, this can scarcely be carried out without shaking the cranium. The dangers of subsequent aspiration pneumonia should be minimised by maintaining an aseptic condition of the mouth, any dental plates being removed, and the tongue and lips smeared with Glycerin of Borax.

Nothing should be done to combat any symptoms of shock or collapse beyond the above palliative measures. To administer hypodermically or by rectum powerful cardiac stimulants will only cause the heart to beat more vigorously and pump more blood into the ruptured cerebral tissue; hence even the use of irritating smelling-salts may be injurious through their power of increasing the general blood-pressure.

The question of blood-letting should be considered if the profound coma remains, with a high tension pulse, vigorously acting heart and signs of asphyxia. Before this is finally settled, a brief trial may be made of compression of the carotid trunk in the neck with the view of arresting the circulation in the branches of the middle cerebral. If carefully and skilfully carried out this procedure can do no harm. Ligature of the vessel has been recommended by Horsley and others. The antique practice of opening the temporal artery is now universally condemned, but unquestionably speedy and sometimes permanent benefit follows the opening of a vein in the arm when asphyxia is increasing and threatening life. Of late years a bolder surgical measure has been advocated, and found acceptance in some quarters. This consists in trephining a large opening in the skull and evacuating the area of hæmorrhage; but as pointed out by Russell and Sargeant, this is only admissible when the case is going on from bad to worse, and when in the coma it can be confidently ascertained that the paralysis of motion is hemiplegic.

Before, however, considering such a serious step, the physician should resort to the use of other agents possessing the power of reducing the general blood-pressure after venesection has been tried. These are vaso-dilators and purgatives. Nitrite of Amyl is practically the only drug available of the former class, as it can be so readily administered by inhalation, and it is innocuous unless asphyxia be already urgently threatening life. It is therefore worth a trial when the pulse is bounding and the tension high. Owing to its evanescent action, the effects must be kept up for some time before its trial is abandoned. Owing to the slow action of purgatives in the apoplectic state, even of Croton Oil—the only available cathartic—this drug should be administered without delay.

Whilst it is true that remedies which reduce the general blood-pressure are injurious in thrombotic cases, and should not be used when the clinical symptoms or the history of former attacks of syphilitic thrombosis clearly indicate this condition, it is to be remembered that the diagnosis is often almost impossible, and of all the agents used to reduce blood-pressure purgation is the least objectionable or dangerous. Hence under the conditions now being considered, it may be used as a routine with comparative safety. No good usually can be expected by enemata, and much harm may be done by the necessary changes produced by the moving about and turning of the patient's body during their administration. An enema is, however, clearly indicated if the rectum is impacted with scybalæ, which prevent the action of croton oil. One or two drops of croton oil, with 5 grs. of calomel mixed with a little butter or a few grains of moistened sugar, should be placed far back upon the tongue, and often

this dose will require repetition. The necessity of relieving the bladder should not be lost sight of.

Should the patient survive the comatose stage, the period of returning to consciousness demands close attention. This is often accompanied by febrile reaction, which necessitates the removal of all external aids to the keeping up of the body heat, as it clearly also is indicative of the continuous use of the ice-cap and the enjoinment of absolute rest of both body and mind. Nothing is more reprehensible at this stage than the attempts to test the patient's consciousness by tempting him to recognise his friends and answer questions and otherwise rousing him. As soon as swallowing power has returned, a few teaspoonfuls of milk may be cautiously administered from time to time, and it is a wise precaution taught by the experience gained from surgical head injuries to withhold all animal foods, even in the form of soup, for a long period after convalescence. The rest during convalescence should be prolonged and thorough.

The after-treatment of cerebral hæmorrhage is identical in most cases with that of the hemiplegic condition usually remaining, and will be dealt with under its own heading. The primary condition causing the hæmorrhage, as Bright's Disease, arterio-sclerosis, &c., will of course require attention in all cases.

It only remains to mention the treatment of an apoplectic seizure, where the history or symptoms indicate thrombosis or embolism as the cause of the loss of consciousness.

In *thrombosis*, after the patient has been put to bed with his head and shoulders but slightly if at all raised and heat applied to his surface, the immediate indication is to check the coagulable power of the blood. Owing to the urgency of the symptoms drugs for this purpose are too slow in their action to be relied upon, though the writer once injected Ammonia into the carotid artery with the hypodermic needle, a procedure followed by most striking relief for a time to all the symptoms. In relapsing cases where time permits the blood may be decalcified by the administration of Citric Acid or its potash salt.

As the extension of the thrombotic change is favoured by everything that tends to render the circulation languid stimulants are indicated. The best of these is Ammonia, for as already mentioned it diminishes the coagulability of the blood, and at the same time quickens and strengthens the heart's contractions. 30 mins. of the diluted liquor may be mixed with 10 oz. normal saline and injected into a vein or hypodermically, and the strong liquor may be held near to the nostril. Guthrie emphasises the view of Mott that the deep coma in thrombosis is due to the pressure of venous congestion consequent upon arterial blockage; hence the necessity of relieving the asphyxia by moderate venesection, leeching, or dry-cupping, and purgation in the later stages, as in cases of cerebral hæmorrhage. In syphilitic cases where warnings of the threatening attacks are not rarely seen the proper after-treatment will consist of full doses of the Iodides, always combined with large doses of Ammonia, whilst Mercurial Inunctions should be commenced without

delay. Sometimes in cases of cerebral hæmorrhage, especially where there are reasons for believing that small foci of softening have previously existed, these warnings, if promptly met by absolute rest and remedies capable of reducing the blood-pressure, may save the patient from a severe and fatal apoplectic seizure.

Embolism causing apoplexy must originate in the detachment of a fibrinous mass from the endocardium, or pulmonary veins, or from a vessel between the heart and the cranium. The immediate effect is the shutting off of blood from an area in the brain, and the tendency to further coagulation of the blood around the fibrinous focus brings the treatment of the case practically into the same category as that of thrombosis, and Ammonia in normal saline solution, hypodermically or by the rectum, affords the best prospect of success, followed up by full doses of Citric Acid should the patient survive the initial shock and pressure symptoms.

The plug being of a septic nature in the embolism following ulcerative endocarditis, thrombosis is certain to follow, and a fatal issue is always to be expected from subsequent cerebral abscess. In the sinus thrombosis which is often secondary to disease of the middle ear or mastoid cells, and which sometimes demonstrates its presence by the gradual onset of apoplectic symptoms, the treatment should consist of the prompt removal of the original septic focus in the temporal bone by the active surgical measures detailed under Ear Disease. The intense headache following all the forms of cerebral apoplexy after consciousness has been restored is best relieved by large doses of Bromides combined with moderate amounts of Antipyrine, and some practitioners still believe that the absorption of the clot in the cerebral tissue may be hastened by the continuous administration of Iodides.

APPENDICITIS, Acute Form.

The writer regards it as now definitely established that under this title are included two distinct entities: (1) Acute Inflammation of the Appendix, and (2) Acute Appendicular Obstruction, the latter being the more serious, not only on account of the insidious character of the early symptoms, but also and chiefly on account of the more disastrous, often fatal, sequelæ which ensue.

(1) *Acute Appendicitis*, primarily and essentially an inflammation of the appendix spreading to the peritoneal coating, is characterised by a continuous pain beginning in the right iliac fossa, tenderness and rigidity. Vomiting is not a common symptom of this form. The temperature and pulse are elevated. This is a rare form of the disease, so much so, that when the patient in the early stages refers the pain to the iliac region, the observer always thinks of other causes of the illness, such as pyelitis, ovaritis, salpingitis, etc.

(2) *Acute Appendicular Obstruction.*—This form includes about 95 per cent. of the acute diseases of the appendix. Here the initial pain is referred to the gastric or umbilical region, or even to the left side of the abdomen, is of a colicky character, and is soon followed by vomiting.

At this stage there is no elevation in the temperature, and the pulse will not be markedly increased in frequency. These symptoms are due to obstruction of the lumen of the appendix, usually by a coprolith or stricture. It is difficult during this stage to identify the disease as due to the appendix, but once the diagnosis has been made no time should be lost in getting appendicectomy performed.

With the diagnosis settled, the patient should be placed in the Fowler position, any food or medicine which will provoke intestinal peristalsis denied, and a small dose of morphia (gr. $\frac{1}{4}$) with atropia (gr. $\frac{1}{150}$) administered hypodermically. If this does not control the pain, hot fomentations may be applied to the abdomen. Previous to operation a small soap and water enema may be given, but all aperients must be withheld.

By this means an appendix not yet perforated may remain *in statu quo* until removed by operation, and the results in such cases leave little to be desired in the matter of prognosis, the results being almost uniformly good and the period of incapacity short.

An obstructed appendix left to itself usually proceeds to gangrene. This is recognised by some rise of temperature (99°-100° F.), increasing frequency of pulse, diminution in pain, but increase in tenderness and rigidity of the right side of the abdomen. Perforation of a gangrenous appendix, a later stage still, is marked by a rising pulse and temporary fall in the temperature and recurrence of pain in the right iliac fossa. Here again the line of treatment already laid down is indicated—viz., rest in Fowler position, denial of food or aperient medicine, and the administration of a small dose of morphia with atropia—these preparatory to operation, which should be carried out without delay and with the least disturbance of the patient. There should always be kept in mind the risk of rupturing a thin-walled gangrenous appendix, and the conversion of a localised disease of the appendix into a suppurative peritonitis.

A wholly different problem confronts the surgeon when he is first called to see a patient who has already passed the acute stage of an attack. Some surgeons hold the opinion that even then it is good practice to perform the operation at once; others, however, believe that the operative risk will be lessened by delaying for a time and doing what is called an " interval operation " after all inflammatory symptoms have disappeared.

For removal of a diseased appendix two incisions only are now much used: (1) The gridiron incision running in the direction of the fibres of the external oblique muscle about two fingers' breadths above Poupart's ligament, one half of the incision lying above the line joining the umbilicus with the anterior superior iliac spine, and the other half below it. The external oblique, the internal oblique, and the transversalis muscles are incised in the direction of their fibres; the transversalis fascia and the peritoneum are divided transversely. (2) The incision through the right rectus muscle in the line of its fibres. Both these incisions can be firmly sewn up afterwards, and show little tendency to hernia unless it be found necessary to drain the abdomen. Having opened the peritoneal cavity,

the cæcum is sought for and hooked up on the index-finger. If necessary the appendix is found by tracing downwards the longitudinal muscle bands of the cæcum. If pus be suspected it is necessary before disturbing the appendix region to pack off the abdominal cavity with three gauze sponges rung out of normal saline solution—one of these passes up towards the right kidney, one passes inwards towards the general abdominal cavity, and one passes downwards into the pelvis. Having isolated the appendix, its mesentery is ligatured off in segments; a purse-string suture surrounds the base of the appendix; the base is crushed with a crushing forceps or a strong artery forceps; the crushed portion is ligatured with catgut and the distal portion removed. The ligatured and crushed stump is then disinfected with Tr. Iodi and invaginated within the purse-string suture and the latter tied. Two or three Lembert sutures are inserted to cover the purse-string suture, and the parts returned within the abdomen. The layers of the abdominal wall are sutured with catgut, so as to restore the parts to their normal positions, and finally the skin is closed with interrupted sutures of silkworm gut.

In the absence of complications cases of appendicitis are allowed out of bed about the tenth day, and leave hospital about the fourteenth or fifteenth day after operation.

When suppuration (practically always due to rupture of the appendix) has already occurred, the treatment will depend on other factors: (1) Is the suppuration localised? (2) Or is there a diffuse suppurative peritonitis present? Taking first the case of a localised abscess, the pus may be found in the right flank, in the iliac fossa, in the pelvis, or lying on the posterior abdominal wall. In the first three situations it is generally regarded as good practice to open the abscess *without* opening the general abdominal cavity. A finger should be introduced and the cavity explored, and a loose appendix or concretion, if present, removed. In the case of an abscess lying on the posterior abdominal wall this must be opened through the general peritoneal cavity, and great care should be exercised by packing to prevent the infection spreading to the healthy peritoneum. Murphy disagrees with the direct opening of abscesses without opening the abdominal cavity, whilst Page, speaking for the surgeons working at St. Thomas's Hospital, believes that no abscess should be opened through the general cavity, but if the abscess be not opened directly a gauze drain should be inserted down to but not into the abscess, so as to form by adhesions a safe track for the pus which later comes away spontaneously, or may be opened by a finger passed along this track. Abscess cavities should be gently swabbed out with gauze, but no lavage, which may drive infection into clean parts of the abdomen, should be allowed. After thorough gentle swabbing out of the cavity a wide-bore drainage-tube is introduced.

In suppurative cases there is still a division amongst surgeons regarding the treatment of the appendix itself. Most operators, however, now believe that after evacuation of the pus a thorough investigation of the abscess wall should be made. If the appendix can be detected and iso-

lated without much disturbance of uninfected tissues it should be removed. Otherwise it should be left and dealt with at a subsequent operation.

When a *spreading or general septic peritonitis* follows the rupture of an obstructed and gangrenous appendix, one of the most serious of surgical problems confronts the operator. There is, however, as a rule no alternative but to give the patient the advantages which prompt interference alone affords. It will generally be found that an incision in the middle line just above the pubis affords the most direct route to the collection of pus, as well as the most efficient for the purpose of abdominal drainage. In late cases this incision can be made under local anæsthesia, a wide-bore drainage-tube with a gauze wick introduced deep into the pelvis, and no attempt made to deal with appendix. Certain points must be kept in mind in dealing with these cases: (1) They should be disturbed as little as possible; (2) they should be kept in the Fowler position; (3) they should never get chloroform as an anæsthetic—if one be necessary, it should be open ether given as sparingly as possible, and preceded by a hypodermic of morphia and atropia.

Upon recovery from the anæsthesia the patient is placed in the Fowler position (propped up in bed in the sitting posture), and with a suitable irrigation apparatus saline solution is made to trickle into the rectum not quicker than it can be absorbed. The quantity introduced in this manner skilfully carried out may amount to 20 pints in the 24 hours without the least distension of the rectum or colon. The abdominal and pelvic lymphatics being distended and flushed by this means, the danger of septic absorption is reduced to a minimum, thirst disappears, the eliminatory organs are powerfully stimulated and the heart strengthened. Lavage may be resorted to when the vomiting is persistent, but if his condition does not permit of this the patient should be encouraged to wash out the organ by taking large draughts of tepid saline solution. Aperients should be withheld until the signs of spreading peritonitis have abated, and then a full dose of castor oil (℥ii.) is the safest and most reliable purgative. Many of these cases develop signs of obstruction, due, according to Handley, to Ileus Duplex, for which the only remedy is drainage of the bowel through a tube introduced into the first distended loop of gut that comes to hand. In *recurrent* appendicitis the mortality has been reduced to almost nil by undertaking the removal of the diseased appendix during a quiescent period, and where induration and tenderness or local pain remain after spontaneous recovery of an inflammatory attack the surgeon should warn the patient not to wait for the advent of a second seizure. The purely expectant treatment of these and all other forms of appendicitis, acute or chronic, should be abandoned, owing to the dangers of perforation, gangrene, suppuration, or spreading peritonitis, which may without warning of any kind suddenly supervene during the progress of an apparently mild attack.

As to the cause of appendicitis, it has lately been established by Wilkie and others that at all events the predisposition arises from the alteration in our habits from being largely vegetable eaters to meat eaters. Wilkie

has experimented upon an artificially formed appendix in cats, and has shown that complete obstruction in cats fed on rich proteid diet and containing cæcal content goes on to gangrene and perforation, whilst in animals fed on porridge merely a cystic distension occurs. *Prevention* would therefore seem to lie along the way of return to vegetarianism associated no doubt with improved habits of life in general, including regularity of meals, thorough mastication, repair of diseased and septic teeth, and perhaps, as Tyson suggests, the return to the primitive attitude during defecation.—S. T. I.

ARTERIO-SCLEROSIS.

Of Allbutt's three types of this condition the *toxic* is regarded as the product of blood changes, probably acting through the increased viscosity of the circulating fluid, due to the influence of toxins manufactured mostly within the body, as in typhoid fever, diabetes, and syphilis, or poisons, like lead and alcohol, introduced from without.

The treatment of this type of the disease must lie in measures directed to the primary malady or infection, and to agents which promote elimination as purgatives, diuretics, baths, massage, &c. As there is no rise in pressure, vaso-dilators are not indicated. Huchard maintained that the first stage of arterio-sclerosis (presclerosis) is due to intoxication, the direct result of renal and hepatic insufficiency, and is curable by suitable milk and vegetable diet, which reduces arterial tension by producing more complete elimination of the toxic substances assisted by diuretics like Theobromine, and by regulation of the habits and daily exercises.

The *hyperpietic* type, the effect of persistently high blood-pressure, is caused by either increased viscosity or a narrowing of the small arteries, or a combination of both these causes. The common causal factor in these cases is over-eating, though the patient may be of spare habit, and it is usually aggravated by the too free indulgence in alcohol, tea, coffee, and tobacco. The clear indication for treatment is to reduce the volume of food and drink to the requirements of the body; highly nitrogenised diet, especially that containing purin bodies and meat extractives, should be cut down to the lowest safe amount, as in the dietetic treatment of chronic gouty patients. Milk, koumiss, or buttermilk, moderate amounts of farinaceous foods, fish, cheese, biscuits and white bread, fresh vegetables, fruits and eggs, should constitute the staple limited diet, tea, coffee and alcohol being prohibited. The habits of the patient as regards regularity of meals, moderate and cautiously regulated muscular exercises and the curtailment of all intellectual and business pressure or worry are no less important elements in the treatment. The general management of patients suffering from this type of arterio-sclerosis has been already defined in the article under the heading of Angina Pectoris, and by following the general principles there laid down life may be prolonged, and sometimes its span lengthened into the senile period of existence.

Diet is vastly more important than drugs, and though the Nitrites are

often irrationally and mischievously employed, their administration is nevertheless at some stage necessary and highly beneficial, as in exacerbations of high pressure, but with evidence of failing pumping power their use is fraught with danger. Of these as a rule only the most slowly and continuously acting are admissible, save in the presence of acute attacks, when Amyl may be called for. There is a consensus of opinion in favour of occasional short courses of mercurials, 4 grs. Blue Pill twice a week, or ½ gr. Calomel daily for 5 or 7 days at considerable intervals. These drugs must, however, be given with great circumspection when there is much albumin in the urine, and their effects must be carefully scrutinised. Saline purgatives are also of value.

Iodides are undoubtedly of use; their beneficial action on the circulation has already been dwelt upon in the description of the treatment of angina pectoris and aneurism. The Iodide of Sodium may be given in prolonged courses of 5-15 grs. *ter die* alone or combined with a vaso-dilator like Trinitrin (see formula on p. 44). Iodipin and the newer iodine compounds are extolled, but there is no proof that they are more efficacious than the sodium salt, though undoubtedly they can in some cases be better tolerated, and Iothion may be administered by inunction, and is very valuable in syphilitic cases.

Vaso-dilators may be employed to ward off a threatening attack of cardiac distress or asphyxia, and the nitroglycerin tablets divided into fragments may be continuously administered for many hours as described under Angina. Urgent dyspnœa may herald a fatal attack of œdema of the lung, and the writer satisfied himself that he has saved life by promptly opening a vein in the arm; and some authorities highly recommend periodical bleedings in the plethoric type of patient, and moderate hypodermic injections of Morphia may be safely administered to relieve severe cardiac and respiratory distress when there is no suppression of urine.

Renon reports benefit from Fibrolysin injections, which sometimes reduce headache and diminish the blood-pressure. Cardiac tonics are only admissible when the heart muscle has already shown signs of failure, and even then their administration must be carried out with much circumspection. As a rule Digitalis should be avoided owing to its action on the peripheral vessels, and the practice of minimising this by combining Trinitrin or Nitrite of Sodium with it in a mixture is based upon ignorance of the pharmacology of these drugs, the nitrites expending themselves upon a vaso-dilating influence which passes off rapidly, leaving the digitalis to produce a prolonged and continuous action upon the high pressure which may seriously embarrass the already over-burdened ventricle. Moreover, as a general rule when digitalis is indicated the vaso-dilators are not required.

Diuretics are indicated when the urine is scanty and of high density, a condition usually met with when the arterial tension is not abnormally great; here, as in the stage of presclerosis, Theobromine (5 grs.) or Diuretin (10 grs.) may be safely administered for considerable periods.

The practice of decalcifying the blood by the administration of Lactate of Soda and Lactic Acid, with the view of preventing atheromatous deposits in the vascular walls, is of doubtful utility, as is also the plan of prescribing Citrates or Lemon Juice.

As little can be said for Barr's plan of adding lime salts to the blood. Enough calcium is obviously supplied in the milk administered.

Though Hydropathy and Baths of all kinds have been vaunted as curative, little benefit is to be expected from them, but unquestionably excellent results are often obtained by a sojourn at an alkaline spa, where a course of the mineral waters may be associated with bathing and the Aix douche. Brunton strongly recommended the diuretic waters at Evian, near to Geneva, and prescribed for home treatment the following powder, to be taken every morning in a large tumblerful of water:

℞ *Sodii Nitritis* *gr.* ss.—*gr.* ij.
Potassii Nitratis *gr.* xx.
Potassii Bicarbonatis *gr.* xxx.

The High-frequency Current as a means of relieving the increased arterial tension has of late years found many supporters, and excellent reports are published. In one case under the writer's care marked temporary benefit was obtained, but unexpected failure of compensation set in soon afterwards which, however, may not have been due to the treatment. The Electric Cabinet, Arc Light and Nauheim baths have their strong supporters; when with these are judiciously employed massage and graduated relaxation exercises much benefit has been obtained.

The third type of arterio-sclerosis, as defined by Allbutt, is the decrescent or *involutionary*. This degenerative type does not correspond with any of the clinical stages of the disease as described by Huchard, but it may at any time become accentuated by the supervention of the toxic or of the hyperpietic. As its cause probably lies in far-off hereditary influence or congenital dystrophy, little can be expected from the administration of drugs, especially as in these cases the tension is but slightly if at all increased. That the condition is not incompatible with long life may be vividly realised by the interesting research made upon the arteries of some of the Pharaohs, including Menephtah and others, who had lived to very advanced ages, the bloodvessels in the mummies of these veterans being found by Professor Elliot Smith in the condition of rigid calcareous tubes.

When the condition is duly recognised from its family and individual history and from the absence of the causal factors usually found to be present in the ordinary high-pressure type of sclerosis, the only treatment to be adopted is the one of so regulating the life of the patient as to shield him from those influences which tend to increase arterial tension, as in the management of angina pectoris. It is obviously irrational to depress the action of an already unsound heart by reducing the dietary below that which is necessary to sustain life, especially when the victim, as is

often the case, has always been a spare eater or frugal liver. At times it may be necessary to strengthen the enfeebled ventricle by Strychnine, or in the presence of accidental high tension to administer cautiously a vaso-dilator or strong saline purgative.

The treatment of any underlying condition must not be lost sight of in the general management of all cases of arterio-sclerosis. Thus Bright's Disease will give indications for eliminatory measures, and obesity, diabetes, or glycosuria for dietetic correction.

In the arterio-sclerosis of syphilis much good may be expected if the case be met in the earlier stages by the vigorous use of Iodides in large and long-continued doses, and always when the renal organs are sound the treatment should be commenced with Mercurial inunctions, which may be cautiously repeated during the intervals when the iodides are necessarily suspended from time to time. Salvarsan is an agent of doubtful utility.

ASCARIS LUMBRICOIDES.

Preventive treatment is always efficacious; the drinking water should be boiled or filtered, and all uncooked vegetables or salads should be thoroughly soaked in strong salt solution, and washed with care by a strong stream of running water.

Santonin meets every requirement once the patient is known to be the host of the parasite. After a gentle purge or moderate fast, 4 grs. of the drug may be administered to an adult, or 2 grs. to a child 2 years old and upwards. It should always be administered in fine powder, and mixed with a teaspoonful of Castor Oil; in this way the untoward cerebral symptoms, as convulsions and vertigo, may be entirely prevented. If purging does not follow, any mild cathartic like Syrup of Senna may be given, and the worm is usually dead when expelled. The writer has never once seen dangerous symptoms follow the use of santonin when combined with castor oil as prescribed by him in several thousands of instances in the large extern department of a children's hospital.

When a child cannot be made to take the oil, santonin may be well mixed with butter and a little Calomel and administered with bread as a thin sandwich. Yellow vision and orange-red discoloration of the urine are common results, but these always pass off within 24 hours, and need excite no uneasiness. Rhubarb is a commonly used adjuvant, but to young children it is always a nauseous and unnecessary combination.

The examination of a minute particle of fæces will show the ova of the parasites if all have not been expelled, but usually one dose is sufficient.

Ascaris mystax is to be treated in the same way, and with similar dosage.

Recently Oil of Chenopodium (3-6 mins.) given in Castor Oil has proved highly efficient.

ASCITES.

The treatment of ascites in the first instance must be directed to the removal of the primary cause, and this will obviously consist in the exhibition of the remedies suitable to the management of the different diseases

which will be enumerated under their separate headings. Failure generally is the result of such efforts, especially in cirrhosis of the liver, and the same can be said of counter-irritation and the local and mouth administration of so-called "absorbent agents." The injection subcutaneously of a quantity of the ascitic fluid to produce an increased diuresis is as inefficient as the stereotyped diuretics; little is to be expected from saline purgatives or the withholding of liquids or salt from the diet.

Failing these, there is nothing left but the operation of tapping when the accumulation is large enough to cause discomfort or threatens to render breathing difficult. By evacuating the fluid life will be prolonged in the worst cases, and in a few instances early and repeated tappings have been known to permanently relieve cirrhosis of the liver.

The patient, if weak, may have the operation performed in bed, but it is more satisfactory to place him in a chair after the contents of the bladder have been voided or removed by catheterisation. A broad binder having been loosely applied to the abdomen with the view of exerting pressure by traction on its ends during the withdrawal of the fluid, the surgeon having percussed the middle line and found complete dulness between the umbilicus and pubes makes a minute incision into the sterilised skin midway between these points, through which he thrusts a trochar and canula. On withdrawal of the trochar, the fluid is permitted to flow, pressure on the walls being made by drawing on the ends of the bandage. There is no advantage in using a large instrument, and some operators prefer a minute tube of the Southey type with rubber attached, through which the fluid may be allowed to slowly flow into a basin as the patient lies on his back or either side in bed.

After the peritoneal sac has emptied itself, the opening is closed by a little lint soaked in Friar's Balsam, and kept in its place with a strip of plaster. A dry diet will usually considerably delay the return of the accumulation.

When, after repeated tappings, the speedy reaccumulations of the fluid prove that there is nothing more to be hoped for than palliation of the condition, the surgeon may be requisitioned to perform a radical operation. This is obviously only admissible when the primary disease is not of a malignant nature, and it has afforded permanent relief in many cases of hepatic cirrhosis when undertaken in the early stages of the disease before the patient's peritoneum has lost its absorptive powers by the supervention of inflammatory thickening. It consists in establishing an artificial anastomosis between the general circulation and the portal system as recommended by Talma and carried out by Morrison. A small incision should open the abdomen above the umbilicus, and after the fluid has been entirely evacuated, a portion of the omentum is drawn up and sutured to the parietal peritoneum and recti muscles. It is necessary to insure thorough drainage in order to permit of as complete union as possible between the omentum and abdominal parietes. Some operators at the same time rub forcibly the surface of the liver and the adjoining internal surface of the abdominal wall and stitch them together, in order

to encourage the formation of adhesions, in which new vessels will form and still further assist the anastomosis. Cutting the portal vein and suturing its distal end to the vena cava has also been performed.

After tapping through a large incision, Mauclaire fixed a T-tube, the long end of which dipped into the pelvis, whilst the short arms were buried in the subcutaneous fatty tissue at the wound, with the view of draining the ascitic fluid into the connective tissue spaces. The results were, however, very disappointing, and the same may be said of the heroic attempts to establish anastomosis between the vena cava and portal vein or between the vena cava and superior mesenteric vein. A few successes have followed the Ruotte method of cutting the saphenous vein at the saphenous opening, tying the distal end and drawing up the proximal extremity and leaving it free in the pelvic fluid. McDill introduced silk strands through a trochar wound and drained into the connective tissue. Nash inserts a bone bobbin in the right femoral canal through an abdominal incision.

Chylous ascites can only be palliated by repeated tappings, and these should be delayed as long as the patient's sense of discomfort is not seriously drawn upon. Obviously there is little to be expected from the Talma-Morrison operation in such cases, or where the condition is due to syphilitic gummata, which often may be made to yield to large doses of Iodides and short courses of Mercury.

In the ascites accompanying *abdominal tuberculosis* most satisfactory results have followed abdominal section.

ASPERGILLOSIS, Pulmonary.

The treatment of this rare malady, which is caused by the inhalation of a fungus existing on various forms of grain, is in the main the treatment of pulmonary tuberculosis. The truth of this statement will be obvious when the pathology of the disease is remembered, since there are good grounds for believing that in the great majority of cases the *Aspergillus fumigatus* fungus only attacks the lung substance after a nidus for its growth has been prepared through the ravages previously made by the bacillus of tubercle.

The removal of the patient from the source of infection is an obvious necessity; the habit of pigeon and bird fanciers of chewing seeds in their mouth before feeding the young birds with them is a common cause of the danger, of which they should be warned.

The only drug believed to possess any action over the growth of the fungus is Iodine in the form of its sodium or potassium salt in large doses given as in actinomycosis.

ASPHYXIA.

This is the result of many widely differing causes, and the treatment of the primary affection will be found under such headings as Drowning, Laryngitis, Glossitis, Bronchitis, Sunstroke, Poisoning by Chloroform and Gas, Air Passages, Foreign Bodies in, &c. The main indication is for

artificial respiration after the obstruction in the air passages has been removed. The various methods of carrying this out are fully described under Drowning.

In asphyxia caused by heart and lung disease, where death is threatening from the overburdening of the right auricle and ventricle, a prompt and free incision into a vein at the elbow will often save life. The venesection may advantageously be followed up by Oxygen inhalations, and these in the suffocation caused by acute bronchial affections may remove the asphyxia without blood-letting if used as soon as cyanosis appears. The method of injecting Oxygen hypodermically has given good results. A small quantity may be injected direct from the cylinder every hour or less. Saline purgatives in less urgent cases act like a small venesection, and Ozonic Ether may be given with advantage.

In the strangulation caused by hanging the obvious procedure will be instantly to cut down the victim, remove all constrictions about the neck, and begin artificial respiration, which should be kept up for a long period, working with deliberate and slow exertions till after signs of returning animation show themselves. If air cannot be made to enter the chest tracheotomy may be required. Oxygen, if at hand, should always be employed. Laborde's method of making forcible and rhythmical traction on the tongue is a valuable method of exciting the respiratory centre.

To relieve the asphyxia of newly born infants all mucous discharge should be removed from the mouth and pharynx, and by dashing alternately cold and warm water on the chest and face, respiration is usually excited. If these measures and artificial respiration fail the lungs should be inflated through a large catheter, or in desperate urgencies by the physician blowing in air from his mouth. Where the upper air passages are blocked a catheter should be inserted into the glottis till its point is about $3\frac{1}{2}$ inches from the teeth, when a forcible blast of air sent through the instrument will force any blood or mucous discharge upwards into the mouth. The catheter should be passed as the child lies on its back with the head hanging over the edge of a table.

In the traumatic asphyxia and cyanosis produced by thoracic compression, where the patient has been squeezed in a surging crowd, or buried under the weight of fallen earth or masonry, the first step should be the administration of remedies to combat shock. Artificial respiration should not be attempted in the presence of broken ribs and other serious structural injuries.

Along with the treatment of asphyxia or strangulation by the different methods of artificial respiration Laborde's plan may be combined and electrical stimulation used at the same time, but these should only be employed in a rational manner with due consideration of their simultaneous effects upon the natural rhythm of the respiratory movements.

ASTHENOPIA.

When the patient complains of inability to continue the use of the eyes for near work as reading and sewing owing to blurring of the objects,

browache, &c., the cause may be simply due to follicular conjunctivitis, which may be recognised by everting the lower lid, when the rows of swollen lymph follicles will come into view on the lower fornix of the conjunctiva. An ointment of 10 grs. Sulphate of Copper to 1 oz. Vaseline will usually give speedy relief, or a 1 gr. per oz. solution of Zinc Sulphate may be used.

In accommodative asthenopia the affection is usually due to hypermetropia, the overworked ciliary muscle being unable to meet the demands made upon it, and the obvious remedy will consist in the use of suitable convex glasses. Myopia and astigmatism will likewise demand suitable correction in other cases.

Attention must in all cases be given to the general health of the patient, and he must only be permitted to work in a proper light and in a proper attitude, and all overwork of the eyes should be strictly guarded against.

The treatment of asthenopia caused by insufficiency or weakness of the external ocular muscles will consist in the correction of any errors of refraction which may be present, after which the defective power of the muscles can be overcome by suitable prisms and systematic exercise of the weakened muscles. Pilocarpine or Eserine solutions may be occasionally instilled with the view of stimulating the ciliary muscle. In the obstinate muscular asthenopia met with in neurasthenic subjects, the treatment of the underlying neurotic condition will require close attention. The writer has found unmistakable benefit to follow the instillation of a 1 to 2 per cent. solution of Sodium Formate two or three times a day.

When the asthenopia is retinal, or depending upon some exhaustion of the general nervous system, as may be seen after recovery from serious illness, the eyes should as far as possible be rested from all close work, and, if there be any photophobia, light should be modified by the use of smoked glasses. Every means of restoring the general health should be attended to, and the treatment recommended for amblyopia be used—*i.e.*, hypodermic injection of Strychnine, with Iron and Quinine internally at the same time, or large doses of Easton's Syrup may be prescribed. The spasms of accommodation may be relieved by Cocaine or Atropine occasionally dropped into the eye.

ASTHMA.

The theory that this disease is the result of *anaphylaxis* has opened up a new field for preventive and curative treatment, but an underlying neurotic condition is probably always present, and the exciting causes which bring the spasmodic mechanism into play are very numerous. The first step in the management of an asthmatic patient is to try and find out the chief exciting cause which determines the attack; this is of the greatest importance in young patients, as each spasmodic seizure probably renders the reflex mechanism more sensitive to subsequent stimuli. Perhaps the most common cause is a catarrhal attack originat ng in the upper air passages or larger bronchi, and though every effort should be made to guard against undue exposure to cold and damp air, coddling

should be avoided. The opposite extreme of submitting the child to so-called "hardening" influences by light clothing, cold baths in winter, and unreasonable exposure must be carefully guarded against when a warm and equable climate cannot be selected in which atmospheric changes may be safely disregarded. Carefully planned respiratory gymnastic exercises are always valuable.

The nose and naso-pharynx, tonsils and throat should be carefully examined in every instance in the child or adult, and any unhealthy state remedied at once so as to admit of free passage of inspired air. It will also be judicious to see to the state of the teeth. Enlarged tonsils, polypi, adenoids, thickening of the membrane over the turbinated bones as is seen in hypertrophic rhinitis should be removed, as all these conditions tend to the production of recurring catarrhs. The use of the knife and cautery for this purpose is not to be confounded with another form of treatment based upon the fact that spasm of the bronchial tubes can be produced by stimulation of certain sensitive areas on the mucous membrane of the nose. Hence Francis has advocated the cauterisation of the mucosa of the septum, even when no pathological condition is found there. The writer has seen permanent benefit follow this treatment in many instances where there were no indications of the asthma being of nasal origin. Syme applies Nitrate of Silver 10 per cent. to the interior of the bronchi.

The next most common exciting cause of the attacks appears to be some abnormal condition of the gastric or intestinal mucous membrane, and the theory has been promulgated that there are hypersensitive areas in these regions like those known to exist in the nasal mucosa. The fact is proved by clinical experience that an overloaded stomach, an attack of acute dyspepsia, or even the presence of intestinal parasites sometimes brings on an asthmatic seizure, recurrence of which is prevented by regulation in the hours of feeding and a revision of the dietary, or by the use of anthelmintics to clear out round-worms, &c.

There can also be little doubt that the gouty condition of the blood may precipitate an asthmatic attack possibly by rendering these areas so hypersensitive that ordinary stimuli may be sufficient to cause spasm of the bronchial tubes.

The inhalation of various emanations and of dusty particles of many kinds is a well-recognised exciting cause. Thus the odours arising from cats, dogs, birds, or certain flowers, pollen of grasses, and the dust which clings to feathers may be found on careful scrutiny of the history of attacks to be causative. Many patients experience immunity for long periods whilst avoiding the use of feather-beds.

Obscure atmospheric conditions apart from dust-laden air are known by common experience to be active, and it is a well-recognised fact that many asthmatics enjoy freedom from attacks in the dusty air of cities, while a removal to a pure seaside or country atmosphere is followed in such patients by a series of severe spasmodic seizures. Even removal from one part of a city or country district to a place a few miles away may

markedly alleviate or increase the number of the attacks. Only the knowledge gained by the patient himself can be utilised in the treatment of the disease by change of air and climate, and no theory of the physician as regards absence of dust, variations of barometric pressure, sunlight, ozone, temperature, &c., can enable him to foretell the probable results of a change of residence.

The identification of asthma with the phenomena which supervene upon the introduction of a foreign protein into the blood (anaphylaxis) has led to the discovery that asthmatic attacks often follow the ingestion of egg albumin. This has been demonstrated by rubbing unboiled white of egg into the sound or lightly scarified skin of the forearm, when a smart local reaction and sometimes an asthmatic seizure follows. In sensitive persons other proteins may be the cause, and by careful experiments conducted on the same lines the offending material may be discovered and eliminated from the dietary. If we assume that such proteids may exist in the nasal, throat or bronchial secretions the visionary hopes of Vaccine treatment may become realised through the use of an autogenous culture. The writer's experience is confined to one case where this was perseveringly carried out without marked or lasting improvement. The value of vaccine therapy as of other methods is most difficult of determination in a disease which has such long periods of total quiesence, hence the necessity of caution in accepting the reports which of late have been flooding current literature. The injection of Normal or Horse Serum has proved curative in the asthma attacking grooms and persons living in close relationship with this animal. Autogenous Defibrinated Blood has been claimed as curative, and Auld immunises patients by 5-15 gr. doses of Armour Peptone in 5-10 c.c. water.

Treatment of the Asthmatic Paroxysm.—Nitrite of Amyl and Ethyl Iodide inhalation often gives speedy relief to some patients, and if at hand they should always have a trial; Chloroform may be used in the same way. A moderate dose of Morphia hypodermically always affords relief, but obviously its frequent use is unjustifiable; and the same may be said of Cocaine. Atropine $\frac{1}{100}$ gr. is equally beneficial and not open to the serious objections which maintain in the case of opiates; it should be given hypodermically. Adrenalin, recommended by Cohen, has often a surprisingly rapid effect upon the spasm when given hypodermically in a dose of 5-10 mins. (1 in 1,000 solution); when used as a spray its effects are also sometimes surprising. Where the attack is the result of an overloading of the stomach $\frac{1}{10}$ gr. Apomorphine may be given, and it sometimes cuts short the spasm without causing vomiting.

The basis of nearly all of the innumerable fumigating compounds intended to be used after ignition is Nitrate of Potassium. The simplest method of carrying out this treatment consists in burning blotting or coarse brown paper which has been previously soaked in a saturated solution of the drug and dried. As soon as the air of the patient's room has become permeated by the smoke of this combustible, so that an on-

looker begins to feel great difficulty in breathing the fumes, the asthmatic will simultaneously commence to show amelioration of his spasm and dyspnœa. The common mistake is made of not burning enough of the paper, and of not using a strong solution for its preparation. Huggin's Ozone Paper contains Iodide of Potassium along with the nitre, and Thorogood recommended the addition of Chlorate of Potassium in order to make it burn more actively. Infusions of Belladonna, Digitalis, Sage, Green Tea, and Stramonium have been also used as the solvent for the nitre.

Stramonium Leaves with Nitre form the basis of the majority of the powders used as asthma cures, as those known as Himrod's, Bliss's, Ellis's, Girdwood's, &c.; Sawyer recommended 1 oz. Nitre, 2 oz. Stramonium, and 1 oz. Anise fruit in coarse powder; and another formula of his consists of Stramonium 16, Sublimed Sulphur 1, Anise 7, and Nitre 8. The B.P.C. Pulvis Stramonii Co. is also prepared from a Sawyer's formula and contains the following powders: Stramonium 50, Lobelia 6, Anise 12, Tea 6, Oil of Eucalyptus 1, and Potassium Nitrate 25, and is perhaps the best of these compounds. It is used by pressing about a teaspoonful of the powder into a cone with the finger-tips, and lighting the apex with a lucifer match. A very convenient fumigation which can be easily prepared by the patient is Stramonium Leaves soaked in a strong solution of Nitre and dried; these can be lighted when required and the smoke inhaled.

Martindale's Compound Asthma Fluid is intended to be used by means of an atomiser, and as it contains some Atropine it may be used with benefit in those cases which yield to this drug when administered hypodermically. Tucker's cure contains cocaine and nitrites and some atropine.

Some patients prefer to use stramonium and lobelia mixed with tobacco in a pipe or as a cigarette, and the addition of tobacco and a little nitre intensifies the action of these drugs. Datura Tatula (a solanaceous plant) chopped up and smoked in a pipe sometimes relieves when other inhalants fail. Arsensic has been added to stramonium, tobacco and lobelia in the cigarette form, but its continuous use is open to serious objection.

Pyridine is an ingredient of tobacco smoke, and the purified liquid obtained from bone oil has been used by Sée for the relief and prevention of Asthmatic seizures; a teaspoonful being poured upon a plate in a small room, the air soon becomes impregnated with its disagreeable odour, and the patient often finds relief by breathing this nauseating atmosphere.

Steam, Oxygen, Compressed or Rarefied Air, sprays of Eucalyptus, Creosote, Cajuput, Friar's Balsam, Conium, Cocaine, Phenol, and Ultra-Violet Radiations, &c., have their advocates.

Of internal remedies used for the relief of the paroxysm all usually are too slow in their action unless, as already mentioned, they be given by inhalation or hypodermically, but sometimes Hyoscine acts speedily ($\frac{1}{150}$ gr. by the mouth), though it also is better given hypodermically.

30 grs. Chloral Hydrate in a draught or a full dose of Cannabis Indica prove useful if given at the beginning of an attack before the breathing becomes very laboured.

Caffeine is a favourite with some patients, but it is liable to aggravate the insomnia which is nearly always present; it is best given in the form of a large cupful of strong black Coffee.

The ethereal tincture of Lobelia, if pushed till nausea supervenes, is often of use, but it is a drug of great power, and may seriously depress the heart.

The strong induced current is recommended by Yeo, who places the electrodes over the pneumogastrics below the angle of the jaw in front of the sterno-mastoids; pressure with the fingers or ice-bags laid over the course of the pneumogastrics act in the same way. A blister over this region is more reliable but much slower in its effects.

Euphorbium Pilulifera, Grindelia, and Gelsemium alone or combined with Nauseating Expectorants or Trinitrin are employed in some cases with marked benefit, and Alum in 15-gr. doses laid upon the tongue has its advocates.

This list, which represents but a small proportion of the agents recommended for the relief of the asthmatic paroxysm, proves that the treatment is largely empiric. One remedy after another must be tried till the drug is found which gives most speedy succour, and this as a rule may be relied upon in future attacks in the same individual. Towards the end of the attack, as expectoration begins to show itself, expectorants in full doses hasten disappearance of the spasmodic condition.

Treatment during the Intervals between the Attacks.—As already mentioned in speaking of the preventive treatment of the paroxysm, the cause of the attack when found must be carefully avoided. The regulation of the asthmatic's dietary is of importance, quantity being often a more serious matter than quality. The chief point is the regulation of the hours of eating, so that a very heavy meal after a long fast is never to be indulged in, hence the necessity of doing away with the boa-constrictor plan of one enormous meal in the day late in the evening, and the substitution for it of a light repast every 4 or 5 hours. As a rule animal food should be sparingly used, fish and chicken with fresh vegetables and cereals meeting all requirements; wines and beer are objectionable. Constipation must be carefully guarded against. When his means permit, climatic treatment, especially for the spring and winter months, should be considered, and from the remarks already made the physician will readily appreciate the possibility of making serious mistakes in sending the asthmatic patient on long journeys in search of health when his best sanatorium may be but a few miles from his usual residence. Nevertheless there are a few guiding principles worth consideration; thus where the asthma is obviously of the catarrhal form a warm, sunny, equable climate suitable for bronchitis should be selected, and Mount Doré and Bourboule in Puy De Dome are favourite resorts, whose waters also contain arsenic. Where already there is much emphysema, a suitable spot in the Riviera may be

selected, as Cannes or Grasse. Where the diseased condition has developed in a low-lying damp region a high elevation Alpine resort usually does well for young patients, but old emphysematous cases fare badly in these regions; the climatic treatment of the bronchitis and emphysema is of more importance than the consideration of the asthma in very chronic cases.

Of drugs suitable for administration during the intervals between the attacks there are two about whose value in most cases there can be little doubt, and these may be given as a routine—viz., Iodides and Arsenic. The following mixture may be employed:

℞. *Sodii Iodidi* ʒiij.
Liquor. Arsenicalis ʒiss.
Vini Ipecacuanhæ ʒvj.
Tinct. Belladonnæ ʒij.
Aquæ Chloroformi ad ʒvj. *Misce.*

Fiat mistura. Sumat coch. min. bis in die ex aq. p.c.

During the attack the above may be given every two hours if the Fowler's Solution be replaced by ʒiv. Tinct. Lobeliæ.

After a few months of the above routine the iodide alone may be given every other month alternating with a month's treatment by arsenic only.

ASTIGMATISM.

This affection is due to inequalities in the refracting surface, the cornea generally being at fault, and it can only be remedied by the use of cylindrical lenses which correct the unequal refraction of entering rays in the two chief meridians. Regular simple, regular compound hypermetropic and myopic astigmatism and mixed astigmatism all require careful correction, and there is extreme difficulty in correcting irregular astigmatism. The serious nerve symptoms which follow eye-strain will often demand immediate correction by means of suitable glasses, and many patients obtain immunity from migraine and other forms of severe headache permanently or for long periods after being fitted with proper cylinders.

ATHETOSIS.

The operation of resecting the posterior roots of several of the spinal nerves has given excellent results in this hitherto incurable affection. The site of the resection and the number of the roots to be divided will depend upon the situation of the muscles affected. Cross-legged progression has been entirely removed by division of the second, third, and fifth lumbar nerves. The injection of strong Alcohol into the trunks of the affected nerves has also caused the disappearance of the spasms, but these are liable to return after a shorter or longer period.

Gowers obtained marked benefit by the systematic and persevering use of the continuous current, the positive pole being placed on the spine or brachial plexus, and the negative on the affected muscles. Where there is evidence of marked irritation about the area of softening or degeneration in the original lesion, large doses of Bromides alone or combined with Iodides, Arsenic or Conium may be occasionally used.

BALANITIS.

Where this is part of a gonorrhœa, rarely will it be necessary to do anything but inject Permanganate of Potassium (1 gr. to 2 oz.) round the glans and also down the urethra, curing both complaints at the same time. If there be much pain and redness, a Lead and Opium lotion applied outside on lint gives relief. Acupuncture is generally bad practice. Should there be a chancre or sore or ulcer causing hæmorrhage, one free cut, slitting up the prepuce on its dorsal aspect, should be made, and Lime Water, Sulphate of Zinc (1 in 100), Boracic Acid (1 in 50), or Carbolic Oil (1 in 15), may be used as a dressing; or Oleate of Zinc or Boracic Ointment may be applied.

Where balanitis comes on in young subjects with long prepuce, as the result of retained secretion, drawing back of the foreskin and thorough cleansing of all discharge several times daily, dusting the part with a powder consisting of equal parts Lapis Calaminaris, Boracic Acid, and Powdered Starch, soon effect a cure. When the disease is very chronic or apt to return, circumcision should be performed, especially if phimosis be present.

Should the inflammation have lasted long enough to produce excoriations of the membrane lining the prepuce or of the surface of the glans, they should be touched lightly with Nitrate of Silver, Nitric Acid, Carbolic Acid, or Liquor Hyd. Pernit., and covered with a piece of dry lint inserted between the glans and foreskin. Where the prepuce cannot be drawn backwards, a fine syringe should be used frequently to inject Hydrogen Peroxide Solution or a stream of tepid water, coloured with Condy's Fluid, between the opposed mucous surfaces. Afterwards a weak Corrosive Sublimate Solution (1 in 1,000), or Nitrate of Silver (1 in 100), or Yellow Wash may be injected. If the foreskin can be drawn back, any of these applications may be inserted upon lint and left *in situ*.

The writer has permanently cured many cases by periodically dilating the prepuce with phimosis forceps or dressing forceps after the subsidence of all inflammatory action, even where the orifice hardly admitted a thick probe. When the stretching is done with patience and care, no pain results, and no inflammation follows this method of treating the acquired phimosis; often the same result may be obtained in the congenital variety.

BALDNESS.

In seborrhœic cases in the early stage the baldness can be arrested or cured by the liberal use of animal fats with antiseptics applied after careful

cleansing of the scalp with Borax or equal amounts of soft soap and Alcohol and the removal of all traces of the soap before using the pomade. If the baldness be due to senile change, treatment is useless. In ordinary cases where the health is good, and where there is nothing to give a clue to the cause of the baldness, the treatment will consist of local stimulation to the atrophied hair bulbs.

A slow continuous current passed through the scalp by brush electrodes has a powerful influence over the nutrition of the hair bulbs in their early stage of atrophy. Cutaneous massage, shaving, shampooing, or blistering the scalp may be tried, but the most convenient and effectual plan is by the application of irritants or stimulants in such proportion that actual vesication is avoided, and a chronic congestion or erythema is habitually kept up.

Cantharidin is the best agent for this purpose, and it may be combined with other local stimulants. The writer has found the following the best combination:

℞ *Liquor. Epispastici* ʒij.
Olei Rosmarini ʒiv.
Olei Amygdal. Dulc. ʒij.
Spt. Camphoræ ʒij.
Glycerin. Boracis ʒj.
Otto de Rosæ gtt. viij.
Tinct. Jaborandi ʒj. *Misce.*

Fiat Linimentum. Sig.—"*To be well rubbed into the roots of the hair morning and night.*"

The following pomade produces good results. It may be tried where lotions cannot be used:

℞ *Pilocarpinæ Hydrochlor. gr.* xx.
Aquæ Destillatæ ʒij. *Misce.*

Fiat solutio et adde

Lanolin. Puriss. ʒx.
Olei Petrolei ("*Snowflake*") ʒvi.
Olei Bergamot. ʒss.
Olei Verbenæ ʒss.

Fiat Unguentum.

Pilocarpine has been also administered hypodermically and by the mouth in various forms of alopecia, and even in universal baldness. Arsenic certainly has some effect upon the hair when administered internally. Thyroid Extract gives surprising results in the baldness of myxœdema.

Gull's Linimentum Myristicæ (1 part of Expressed Oil of Nutmeg to 3 of Olive Oil) is a safe and mild stimulant. Erasmus Wilson recommended the following Ammonia stimulant to be rubbed in once or twice a day:—Liq. Ammon. Fort., Chloroformi, Ol. Sesami, and Ol. Limonis, of each ½ oz., and Spirit. Rosmarini to 4 oz.

Volatile Oil of Mustard, if well diluted, is of some value—Olei Sinapis, 2 drs.; Olei Petrolei, 1 oz.; Olei Olivæ, 9 oz.; misce. Capsicum, Mustard, Euphorbium, and strong Acids have been used, but their application is not to be recommended.

For syphilitic baldness, in addition to the usual constitutional treatment, a pomade made by adding 2 drs. of White Precipitate to 4 oz. ordinary Marrow Oil is of value.

Germicides have been used on the theory of the parasitic nature of baldness. They can only be of use when applied in such strengths as to cause irritation. The best is the White Precipitate pomade, and next come solutions of Salicylic Acid (1 in 20) and of Perchloride of Mercury (1 in 500). Where psoriasis of the scalp is present a weak Chrysarobin ointment (10 grs. per oz.) may be cautiously used. Walker recommends an ointment consisting of Precipitated Sulphur and Salicylic Acid 20 grs. each to 1 oz. 2 per cent. Resorcin in water makes a good application.

No matter what local agents are employed, the general health must be closely looked after. The patient should be advised to wear head covering as seldom as possible, and never when indoors; massage of the scalp is always beneficial.

Alopecia Areata.—In the treatment of this condition one set of authorities, considering the disease to be of nerve origin, recommends remedies for improving the general health and tone of the nervous system in particular, as Iron, Strychnine, Arsenic, Phosphorus, Sulphur, Massage, &c., with generous diet of fats, phosphates, crushed wheat and fish, and the local application of the Faradic or Continuous Current, Hypodermics of Pilocarpine, and the host of rubefacients from Oil of Mustard, Cantharides and Croton Oil to Iodine. Every remedy useful in ordinary seborrhœic baldness has its advocates, but the majority of observers agree that Vesication affords the best results, and it does not seem to matter much how the blistering is effected.

Other dermatologists believe that the disease is parasitic, and they recommend that remedies to be effective must be germicidal; consequently nearly every agent valuable in ringworm has its advocates, and the literature of the subject has become more extensive than the disease appears to justify.

Ultra-Violet and X Rays have given marked results, and several cases have been cured by the High-Frequency Current.

A 3 per cent. Solution of Creolin is applied to the entire scalp by O.-Dumesnil, and to the patches he rubs in a 1 gr. per oz. Sublimate Ointment. Leistikow applies a 25 per cent. Chrysarobin Stick. Many authorities apply pure Carbolic Acid to the patch, and some speak strongly of the value of Iodized Collodion, Oils of Cade, Wintergreen, and

Cinnamon, and 1 per cent. Ointment of Biniodide of Mercury, and Trikresol. Crocker succeeds best with 1 to 5 grs. Sublimate, 1 dr. Spirit, and 7 drs. Turpentine or Ol. Pini Sylvestris. Walker recommends a lotion containing 5-10 per cent. Lactic Acid with Castor Oil in Alcohol.

A study of the effects of these various anti-parasitic remedies shows that the best results are constantly obtained by those agents which cause the most irritation.

Liq. Hyd. Pernit. lightly brushed over the spot often succeeds; the writer has seen better results from painting over the patches with strong Sulphurous Acid than from any other treatment, save constant blistering with Liquor Epispasticus. The rare form of baldness produced by *Folliculitis decalvans* is best treated by epilation of any remaining hairs, after which the scalp should be thoroughly washed and Tr. Iod. Fort. applied repeatedly or a weak ointment of Iodide of Sulphur rubbed in. When the parasitic organisms have been destroyed a Cantharidin preparation should be used to excite stimulation of the atrophied hair bulbs, but the baldness is often permanent in spite of all treatment.

BEDSORES.

Preventive treatment is of primary importance, and since the sores are almost invariably secondary to some bedridden condition the attention of the physician and nurse should always be directed to the possibility of their supervention in prolonged fevers, paralysis, fractures of the femur, &c.

Continuous pressure over some bony prominence being the main cause, the patient's position in bed will demand regular changing several times a day and occasionally through the night as well, so as to avoid the pressure caused by the weight of his body being exercised for any length of time upon a particular part of the skin. Air or water cushions or extemporised pillows or small cushions stuffed with well-teased-out sheep's-wool having a central opening opposite to the bony prominence will be required. Smooth and creaseless linen draw-sheets should take the place of mackintoshes, as next to pressure the irritation of sweat and other secretions is a fruitful source of this opprobrium to nursing. The skin must be kept as dry as possible, and all parts of the patient's body in close contact with the hair mattress should be thoroughly cleansed at least twice a day with soap and water, and after carefully towelling they should be bathed with methylated spirit, whiskey, or eau de Cologne, which is permitted to dry spontaneously. If incontinence of urine or fæces is present it is needless to say these operations must be carried out very frequently through the day and night. After the ablution has been finished, finely powdered Boric Acid, Fuller's Earth, Prepared Calamina, Talc or Huxley's Dusting Powder, should be gently rubbed into the parts.

In patients with abnormally dry skins, after the cleansing process has been completed, a little Lanoline may be advantageously used instead of the dusting powder; it is in such cases that creases in the sheets and the

irritation caused by bread crumbs are liable to produce minute abrasions ending in sores. The *acute* sloughing bedsore, which follows spinal injuries, can only be effectually prevented by the early use of the water bed.

When permanent redness of the skin has already appeared, sometimes painting of the erythematous area with Flexile Collodion may avert the threatening abrasion, but if this has already occurred a piece of Soap plaster spread on soft chamois, or the application of an ointment of Zinc Oxide with 10 or 15 grs. to each ounce may prevent the abrasion developing into an ulcer if all moist applications be discontinued.

If the sore has already formed, the first step is to thoroughly cleanse it of all dead matter, and though the large sloughing gangrenous surface may sometimes require the application of a warm linseed poultice, in most cases a Boric Acid compress composed of several layers of lint soaked in a warm saturated solution of the drug is a better and safer remedy. As soon as the separation of all sloughs has been effected the granulating surface should be treated on general surgical principles, by the use of weak astringent and antiseptic lotions, as Alum (1 in 100), Boric Acid (1 in 50), Carbolic Acid (1 in 40), Spirit (1 in 3), Corrosive Sublimate (1 in 500); Red Lotion (containing Zinc Sulphate, gr. ij. to the ℥i.) gives good results in these cases. These require to be covered over with oiled silk, and occasionally the retained secretion under the silk and beyond the moistened edges of the lint tends to irritate the healthy skin, in which case dry dressings, Iodoform Gauze, powdered Boric Acid, &c., may be substituted. A thin sheet of perforated celluloid may be laid over the ulcerated surface.

Where the sore is small, ointments are more suitable, and the official Boracic, Zinc, Carbolic, Salicylic, or Iodoform unguents may be employed. In slowly healing or sluggish sores a pomade consisting of equal amounts of Basilicon Ointment and Balsam of Peru is a valuable preparation. Under the heading of Ulcers various other formulas will be found, any of which may be tried when the above-mentioned remedies fail. During the healing process the part must be kept free of all pressure by the use of the ringed sheep's-wool cushion already mentioned.

Bird's method of healing chronic bedsores in paralysed patients has been found by the writer to be efficacious after the failure of ordinary treatment. It consists in the application of a thin sheet of silver laid on the granulating surface of the ulcer; the silver has attached to it a bent wire of the same metal which is soldered to a small disc of copper at its other extremity; this is laid upon the healthy skin over a piece of wash-leather or lint moistened with vinegar. The resulting galvanic action usually excites rapid healing. Sometimes a layer of sheet-lead laid over the sore excites new action in it.

Scraping or excision of the slough followed by the application of strong Carbolic Acid is sometimes resorted to by the surgeon where there is evidence that septic absorption is threatening or has already occurred.

BERI-BERI.

Until the true pathology of this interesting disease is worked out its treatment must remain unsatisfactory. Whether the real causal factor is of the nature of a ferment or a microbe, this much appears to be proven —that its *prevention* can be accomplished by using undermilled or unpolished rice instead of the polished grain, the latter being apparently devoid of some agent which prevents the growth of an organism or inhibits the formation of a deleterious ferment.

Moreover, the fact that the disease can be cured by the administration of a Hydrolysed Extract of Rice Polishing proves that it is caused by an absence of the vitamines in the polished grain. The mixing of beans, potatoes, and fresh fruit or yeast with the diet when the unpolished or unpalatable rice is not available is of considerable value. Benefit also follows the improvement of the patient's environment, as removal to a higher and drier locality.

The way, therefore, seems open to the future rational treatment of this preventable malady by the administration of the above-mentioned extract, provided the patient comes under observation before irreparable damage is done to the nerves.

The peripheral neuritis and anasarca afford clear indications for treatment, though no known drug can be said to possess any specific action; minute doses of Antipyrine or Nitrate of Silver, and in the dry form of the disease the latter drug combined with Belladonna, have proved valuable. Absolute rest in bed for long periods is essential owing to the danger of the cardiac dilatation through implication of the vagus which is usually present. Strychnine hypodermically with inhalation of Nitrite of Amyl, and even venesection may be demanded.

Diuretics are indicated where the anasarca is abundant, and these should be combined with Digitalis and Quinine or with minute doses of Trinitrin. Massage and Electricity, with passive movements of the joints, should be practised twice daily, after the subsidence of pain and muscular tenderness, before the patient is permitted to leave his bed.

BILHARZIA HÆMATOBIA.

The parasite, whose natural habitation is in certain small water-snails, common in Egypt and South Africa, gains entrance to the body during bathing, probably through the urethra, and also through the mouth in drinking water, cresses, and fresh-water molluscs. Preventive treatment is therefore obvious; all water should be boiled and filtered, and uncooked vegetables and shellfish forbidden.

As the male trematode resides in the veins of the portal system and the female infests the urinary tract, its ova reaching the bladder and rectum, it is beyond the reach of the ordinary anthelmintics, though in Cairo the usual practice is to administer Male Fern. The writer's suggestion in a former edition of this work has as far as he knows never been tried. It was to saturate the blood several times with chloroform or ether vapour as in prolonged anæsthesia, with the view of causing the death of the

parasite. The X rays have recently been reported upon as giving encouraging results. Symptomatic treatment is all that is usually attempted; the bladder irritation and hæmaturia should be allayed by washing out the organ with saturated Boric Acid Solution, and the calculi which are liable to form should be crushed or otherwise removed. Rectal polypoid or papillomatous growths should be removed when these are causing much pain and hæmorrhage, and Legrand resects the mucous membrane of the ano-sigmoid region.

BLACKWATER FEVER.

This condition is intimately associated with malaria, since malarial parasites have been found in 95 per cent. of the cases investigated, but as the condition of hæmoglobinuria which characterises it is only seen in a small number of severe malarial fevers, it is obvious that some unknown factor capable of producing dangerous hæmolysis must be also present when the condition known as blackwater fever supervenes. Whether this is a toxin produced in the patient's body or whether it is a toxin elaborated by some unrecognised malarial or other parasite cannot be at present demonstrated.

The disease is not produced by quinine, since blackwater fever has been repeatedly found in patients who had never taken this drug in any form, but quinine may precipitate an attack when the hæmoglobinuric condition is present, but which is not of sufficient intensity to produce the characteristic symptoms of the disease, unless renal inadequacy is present.

The patient should be at once put to bed and the fever treated by diaphoretics, and symptoms relieved by approved remedies as they arise; thus vomiting may be met by Morphia hypodermically, the liver and loin pains will require hot fomentations or dry-cupping, and the bowels should be opened by a smart saline purgative. The serious question at once arises: Should Quinine be administered ? Some answer this in the affirmative and commence the treatment of the disease in a routine way by administering 5-10 grs. Quinine every 6 hours; others, believing that the drug has no specific effect over the hæmoglobinuria in its acute stage, hesitate to employ it in this stage; whilst probably all are agreed that the drug must be resorted to for the cure of the disease after the pressing urinary symptoms have been relieved. The writer has had the experience of four typical and severe cases of the disease occurring in individuals just arrived from the tropics, and three of whom bore quinine well. Unfortunately the quinine difficulty is not the most serious consideration for the physician; the great danger to the patient is that of suppression of the urine, and as a rule this is a graver complication than the height of the fever.

The urinary suppression is due to mechanical obstruction of the tubes by large epithelial casts. This mechanical plugging causes more or less renal congestion, and unlike what occurs in ordinary paroxysmal hæmoglobinuria the urine shows red blood-cells in half the cases where sup-

pression is about to occur. This fact has a most important bearing upon the treatment. The patient must be poulticed or cupped over the loins, and the skin made to act by the hot bath or by the hot-air bath as in acute Bright's Disease where uræmia is threatening. A large enema of Saline solution should be administered with the view of diluting the toxin in the blood and of flushing the urinary tubules. When the enema is rejected or in desperate cases, in addition to the enema Saline should be injected into a vein as in hæmorrhages, or into the subcutaneous areolar tissue in different parts of the body, 4 or 6 pints being employed, and there can hardly be a doubt that in some cases life may be by this means saved. In one patient seen by the writer this procedure certainly appeared to save life. A strong Saline purgative or a dose of Croton Oil should be administered as soon as the hypodermic injection of the saline solution has been given.

The immediate after-treatment, once the danger of suppression of the urine has been combated, must consist of Quinine, and Stephens affirms that the cure cannot be considered as complete till the patient has been enabled to take 15 grs. without any ill-effects. Any salt of the alkaloid may be given. Celli advocates the tannate by the mouth; others administer the hydrochloride by the bowel in doses of 15-20 grs., whilst many authorities prefer to give 5-10 grs. of the acid hydrochloride by the skin. Should the hæmoglobinuria have followed the use of quinine in the first instance the drug must be cautiously tried in half the above doses, or its administration postponed for 48 hours. It is advisable not to administer the sulphate, as all sulphates tend to favour hæmolysis.

Vincent has shown that the hypodermic administration of Calcium Chloride renders the employment of quinine safe, and it is a good routine to add the calcium salt to the normal saline solution injected into the bowel, subcutaneous tissue, or veins in the treatment of threatening suppression, though the drug appears to possess no influence over the paroxysms of ordinary non-malarial hæmoglobinuria.

BLADDER, Atony of.

The loss of tone in the muscular walls of the bladder being always the result of over-distension from postponing the act of micturition or from obstructive causes as stricture, enlarged prostate or temporary paralysis as in fevers, the treatment will obviously consist of the removal of the obstructive cause, and the judicious use of a sterilised catheter at regulated intervals. Drugs possess little influence over the muscular fibres of the organ, but Strychnine alone or with Ergot should always have a prolonged trial, and Electricity, in the form of the constant and interrupted current, is undoubtedly useful. The following is a good routine combination: Ext. Nuc. Vom., gr. $\frac{3}{4}$; Ergotin, gr. 1; Quininæ S. and Ferri Redacti, ana gr. 1; in pil. 1 ter in die. Cantharidin, in minute doses, may be tried.

Where already the muscular fibres have become the seat of fatty or fibrous degeneration the only available treatment will lie in the future

permanent resort to the catheter to avoid distension, and this should be combined with short courses of urinary disinfectants to prevent the supervention of cystitis, which is liable to follow the introduction of germs through some omission at times in the technique of sterilisation of the instrument. When the patient is unwilling to submit to catheter life, it is often advisable to do a preliminary suprapubic drainage of the bladder before dealing with the main cause of the obstruction, such as stricture or enlarged prostate.

BLADDER HÆMORRHAGE.

The treatment of the primary disease which causes the bleeding is the first consideration: this will be found detailed under its own heading. See also under Hæmaturia.

BLADDER, Inflammation of.

Of the causes of *acute* cystitis one of the most common is the extension backwards of a gonorrhœal urethritis. The best treatment will consist in absolute rest in bed with the free use of the hot Sitz bath (temp. 105°) at short intervals, and a ½-gr. Morphia suppository containing 1 gr. Extract of Belladonna. If the pain and straining resist these measures, ½-1 gr. Eucaine Hydrochloride in 30-60 mins. of water may be injected through a soft instrument passed gently down the urethra. A large linseed poultice to the lower part of the abdomen often gives relief. All injections for the cure of the gonorrhœal urethritis should be stopped till the strangury and tenesmus are relieved. A milk diet with the free use of barley water or linseed infusion and the avoidance of alcohol, coffee and tea should be ordered. A mixture containing Hyoscyamus, Bicarbonate of Potassium, or the Liquor Potassæ with a small amount of Opium can advantageously be given in the linseed infusion. After the subsidence of the acute symptoms, urethral injections of a weak warmed solution of Permanganate of Potassium may be commenced, and continued every hour or two, gradually increasing the strength of the solution till 1 gr. per oz. is reached. Oil of Sandal Wood in capsules (10 mins.) is very efficacious. Where the attack of acute cystitis follows the use of a catheter, lithotrite or other instrument, the treatment is essentially the same.

Gout sometimes declares its presence by a severe attack on the mucous membrane of the bladder, when a smart saline purge followed by Colchicum and Alkalies should be administered.

Cantharidin applied to any part of the cutaneous surface in the form of a large blister may be absorbed and cause severe cystitis with strangury. The treatment in such cases consists of the use of the hot Sitz bath with large drinks of barley water or other diluents and Morphia by the rectum after the removal of the blister and the letting out of any bullæ. Saline purgatives are indicated in all cases.

Bacilluria is the name given to the condition in which micro-organisms are found in the urine, and their presence sometimes excites acute in-

flammation of the bladder, even when they have been absorbed from some distant site and eliminated by the kidney, as in typhoid fever and in *Bacillus coli* infection. The treatment of acute cystitis of this type consists of urinary antiseptics like Urotropin (5-10 grs. ter die). In *B. coli* cystitis the acid reaction of the urine must be changed to alkaline by large doses of Bicarbonate or Citrate of Potash, after which antiseptics should be given.

Staphylococcic cystitis is often of the acute type supervening upon retention of the urine from obstructed flow in prostatic enlargement, calculi, stricture and spinal disease. *Streptococcic* cystitis is still more common, being usually the result of infection by soiled catheters and other instruments, or the organisms may reach the bladder from foci of septic inflammation in the female pelvic organs and from perineal wounds. In many instances the infection will be found to be a mixed one. The treatment in these cases will consist of urinary antiseptics by the mouth till the violence of the acute inflammation has been somewhat abated, after which the bladder is to be thoroughly washed out or irrigated by Boric Acid or Permanganate of Potassium solution; it is not safe practice to resort to the passage of instruments and irrigation in the presence of a very acute inflammation of the bladder.

In the acute septic cystitis following bladder injuries as well as in the most severe types of acute inflammation just mentioned it may sometimes be necessary to drain temporarily the bladder through the perineum or to continuously irrigate it by Cathcart's apparatus after a suprapubic cystotomy has been performed.

Chronic Inflammation of the Bladder.—The treatment of this condition in the first instance as in the acute affection should consist in the removal of the cause when possible. The following are the chief causes usually met with: (1) Prostatic Enlargement, (2) Stone or Foreign Bodies, (3) Atony, (4) Tumour, (5) Stricture, (6) Spinal Paralysis, (7) Gout, (8) Abscess in the uterus or pelvis, (9) Parasites or their ova as bilharziosis, hydatids, &c., (10) Micro-organisms as in *B. coli*, tubercular and typhoid infections, chronic gonorrhœa, &c.

Prostatectomy by Freyer's suprapubic method should be resorted to before the bladder has become infected, when the enlargement has become a serious obstacle to the emptying of the bladder in micturition.

The treatment of cystitis caused by the presence of stone, foreign bodies, tumours, and stricture can only be met by dealing with the primary cause. Gouty cystitis yields to the constitutional treatment indicated for the uric acid diathesis. Typhoid cystitis, the colon bacillus, and chronic gonorrhœal cystitis yield to the disinfection of the urinary tract by Urotropin or Boric Acid administered by the mouth as in the acute affection. In obstinate gonorrhœal cases there is always more or less prostatitis which may end in abscesses, and often some narrowing of the urethra. The treatment of these cases is often most tedious and disappointing; it consists in the passage of a full-sized solid metal bougie to dilate the urethra, after which the urethroscope or cystoscope may be passed to investigate

the condition of the prostatic urethral membrane and neck of the bladder. Janet's posterior irrigation after the urethral injection of Cocaine to remove spasm of the compressor urethræ is most valuable, a weak solution of Silver Nitrate, 1 gr. to 1 pint, being used, or a soft rubber catheter should be passed till its eye reaches the affected spot (the apex of the prostate), which is usually about $7\frac{1}{2}$ inches from the meatus; Guyon's method of instillation of the posterior urethra is then carried out by injecting through a graduated syringe a strong (10 per cent.) solution of Nitrate of Silver. Any abscesses about the prostate or Cowper's gland will require incision from the perineum. Massage of the gland through the rectum is of much value in inveterate cases, and Vaccine treatment by injection of killed gonococci should always be resorted to; doses gradually increased to 100,000,000 organisms have been injected hypodermically without harm.

Chronic cystitis in which the tubercle bacilli are found in the urine is usually but not invariably due to a local lesion in the genito-urinary tract or renal pelvis. When the cystoscope reveals evidence of tuberculous ulcers (these are generally found in the region of the trigone), no good can be expected from injection into the bladder of antiseptics like Iodoform Emulsion or Lactic Acid. In the large majority of these cases the bladder condition is secondary to tuberculous disease of one kidney. Treatment consists in determining (1) the site of the diseased organ, and (2) whether the other kidney is sound. When this has been demonstrated by the help of the catheterising cystoscope and a careful bacteriological examination of the urine from each kidney, the diseased organ must be removed at once. This will usually be rapidly followed by relief of symptoms, and after a period of constitutional treatment by complete cure.

In atony of the bladder when not dependent upon the obstruction of stricture or other removable cause the cystitis present must be treated as in paralytic cases, and a wide selection of agents and drugs is at the command of the practitioner. Since the use of these is indicated in all the chronic types of cystitis whose causes are beyond the reach of operative surgery, they may advantageously be considered seriatim.

First will come the discriminating use of the catheter; this will be indicated in all cases of atony and paralysis, and its use is imperative where great tenesmus and pain are present from inability of the bladder to expel its contents completely. Where there is a large amount of residual urine found upon the first passage of the instrument it is risky to empty the organ. When it is necessary for diagnostic purposes to completely evacuate the contents, a quantity of Boric Acid solution should be injected through the catheter and left in the bladder to prevent collapse from the altered pressure of the blood in the abdominal vessels.

The frequency of catheterisation will depend upon the symptoms and amount of residual urine present; the intervals can be gradually lengthened till a morning and night or 8 hours' rule becomes practicable. A soft rubber instrument of the *coudé* shape is to be preferred when such is passable, and the patient must be thoroughly initiated in the sterilisation

of it. The best lubricant for the rubber instrument is K.Y. Jelly, a proprietary preparation composed of glycerin, pulv. tragacanth, gelatin, and an antiseptic, which in addition to its lubricating properties possesses antiseptic virtues, and it tends also to preserve the rubber elasticity intact, whilst oils are liable to cause brittleness. When it is found necessary to tie the catheter in position for any length of time, a rubber instrument when possible should be selected.

Irrigation will be necessary in all cases where the urine is putrid or contains pus and blood-clots. The simplest and most efficient apparatus for this purpose consists of 2 or 3 feet of soft rubber tubing to one end of which a small funnel of glass is attached, while into the other extremity a piece of glass tubing is inserted which fits into the lumen of the catheter.

After catheterisation and the withdrawal of the bladder contents through the apparatus as the patient lies in the recumbent posture on his back, the funnel is raised and the injecting material—warm saturated Boric Acid solution or Permanganate of Potash (3 grs. to 1 pint)—is poured into it, and flows into the bladder, which should never be distended beyond moderate dimensions. By depressing the funnel the solution as readily flows out as it flowed in, and the operation should be repeated till the washings show no traces of turbidity or odour. Two, three or more pints may be required for this purpose when the urine is very foul. Many other solutions have been recommended, and the following amount of each drug may be added to 40 oz. water to form a liquid for bladder irrigation: Carbolic Acid, 3 drs.; Nitrate of Silver, 2 grs.; Sulphate of Copper, 30 grs.; Chloride of Zinc, 1 dr.; Perchloride of Mercury, 2 grs.; Resorcin, 4 drs.; Creolin, 4 drs.; Protargol, 2 drs.; Argyrol, 4 drs.; Argentamin, 5-10 mins.; Lysol, 4 drs.

When the bladder has been thoroughly washed out with boric acid or weak permanganate solution, any of the above liquids may be injected in double or treble strength, and the injection permitted to remain for a few minutes. 2-4 oz. of a 2 per cent. solution of Nitrate of Silver may be safely used in this way, or a small quantity (30 mins.) of a stronger solution (5 per cent.) may be instilled drop by drop into the neck of the bladder by Guyon's method; 2 oz. of solution of argyrol of the latter strength may be left in the bladder.

Of urinary antiseptics for administration by the mouth Boric Acid is very efficacious in daily doses of 20 grs., but this amount is very liable to produce gastric irritation and skin eruptions if continued for any length of time, and always upsets digestion seriously *when the kidneys are diseased.* Urotropin in similar dosage (6 grs. ter die) is equally efficacious and less liable to produce irritation even when given more freely. Salol, Benzoate of Soda, Betol, Aspirin, Alphol, Helmitol and many other drugs of the same class act as urinary antiseptics after their elimination by the renal organs. Creosote when given in 2-5 min. doses in capsular form is a far more reliable urinary antiseptic than is generally appreciated. Any of these drugs or each of them in turn in short courses should be administered when the habitual use of the catheter is necessary, since no patient

can be trusted always to have the instrument in a thoroughly aseptic condition; by their judicious administration the washing out of the bladder may frequently be dispensed with. Many vegetable drugs formerly prescribed as bladder sedatives, such as Pareira, Buchu, Uva Ursi, Triticum Repens, Zea Mays, Copaiba, Cubebs, Alchemilla Arvensis, &c., are steadily falling into disuse; those of them that possess any marked action owe their virtues to some antiseptic principle as the arbutin contained in uva ursi, or the volatile oil in buchu. Hyoscyamus and Belladonna exercise a sedative influence over the bladder, and either drug may be combined with antiseptics advantageously; but in full doses they are sometimes liable to precipitate an attack of retention of urine. Oil of Sandal Wood is perhaps the most reliable of the entire group; it has both antiseptic and local sedative action, and when combined with Saw Palmetto, as in the proprietary compound known as Sanmetto, most decided benefit is obtained in the treatment of chronic cystitis, and especially of the type accompanying enlarged prostate.

Alkalies (the Liquor Potassæ and Bicarbonate) are often valuable, and still are favourite agents when combined with Hyoscyamus, but the strongly alkaline reaction of urine is a barrier to their prolonged use. Chloride of Ammonium in full, and Cantharidin in minute doses, are occasionally beneficial, and the Acid Phosphate of Sodium in 30-gr. doses is most valuable where there is excessive alkalinity and much deposition of lime salts. For the relief of urgent pain and tenesmus Opium is often indicated; the best way in which to obtain all the benefits of morphia or opium without any of their drawbacks is to inject into the rectum, with a glycerin syringe, the proper dose of laudanum diluted with 30 mins. of water. In severe and intractable cases it may be necessary to open and drain the diseased bladder from a small median incision in the perineum, or by continuous irrigation after suprapubic cystotomy. The diet of the patient suffering from Chronic Cystitis should be carefully regulated to his requirements. As a rule animal food should be sparingly used, and it is a common mistake to prohibit the free use of diluents on account of the frequent call to micturate; this is often accentuated by a concentrated state of the urine, which is removed by copious draughts of barley water or other mucilaginous drink. Alcoholic stimulants should be avoided. Often benefit is obtained by a sojourn at a warm spa where alkaline waters may be freely administered.

Exposure to cold and damp should be avoided; the clothing should be warm and the feet protected by woollen stockings and thick-soled boots, rubber over-boots being worn during wet weather and in frost. Bodily fatigue, especially such as is induced by long carriage or omnibus drives, is injurious.

BLADDER, Irritability of.

This may usually be regarded as the first symptom of a cystitis, and treated accordingly by the removal of the cause and the use of the agents and drugs discussed in the previous article. It must be remembered

also that such reflex causes as displacements of the uterus, phimosis, adherent prepuce, threadworms, rectal fissures, ulcer, polypi, and hæmorrhoids may be producing frequency of micturition. The removal of these will be soon followed by a disappearance of the irritable condition of the bladder. Sexual excess, probably by inducing prostatic hyperæsthesia, is a not uncommon cause, and the symptoms rapidly subside as soon as abstinence is insisted upon. An irritating state of the urine may produce considerable frequency in micturition, as the writer has very often observed in cases of even mild glycosuria, and in the absence of bladder disease the secretion should always be examined for sugar.

Hyperacid urine is a frequent cause of irritability, and can be relieved by large doses of Bicarbonate of Soda or Potash. Phosphaturia with an alkaline or neutral urine also gives rise to this symptom. Hexamine (10 grs.) combined with Acid. Sod. Phosph. (gr. xv.) thrice daily and regulation of the diet gives immediate relief.

A gouty urethritis is also often to be met with which yields to constitutional treatment. Where the irritability is part of a neurosis, as is commonly the case in patients who suffer from severe insomnia, the treatment of the underlying condition is clearly indicated. In rare intractable cases where the irritability remains even after the removal of the primary exciting cause and the continual tenesmus is wearing down the patient, it may be necessary to open the bladder from the perineum by a small incision in the middle line and establish temporary drainage.

BLEPHARITIS, OR TINEA TARSI.

This is due to an eczema of the margins of the eyelid, and may be caused in mild cases by errors of refraction, which tend to produce a chronic hyperæmia of their conjunctival covering. In severe cases the disease may be part of a strumous or phlyctenular ophthalmia, both of which conditions will require treatment before the blepharitis can be removed.

The form known as squamous blepharitis yields after a time to an ointment of Boric Acid (1 in 20), or Yellow Oxide of Mercury (1 in 100), applied after the branny scales have been washed away every morning and evening by the thorough use of a warm solution of Bicarbonate of Soda (15 grs. to 1 oz.). The margin of the lid should be carefully dried before applying the ointment, or the scales may be removed by swabbing the margins with lint or wool soaked in Olive Oil before the ointment is applied.

In ulcerous blepharitis the treatment is more radical; the crusts having been removed as in the squamous variety, though without the use of friction, the minute ulcers coming into view are each to be cauterised by a pointed stick of Mitigated Nitrate of Silver, and any pustules pricked with a cataract knife and all loose eyelashes epilated. Where the ulcerated surface is extensive it may be brushed over with a solution of the Nitrate of Silver (10-15 grs. to 1 oz.). After thorough washing and drying by pressure, Swanzy used the following ointment rubbed in with the finger: Hyd. Precip. Alb., gr. xij.; Zinci Ox., gr. xvj.; Liq. Plumbi subacet.,

min. xij.; and Adeps. Benz., ad ʒj.; and in mild cases Boracic Acid ointment (1 in 10). Diluted Citrine Ointment meets most requirements, but these applications are useless unless the crusts and loose eyelashes are scrupulously removed by the previous use of alkaline lotions, or soaking of the lids with oil. Lachrymal obstruction, resulting from the inflammatory action, is often present in severe chronic cases, and ectropion may follow these with such complications as trichiasis, and tylosis must be remedied by appropriate surgical treatment. The general health must be attended to, and as the disease is often associated with anæmia, chlorosis, and struma, constitutional treatment with Iron, Cod-Liver Oil, and removal to a bracing seaside resort are often essential.

BLEPHAROSPASM.

Tonic contraction of the orbicularis muscle, when not due to a general hysterical condition, is always the result of some reflex irritation, originating in a twig of the ophthalmic division of the fifth nerve exposed in the cornea or conjunctiva, or of the upper or lower maxillary nerves distributed to the nose and teeth. The primary source of irritation in the eye, nose, or teeth must in all cases be patiently sought for and removed. When the habit has been long acquired the cramp may, however, remain after the removal of the exciting cause, and in such cases, and where the source of irritation cannot be reached, nerve stretching or excision of the involved branches may be necessary. Pressure over the supraorbital nerve at its notch, or over the infraorbital, temporal, or alveolar branch, may dispel the spasm for a time. In hysterical cases the obvious treatment will be that suitable to the underlying neurosis. Intractable spasm may be relieved by snipping through the orbicularis muscle at the outer canthus.

BOILS.

These are always due to the introduction of *Staphylococcus pyogenes aureus* to a hair follicle or sebaceous gland, and the *preventive* and *curative* treatment of furunculosis by Vaccine therapy may be relied upon. 100 million staphylococci administered to a patient developing an isolated furuncle always produce an immediate positive phase and arrest its development, whilst 300 million three or four days later reinforce the action of the previous dose, and put an end to the furuncle. Hence the treatment of recurring furunculosis is practically identical with that of acne, and the older methods of administering Sulphide of Calcium, Arsenic, Yeast, Nucleinic Acid, Quinine, Iron, &c., are abandoned in all chronic cases. Constitutional treatment, however, is not devoid of value, especially when boils continue to form in subjects suffering from diabetes, chronic Bright's disease, gout, or other serious organic conditions, which lower the resistance to the cocci. J. and R. Reynolds have reported excellent results from the administration of full doses of Dilute Sulphuric Acid every four hours in all cases not complicated by glycosuria.

When an isolated boil shows itself an attempt may be made to cause

its abortion by the use of local antiseptics. The skin over the summit of the inflamed cone should be scraped gently till a minute trace of blood exudes, or the hair may be plucked out of the congested follicle, and strong Carbolic Acid, Nitrate of Mercury solution, or Iodised Phenol upon the point of a sharpened end of a piece of matchwood, or a fine caustic point, should be thrust into the centre of the small circumscribed swelling. Some surgeons inject a few drops of Carbolic Acid or weak Tincture of Iodine by a hypodermic syringe. After this has been done the part may be brushed over with Collodion, Nitrate of Silver solution, Ichthyol and Glycerin (1 in 2), or Thiol, or covered with a piece of lint soaked in a solution of Chloral Hydrate in glycerin and water (1 in 4), or with a compress soaked in saturated solution of Boric Acid. When much pain is felt the Green Extract of Belladonna, rubbed up with an equal amount of Glycerin, may be smeared over it.

Sometimes the application of a piece of warmed Belladonna, Opium, Salicylic, or Mercurial Plaster, with a small circular aperture in the middle laid over the developing furuncle, causes its abortion, but when the surrounding skin is already infected new furuncles may appear under the plaster.

Schüle anaesthetises the boil with 3 per cent. Novocain till a wheal forms, then injects 1 c.c. of the solution slowly into the centre, and destroys it thoroughly by the point of the Paquelin cautery.

Where suppuration has already occurred a little strong Carbolic Acid may be brushed over the part to destroy the sensibility of the skin, or Cocaine or freezing may be resorted to, and the boil incised with a sharp abscess-knife. For large boils, and for carbuncles which are of the same nature as furuncles, sometimes the cavity or core is swabbed with strong Carbolic Acid, but upon the whole it is better after incision to wash the cavity with Hydrogen Peroxide and to apply a poultice to assist nature in the separation of the slough or central core. The old linseed cataplasm can only be kept sterile with great difficulty, and since asepsis is essential the best poultice consists of several layers of lint soaked in a warm saturated solution of Boric Acid and renewed frequently. This or any other liquid application should not be covered in with oiled silk; the retained secretion and sweat are liable to bring out further crops of boils around the skin beyond the margins of the lint. Where an evaporating lotion is indicated Rectified Spirit (1 in 3) may be applied. Salwedel's method is a compromise between poulticing and applying evaporating lotions; he lays over the part layers of lint or wool saturated with alcohol, and covers these in with oiled silk perforated by small openings.

Boric Acid Ointment is a good routine application as soon as the contents have been evacuated, and antiseptic ointments, as a rule, are better than aqueous solutions. Basilicon Ointment is a valuable application when the healing is slow. A smart saline purge is always beneficial when the suppurative process is in the acute stage, and the tension of the parts causes throbbing and constitutional discomfort, or fever.

During the healing process, Quinine and Iron, Yeast or Sulphides, and

appropriate strengthening diet as strong soups, &c., may be administered, and onions may be freely partaken of. The closest attention should be given to the cleansing of the skin by antiseptic baths, especially in the recurring form of the disease, even when vaccine treatment is resorted to. Bowen insists upon a sterilisation of the skin after a warm bath by sponging the entire body with saturated Boric Solution which is permitted to dry spontaneously. The writer prefers a bath deeply coloured by Permanganate of Potassium. The clothing and bed-clothes should be frequently changed.

In the troublesome furunculosis affecting the external auditory canal the writer finds that the best routine treatment consists in the instillation of the official Liq. Hydrarg. Perchlor., and the loose plugging of the meatus with wool saturated by the same liquid. Grosch uses solution of Acetate of Alumina (1 in 4). Where the boils are already discharging into the meatus, Boric Acid powder may be insufflated.

The treatment of Carbuncle will be described under its own heading.

BONE, Diseases of—see Caries, Periostitis, etc.

BRADYCARDIA.

The slow action of the heart, to which this title is restricted, is but a sign of various pathological conditions, some of which are situated within, whilst others are outside the organ.

The treatment of those cases of bradycardia which are due to the influence of a toxin like that produced in diphtheria, influenza, typhoid fever, gout, jaundice, diabetes, and uræmia, should be eliminatory in principle. It is of primary importance to insure rest in the horizontal position, as the paralysis of the accelerating or the stimulation of the inhibitory mechanism may be sufficient to stop the ventricular contractions during movement or exertion of the body. The poisons are certain to be eliminated by the skin, kidneys, and bowel if the patient can be kept alive for a sufficient time by the administration of highly nutritious liquid food, and if Strychnine be employed hypodermically. Hot-air baths administered in the horizontal position, diuretics and mild saline purgatives, followed by general massage, will hasten the elimination of the toxic substances. The strychnine is believed to act as an antidote to the organic poison as well as a tonic to the cardiac muscular fibres, and it is often advisable to combine it with very small doses of Strophanthus given by the mouth. 5 mins. liquor strychnine should be given twice a day by the skin, and $2\frac{1}{2}$ mins. tincture of strophanthus every six hours by the mouth. Atropine is also a drug of considerable value when used judiciously; $\frac{1}{200}$-$\frac{1}{100}$ gr. may be injected with each dose of the strychnine, or given with the strophanthus.

The treatment of bradycardia, produced by muscarine (poisonous fungi), lead, alcohol, tobacco and digitalis, is to be conducted upon the same lines. In gouty cases, Colchicum is clearly indicated in moderate doses, combined with the free use of Citrate of Bicarbonate or Potash.

When there is associated a high degree of tension in the vessels with slowness of the pulse, Nitroglycerin is clearly indicated, but this type of bradycardia is usually due to intrinsic cardiac disease of the degenerative type, as in—

Paroxysmal Bradycardia, or Stokes-Adams Syndrome.—This form of bradycardia may be regarded for all practical purposes as identical with "Heart Block." It is most frequently met with during the senile stage of life, and is usually associated with degenerative changes in the auriculo-ventricular strands of Kent, which prevent the transmission of the stimulus (originating in the auricles) to the ventricular walls. The slowness of the pulse-rate, which may fall to twenty or less per minute, is not influenced by Atropine or Amyl. The only available treatment lies in rest and the hypodermic use of Strychnine, with the administration of large doses of Iodides for long periods.

The treatment of bradycardia, caused by increased cranial pressure, and of the form associated with chronic valvular disease and arterio-sclerosis, will consist in the use of remedies suited to the primary disease.

BRIGHT'S DISEASE, Acute.

Rest must be given to the acutely affected renal organs, any attempt to stimulate the kidney by diuretics in this condition being liable to increase the congestion and to cause suppression of urine.

The patient should be ordered to take to his bed as soon as the physician is satisfied about the nature of his attack; he should be enveloped in a light flannel sleeping-suit, and have a blanket placed above and beneath him, linen and cotton shirts being objectionable where the functions of the skin require to be encouraged.

Food should consist entirely of milk, administered frequently in small quantities, and the total daily amount need not exceed 2 pints at first. The thirst which is often present may be assuaged by diluting the milk with barley water, or effervescing soda, or potash water. Potus Imperialis may be freely administered between the doses of milk, as there is little danger of the ingestion of fluids embarrassing the kidney unless extensive anasarca be present. By these means the high specific gravity of the urine is decreased, and the renal organs are relieved; even with a considerable amount of dropsy it is a mistake to prohibit liquids, as the free use of water tends towards the flushing of the renal tract, and the elimination of effete products, or the removal of epithelial detritus, and the recommendation to prohibit Chlorides is equally unnecessary. Buttermilk, two days or more old, alone or mixed with potash water, affords a most grateful means of dealing with the acute stage of the attack. Animal foods, soups, broths, and eggs, as well as alcohol, in every form should be strictly prohibited, but after a few days farinaceous food may be permitted. In the presence of symptoms of acute uræmia, the milk may for 24 or 48 hours be replaced by plain effervescing soda water given in fair amount.

Recognising that the excretory function of the renal cells is in abeyance,

the physician should aim at the elimination of the retained toxic products in the blood by stimulation of the functions of the skin and bowel.

Diaphoretic drugs are much less reliable than the hot pack or hot-air bath. These may be employed as the patient lies in bed in the horizontal position. The hot-air bath, consisting of a large copper spirit-lamp, enclosed with wire gauze as in the Davy lamp, and protected by a wooden cradle to support the bed-clothing, should be placed between the patient's knees. The spirit being ignited, the blankets should be lightly tucked in, only the face being left uncovered, and soon a high temperature of the confined air is obtained (130° F. answers all purposes). The apparatus in constant use in all hospitals is safer; this is usually made of tin. The spirit-lamp has attached to it a long bent chimney or wide telescope-tube, which permits the spirit being ignited on the floor of the sick-room; the heated air passes through the tube, which is introduced beneath the bed-clothes; all danger of fire from the upsetting of the lamp in the bed is thus avoided. The electric lamp bath may be likewise used. The ordinary hot-water bath (105° F.) may be resorted to in the absence of these appliances, but the danger of syncope induced by the removal of the patient to bed and the risk of chills are serious drawbacks to its use.

The patient may be permitted to remain in the hot-air bath for about 30 to 40 minutes, by which time usually copious perspiration will be induced, and he may have abundant warm, diluent drinks to encourage the sweating. Any symptoms of cardiac depression must be instantly met by the withdrawal of the lamp, and by sprinkling the face and hands with cold water. The bath may be repeated daily, and the temperature increased, as well as the duration of the bath lengthened according to the effects produced; after the bath the skin should be dried with warm towels and the following diaphoretic mixture administered with the view of keeping up the action of the skin:

℞. *Liq. Ammon. Acet.* ℥ij.
Spt. Ætheris Nit. ℥vj.
Aquæ Camphoræ ad ℥viij. *Misce.*

Ft. mist. cujus capiat cochleare magnum omni hora.

If feverishness be present and no cardiac contra-indication obvious, ½ min. Tincture of Aconite may be added to each dose with advantage.

When uræmic symptoms threaten, or when convulsions have already appeared, the hot-air bath should not be relied upon, but resort should be made to the more rapidly acting hot pack. A large tub or bath, half filled with almost boiling water, being carried into the sick-room, a few ounces of Mustard previously blended with cold water are mixed with the contents, after which a large double thick blanket is thrown in, and in a few minutes wrung out by two nurses to get rid of superfluous moisture. In this the patient is completely enveloped, all but his head; there is little danger of scalding, since the heat is rapidly reduced by the evapora-

tion from the large surface of flannel, and the blanket may be with safety as hot as the hands of the attendants can tolerate in the wringing process. Enveloped in this manner, the patient is placed upon a mattress or palliasse of straw, and covered over with blankets, sheets, or counterpanes, where he may be permitted to remain for one hour, or even more, till a free amount of perspiration has occurred, during which period copious draughts of water may be administered.

Where suitable appliances are not readily obtainable, Sir Jas. Simpson's poor man's bath is a useful expedient. It may be made by filling a large number of soda-water bottles with very hot water, over each of which a woollen stocking, squeezed out of hot water, is drawn; these are placed alongside the patient's body and limbs under the bed-clothing.

Pilocarpine is the most powerful known diaphoretic, and its hypodermic administration is clearly indicated in the uræmic condition, but its injudicious use has so frequently caused serious pulmonary œdema and even death that many physicians have condemned its employment. Some years ago the writer drew attention to the fact that if the drug be administered to a patient *whilst in the hot pack, after the action of the skin has been started,* there is practically no danger of lung trouble supervening; ¼ gr. may be given under these conditions with safety. Should symptoms of cardiac depression show themselves a hypodermic of Strychnine will be indicated.

The patient should be transferred to another bed with warm flannel blankets after the hot pack, his skin having been rubbed dry with hot towels. The immediate and urgent symptoms having been thus relieved by the powerful stimulation of the skin. Saline Purgatives if not already administered should be given, and they should be resorted to as a routine in every case of acute Bright's disease with a view of causing the elimination of retained products by the bowel. Sulphate of Soda or Magnesia in ½-oz. doses dissolved in half a tumblerful of aerated water may be given twice daily, or smaller amounts more frequently to keep up copious watery evacuations. Cream of Tartar alone or with compound powder of Jalap is preferable where much anasarca exists; Calomel or Blue Pill should not be given in the acute stage of renal diseases. In most cases the following mixture may be relied upon; the method of treating anasarca by concentrated solution of mag. sulph. will be described under chronic Bright's disease.

℞ *Magnesii Sulphatis* ℥ij.
Magnesii Carb. Pond. ʒiij.
Aquæ Menthæ Pip. ad ℥xij. *Misce.*

Ft. mist. Signa.—"*A large wineglassful every* 3 *hours till purging occurs, then half a wineglassful every* 4 *hours to keep up the discharge of watery motions.*"

When uræmic convulsions continue in spite of the above treatment, the question of Blood-letting must be considered, and the physician

should not hesitate to open a vein at the elbow and remove 10-15 oz. blood or more. At the same time he should inject at least twice as much warm Saline Solution into the vein or hypodermically into the loose cellular tissue of the body at several spots without pausing to consider whether the formidable symptoms are due simply to retained urea or to the presence of some toxin in the blood. The serum by diluting the remaining blood in the body prevents its concentrated action on the nerve centres, and may save life which would otherwise be sacrificed even when venesection has been employed.

In extremely urgent cases of renal suppression the method of relieving the renal congestion by cutting down upon the kidney and incising its capsule has been recommended and carried out. Decapsulation of the kidneys has certainly saved life in the acute nephritis of children. It is doubtful if the procedure of wet-cupping of the loins possesses any advantages over venesection, and the washing of the blood is quite as effectually accomplished by the hypodermic injection of the saline as by direct transfusion. In less urgent cases dry-cupping over the kidneys may be resorted to, especially when there is much blood in the urine.

If the blood-pressure is high Nitroglycerin may be safely administered, and Oxygen is indicated when asphyxial symptoms are prominent.

On the disappearance of all uræmic symptoms the question of administering diuretics will crop up when the secretion of urine is scanty and there is much anasarca remaining. As a rule it is safer practice to trust to saline purgation, but such mild hydragogue diuretics as Sweet Spirit of Nitre and the Citrate or Acetate of Potash may be tried. Digitalis in the later stage and Caffeine are valuable, but should never be employed when the arterial tension is high. Stimulating diuretics like squill, broom and gin should be avoided, and cantharidin must never be used as a vesicant or counter-irritant.

The most formidable symptom is severe headache, which, however, is usually promptly relieved by a purgative, and when persistent small doses of Antipyrine or Sodium Salicylate may be given. Opium in every form is most undesirable. Obstinate vomiting is best relieved by small quantities of sour buttermilk, which neutralise the irritating action of the poison on the stomach; when of cerebral origin, its treatment must be on eliminatory lines.

The diet should be cautiously augmented, as the amount of blood and albumin in the urine gets less, the milk being supplemented by carbohydrates in increasing amounts and vegetable soups, and at a later stage fish with egg yolk. Anæmia is always present at this stage, and the best ferruginous preparation for routine use is the extemporised preparation of the Acetate of Iron prescribed as Basham's mixture containing 10-15 mins. tincture of perchloride of iron with 1 dr. of liquor ammoniæ acetatis in water.

Should anasarca and albuminuria remain after the elapse of several weeks the treatment of the case and its complications becomes identical with that of chronic Bright's disease, but the routine use of the hot-air

bath and saline purgatives may be safely continued daily for a period of two or three weeks as long as the patient's strength is maintained. At the end of this time the bath may be given every second or third day for three more weeks, the purgative being administered during the intervening days. A change to a warm equable climate is most desirable in cases which show a tendency to pass into the chronic form of the disease. For long after convalescence it is needless to say that the most scrupulous avoidance of chills and exposure of every kind is to be guarded against by warm clothing and by keeping indoors after sunset in all climates.

War Nephritis, about the causation of which so much has been written lately, yields to the treatment suitable for a mild case of acute Bright's disease—rest in bed between blankets, a purely milk diet, mild saline purgation, a feeble diuretic like effervescing soda or potash water to flush the kidney, and according to some authorities the avoidance of salt. The researches of Keith and W. W. D. Thomson prove the great importance of functional tests for determining the extent of renal impairment in the non-resolving type of war nephritis, and these authorities testify to the value of alkalies in restoring the normal acid-base relationship when symptoms of acidosis supervene (see page 19 and 20).

BRIGHT'S DISEASE, Chronic.

The treatment of the chronic is on the same lines as that of the acute disease—viz., to insure as much rest as possible for the diseased organ, and to encourage the eliminatory action of the skin and bowel.

The treatment of the form known as *Chronic Parenchymatous* or *Tubular Nephritis*, which is pathologically identified by the presence of the large white kidney, will be first described.

Dietary is of vital importance, and as in the acute disease, which often lays the foundation of this chronic form, milk takes a prominent place, but the mistake is too frequently made of keeping the patient upon an exclusively milk diet for an indefinite period to the deterioration of his general physical condition, especially when the drain of albumin is continuously high. It is, however, a good routine to place the patient when first seen, upon an exclusive milk regimen for such a time as will enable the physician to satisfy himself thoroughly whether the case he is dealing with is a mild acute affection or an essentially chronic affection. 3 or 4 pints of milk daily must be considered as a minimum amount to maintain the nutrition of the body, especially when the patient is not strictly confined to bed. Should digestive disturbances be present peptonisation of the fluid will be necessary, or a fairly acid buttermilk may be substituted, or, better still, Koumiss may be given. It is a safe practice to continue this dietary as long as any uræmic symptoms are present, or, in the absence of such, as long as the patient continues to improve in physical tone and condition. Usually after some weeks it becomes necessary to supplement the liquid dietary by farinaceous foods, the best of which is porridge, well boiled with milk; gruel, rice, bread and butter, weak tea with plenty of cream; vegetable soups, white fish, and, at a later stage,

weak mutton broth or boiled mutton may be permitted in small quantity. There is a consensus of opinion that meat extracts and strong animal soups, as well as alcohol in every form, should be prohibited. There is a doubt about the advisability of adding eggs to the diet, owing to their richness in albumin, especially when the urine is highly loaded with this substance, but the yolks of lightly- or hard-boiled eggs may be freely permitted when the patient relishes this article of diet, and they may be advantageously taken as a dressing or accompaniment of fresh lettuce. Peas, potatoes, and fresh fruits and vegetables should enter into the dietary in all cases, but asparagus, owing to the diuretic action of its contained Althein, should be regarded as a medicine to be used tentatively.

A salt-free dietary is only of importance where anasarca is a prominent feature. The mistake is made of trusting to such a dietary for the elimination of the retained metabolic products over whose production it has practically no influence. The excretory power of the kidney over chloride of sodium in patients suffering from chronic tubal nephritis is often much diminished, hence the salt remaining in the tissues retains water there and increases the dropsy. This is seen in some cases of great œdema where the use of a salt-free diet is sometimes followed by a large increase in the amount of urine passed, and a corresponding diminution in the dropsy.

It is impossible to have an absolutely salt-free diet, but by avoiding the use of the chloride in cooking and at the table, the daily intake can be reduced to 20 or 30 grs. by using cream instead of milk with rice, arrow-root and porridge, and tea, and avoiding the use of salt in the making of butter, biscuits and bread. Chicken, fresh-water fish boiled, potatoes, fresh fruit and cream cheese, constitute the staple dietary, which should contain only a moderate amount of liquid. Such a dietary, as in the case of an exclusive milk regimen, should only be persisted in for a few weeks at a time; it is clearly indicated in œdema of the lung.

When the condition of the patient permits of his moving about in the open air, clothing is an important element in the treatment; he should be clad in flannels, and his footwear must be impervious to cold and damp. When complications exist which compel him to remain in bed, he should lie between blankets, and have a freely ventilated room warmed by the fire of an open grate. In the case of children, unless in warm sunny weather, they should be kept in bed, and in winter confinement to a warm room is usually necessary.

The value of climatic treatment is not to be lost sight of when the patient's means enable him to obtain the benefits of a warm, dry atmosphere as that of the Nile or Algiers. In the selection of a climate the most important consideration is to avoid those where the variations of daily temperature are sudden and extreme. Madeira or the Canary Isles afford an equable moist climate for winter resort, especially suitable for patients liable to exacerbations of acute attacks who bear cold badly.

The action of the skin is to be sedulously maintained in a high state of efficiency. In the absence of anasarca or uræmic symptoms the patient is usually able to move about, and beyond the extra precautions as regards

clothing, active diaphoretics can only be employed occasionally. A hot-air or Turkish bath, or in the absence of these a hot-water bath, should be taken every third or fourth night, after which the patient should immediately retire to bed between blankets to prolong the action of these diaphoretic measures.

When there is no dropsy the indication for active treatment by diaphoretics is the diminution in the output of the nitrogenous elements in the urine, due allowance being made for the lowered amount of proteids in the altered dietary. When the bulk of urine is small and the S.G. markedly diminished, even in the absence of symptoms the patient should be ordered to bed and a daily course of hot-air baths prescribed in conjunction with diaphoretic drugs like Mindererus Spirit and Sweet Nitre, as in the treatment of the acute variety of the disease. Pilocarpine by the mouth is recommended, but the use of this drug should be confined to the treatment of the acute uræmic condition; the Tincture of Jaborandi is, however, often of use when there is much blood in the urine, and this is also true of Indian Hemp.

It is necessary to exercise caution regarding diuretics. Digitalis in moderate doses, when the tension is not high, is usually quite safe, and as a rule it can be advantageously combined with iron, as some degree of anæmia is always present. The mixture of the tincture of digitalis (5-10 mins.) with an equal quantity of tincture of iron in each dose, to which 5 mins. dilute phosphoric acid are added, may be taken thrice daily after food for considerable periods. Copaiba, gin, squill, calomel, and other irritating diuretics should never be employed, and though some authorities speak highly of Cantharidin in small doses this agent must be tried with extreme caution.

Suprarenal Extract, Diuretin, Thephorin, Theocine, Agurin, and other Theobromine salts are safe, and may be tried, when the renal secretion is scanty and there is much dropsy; Caffeine is a good routine drug also: all these strengthen the heart and are indicated when there are any signs of cardiac weakness, but as diuretics they are useless in the late stages of the disease.

Trinitrin often acts as a powerful diuretic when the tension is high and the urine scanty; half of a tablet may be given every hour for 4 or 6 times; if no increase in the secretion is observable at the expiration of eight hours its use may be abandoned.

Saline purgatives are always indicated unless when obstinate diarrhœa is present. The most manageable of these is the Sulphate of Magnesia which may be administered every second morning before breakfast as a routine in most cases. Many patients prefer the natural mineral purgative waters, the best of which is Rubinat. In advanced stages of the disease with threatening uræmia and scanty renal secretion, the patient must be ordered to bed and salines administered till a free drain upon the bowel is established, which must be daily kept up by the use of Cream of Tartar or small doses of Mag. Sulph.

No drug can be depended upon to reduce the amount of albumin in the

urine. An absolute milk diet undoubtedly tends to diminish the quantity of albumin, but this effect soon passes off, the albuminuria remaining at a standstill; when this occurs the diet should be altered, and carbohydrates with fish administered. Too much importance has been attached to the amount of albumin present, and no attempt should be made to treat the disease symptomatically from the standpoint of its being simply an albuminuria. When the albumin has been supposed to diminish after the use of a drug it will generally be found to be but an apparent reduction owing to the diuretic action of the remedy administered, since the urine becomes increased and the albuminous fluid diluted; hence the effect of a strictly milk diet on the quantity is always more apparent than real. In the amyloid form of renal disease great quantities of albumin may be voided daily for years without making a grave impression upon the general health. Vegetable and mineral astringents are not only useless but harmful, and as a rule strontium and calcium salts possess no influence over the daily excretion of this substance. When, however, much blood appears in the urine great good can often be obtained by saturating the system with Chloride or Lactate of Calcium; these materially lessen the albuminuria which has been augmented by the outpour of pure blood. In this way also Jaborandi and Indian Hemp may prove useful.

If a routine treatment by drugs must be prescribed in chronic tubal nephritis, the least objectionable and the most generally useful will be the combination of Digitalis with Iron Acetate already mentioned, along with the morning purgative dose of a saline hydragogue.

Decapsulation of the kidneys has been performed successfully in several cases with the view of causing new vascular development between the vessels supplying the renal structure and those supplied to the neighbouring tissues; a new vascular capsule forms, and the amount of urea eliminated increases markedly, and in many instances a permanent cure has been reported.

In the late stages of the disease *anasarca* may threaten life, and must be relieved by more active medication. As by this time the inadequacy of the kidney has become established, no reliance can be placed in diuretics, and calomel is especially dangerous; saline cathartics must be pushed to the farthest extent compatible with the patient's weakened condition. In the general water-logged condition Hay's method of using these agents may be resorted to; he gives 2 oz. Mag. Sulph. dissolved in 2 oz. water after the bowel has been emptied by a 12 to 18 hours' fast. Many pints of fluid may be evacuated by this plan of purgation, and it may be the only available method of prolonging life in the œdema which attacks the lungs or of saving life in the sudden œdema of these organs which occasionally supervenes in the acute form of Bright's disease. A salt-free diet should have a trial in all such cases.

Fluid in the pleuræ, pericardium or peritoneal cavity seldom is so great as to cause danger, but should this occur aspiration must be employed. As a *dernier ressort* the subcutaneous tissue of the lower extremities may be punctured after thorough sterilisation of the skin has been effected,

and its surface has been smeared over with a mild antiseptic lanolin ointment. A number of punctures should be made with a moderately coarse glover's needle over the tali, malleoli, and dorsum of the foot, after which the limbs are to be enveloped in moist warm sterilised flannel bandages. The drainage should be encouraged by elevating the head of the bed so as to determine the dropsical swelling to the seat of the punctures, and in this way many pints of fluid may be evacuated. Sometimes the drainage is effected by leaving a fine Southey's tube *in situ* in the region of each ankle, but the danger of erythematous or erysipelatous eruptions, followed by sloughing, must not be lost sight of whenever the skin is punctured.

When convulsions occur the treatment of uræmia, as mentioned in the previous article, must be promptly commenced; the hot pack, saline purgatives, and in extreme cases venesection with the injection of large quantities of saline solution should be administered. Pilocarpine only being resorted to when there are no signs of pulmonary œdema, and Nitroglycerin used when the tension is high. Chloral Hydrate with Bromides in full doses may be administered by the bowel, and Oxygen inhalations used when the convulsions fail to respond to the action of these diuretic agents, or Chloroform may be tried.

In those cases where respiratory embarrassment, &c., point to the supervention of *acidosis*, the injection of alkalies after venesection is imperative. Vomiting and diarrhœa are to be treated upon general principles, one of the most effective agents being sour buttermilk in small and frequently repeated doses in both these troublesome complications; under ordinary circumstances the diarrhœa should not be controlled by the use of astringent drugs, and opium should not be employed.

Chronic Bright's disease often exhibits acute exacerbations, usually the result of chills or exposure, which manifest themselves by the presence of blood in the urine, and often with increase of anasarca. The treatment should be identical with the management of a typical attack of the acute disease, the patient being sent to bed and hot-air baths, purgatives and mild diaphoretics administered till the case resumes its usual chronic features.

When *pregnancy* complicates the chronic affection, symptoms of uræmia are to be closely looked for; should convulsions occur the uterus must be emptied without delay after chloroform has been administered and venesection followed by saline injections, but the persistent use of saline purgatives may tide the patient safely over the later months till normal delivery occurs.

Uræmic dyspnœa, when not yielding to purgatives and hot-air baths, may be sometimes relieved by drachm doses of Ether or by inhalations of Amyl.

Insomnia should not be met with opiates; Trional or, better still, Paraldehyde may be safely employed; or when the degree of insomnia is not serious Bromides should be tried. Headache may be relieved by Antipyrine in combination with Caffeine, and it is worth remembering that

the intense headache of the later phases of the disease may be of meningeal origin, and not symptomatic of uræmia, as is ordinarily the case.

Hiccough is usually a terminal symptom; when obviously so and the patient is sinking from the agonising exhaustion which it causes, the question of a full hypodermic dose of morphia should be considered with the view of securing euthanasia, and it should not be withheld under such circumstances after the full situation has been explained to the sufferer and his friends, and their acquiesence has been obtained.

The treatment of the *fatty* kidney form of chronic Bright's disease is identical with that of chronic tubal nephritis.

Amyloid or *Waxy* disease of the kidney is sometimes included amongst the group of chronic Bright's disease. The treatment consists in the removal of the cause of the prolonged suppuration which has induced the lardaceous disease, and when bone necrosis is the source of this, operative interference is demanded even though the urine should contain a considerable degree of albumin. The same remarks apply to suppurating lymphatic glands, joints and all forms of chronic abscesses. As a rule amputation is to be preferred to excision when joint disease is the cause of lardaceous degeneration. When the affection has appeared as a sequela of syphilis the constitutional treatment of the causal disease should be commenced by giving large doses of Iodide of Sodium, mercury being given sparingly and only for short periods at a time. Iron is always indicated, and highly nutritious mixed foods should be administered instead of milk diet, as there is always considerable anæmia, and practically no tendency towards uræmia and anasarca unless when tubal or interstitial nephritis supervenes in long-standing cases. Arsenic is highly recommended by several authorities and Phosphorus by some, but their utility is doubtful; the former drug may be combined with the iron for short periods.

The *Cirrhotic* form of Bright's disease (small red or contracted kidney) is to be treated in the main upon the above lines, but with the following modifications:

All excess in eating must be rigorously guarded against. Should the patient be content to live upon a purely vegetarian diet all difficulty will be solved, otherwise he may be allowed to have one moderate meal containing white meat daily, or roast beef, or mutton every third day may be permitted, with farinaceous foods and eggs in fair amount along with fresh vegetables, fruit and potatoes. White fish and chicken should, however, form the staple of his animal food supply; strong soups, game, meat extracts and dishes strong in nuclein must be avoided. Large amounts of fluids are to be prohibited, though occasionally they are advantageously used for short periods to prevent nitrogen retention, and alcohol in every form abstained from or only used in extreme moderation and largely diluted when any complication or symptom warrants its exhibition. Strong tea or coffee is also objectionable, but there is no reason why a very moderate amount of tobacco may not be permitted when the patient has been accustomed to its use.

Warm clothing and everything which tends to keep the cutaneous surface in a healthy and active state without inducing continuous perspiration should be encouraged, hence a warm or Turkish bath twice a week at bedtime is desirable, but as a rule cold baths and open sea-bathing should be prohibited, and the writer is convinced that the morning cold bath should be replaced by a tepid one or else abandoned. The tepid morning sponging indulged in by many patients is not free from serious objections, and is wholly unnecessary when a warm bath and good wash is employed at night two or three times weekly.

The Canaries, Madeira, or the West Indies afford the best conditions for those able to avail themselves of climatic treatment. The condition of the bowels should be closely attended to, and it is essential that not only should constipation be avoided, but a saline purgative should be taken every second or third morning at least, and in the late stages of the disease upon every morning before breakfast.

Often the treatment is that of the arterio-sclerosis of which the renal disease is but a part, and the influence of such agents as tend to produce degeneration of the vessels must be rigorously avoided, as overwork, mental and physical, worry, alcoholism and gluttony. Syphilis, lead-poisoning and gout if present will require appropriate treatment, and the general principles laid down in the article on Arterio-sclerosis for the regulation of the patient's life with regard to work, exercise, sleeping hours and recreation should be carried out.

Renal cirrhosis being usually associated with high arterial tension and cardiac hypertrophy, many of its victims succumb to cerebral hæmorrhage. The question of whether active drug treatment should be continuously employed with the view of lowering arterial pressure is not such an easy one as it may appear; since in the first place it is obviously impossible by drugs to maintain for a period of years a continuous diminution of tension in the vessels, and secondly because there are strong reasons for believing that a permanent reduction of tension below the normal is not free from serious danger. The possibility of the rupture of a cerebral vessel is always a real one, and there should be no hesitation about the employment of agents which reduce tension when this becomes suddenly very high with a bounding pulse and throbbing vessels. The cause of the sudden superlative tension should be sought out; it may be found to be a transgression in dietary which may be remedied by a reduction of food, or it may be the result of mental worry or strain of a temporary character, or of insomnia, some intercurrent febrile attack, chill or over-exertion which has thrown extra work upon the already inadequate renal organs. The immediate treatment in all such attacks is obvious and imperative; the tension should be at once reduced by a vaso-dilator given in small and frequently repeated doses and a smart saline purgative administered, absolute rest of the body for the time being insisted upon.

Iodide of Sodium or Potassium is the best routine in permanently high tension; it may be given in daily doses of 15-20 grs. for considerable

periods. In the intervals during its suspension Nitroglycerin, in doses of half a B.P. tablet, may be taken six or more times during 24 hours, or the more slowly acting Nitrite of Soda or Tetranitrate of Erythrol may be employed in ½-gr. doses six times daily; the high-frequency current has been found of considerable value. In the acute attacks of high tension which sometimes suddenly appear without warning or apparent cause, and which are associated with pulmonary embarrassment and cardiac dilatation, a vein should be quickly opened as the only method of warding off a fatal issue. The writer has had a case under his care where the use of the lancet was upon several occasions resorted to with happiest results; the patient, a medical man, opened his own vein upon three or four occasions with immediate relief from what was felt to be impending death.

Where the tension in the arteries falls below the normal without the use of vaso-dilators this may be the first sign of failing compensation owing to the hypertrophied organ having lost its tone or become the seat of degeneration. The danger of dilatation of the heart under even moderate exertion in such circumstances must not be lost sight of, and cardiac tonics, as Digitalis, Strophanthus, and Strychnine are clearly indicated, as in other forms of failing compensation, till the blood-pressure is elevated to slightly above the normal.

Insomnia is best relieved by large doses of Bromides, combined with a small amount of Chloral Hydrate, Indian Hemp, or Hyoscine; Paraldehyde may be tried, or Trional in 20-gr. doses.

The polyuria of this diseased condition should not be interfered with save by a moderate restriction of the intake of fluid. As there is little tendency to anasarca unless in those comparatively rare cases where an acute attack of tubal nephritis supervenes upon the chronic interstitial affection, agents for the relief of dropsy are seldom clearly indicated, and diuretics should be sparingly used.

Uræmia is the ever-present danger in the later stages of the disease, and this may be long warded off by a judiciously arranged dietary, by the continuous use of saline purgatives, and by close attention to the functions of the skin. When twitchings of the muscles, headache, cerebral irritation or dyspnœa appear the active treatment of the uræmic condition by the hot pack should be resorted to, and Pilocarpine administered. There should be less hesitation in employing this latter drug than in the type of renal disease where dropsy is a prominent feature, and Nitroglycerin or Amyl Nitrite may be freely used in all uræmic cases where the blood-pressure is high. The supervention of symptoms of acidosis demands the prompt injection of alkalies. Upon the first appearance of signs of cerebral hæmorrhage a large vein may be freely opened, especially since it is difficult to gauge how much of the cerebral depression may not be owing to the general toxæmia.

Decapsulation of the kidney, though apparently less hopeful than in the parenchymatous type, has been advocated.

BROMIDROSIS.

The feet and armpits are chiefly the seat of this affection, with its excessive perspiration accompanied by evil-smelling exhalations. The most scrupulous and frequent cleansing by antiseptic solutions must be rigidly enforced, and the general health carefully attended to. Internal remedies are of little use, though Belladonna or Atropine internally has some influence upon the secretion of the sweat, and may be combined with Ergot; or 10 grs. of Boric Acid along with 30 grs. of Precipitated Sulphur morning and night may be tried.

The best local treatment is powdered Boric Acid rubbed into the skin and dusted freely between the toes, and generously strewn over the inside of the stockings and boots, and repeated twice a day or oftener with change of stockings after thorough washing in two or three waters containing Condy's fluid, Creolin or a small quantity of Chlorinated Lime. Cork inside soles should be worn and changed from time to time, or dipped into saturated Boracic Acid Solution and allowed to dry. Stockings may be treated in the same way with advantage. Old footwear should be discarded and roomy shoes, or boots with cloth tops, are to be worn; the feet should be kept as cool as possible, and the armpits well ventilated by apertures made in the undershirt. This treatment will, in the great majority of cases, effect a cure if persisted in. Strong Boric Ointment may be used instead by those who have long walks to accomplish. Smearing the feet or axillæ with Glycerin or sponging with strong Alcohol is often efficacious.

Bardet recommends Pulv. Talcis, ʒx.; Bismuthi Subnit., ʒxi.; Potassii Permang., ʒiij.; Sodii Salicyl., ʒss., sprinkled inside the stocking soles after washing the feet.

Pringle uses Sodii Salicyl., 15 grs.; Bismuth. Subnit., 30 grs.; Pot. Perman., 80 grs.; with Creta Prep., 6 drs.

Liniment of Belladonna is useful when painted over the feet or armpits; and Hebra used the Diachylon Ointment (melted diachylon plaster, mixed with an equal weight of linseed oil), spread upon strips of linen and applied morning and night. In a few days the thick cuticle exfoliates, leaving a healthy skin below. After this has come away, astringent dusting powders effect a cure in a few weeks.

Stillians recommends the painting on of a 25 per cent. Solution of Aluminium Chloride, which should be allowed to dry on the skin. Hydrg. Perchlor. Solution 1 in 2,500 has been tried, and solution of Salicylate of Soda, Oxalic Acid, Naphthol and Boroglyceride have given good results. A strong spirituous solution of Quinine and a 6 per cent. aqueous solution of Zinc Chloride have given good results. Unna uses an ointment consisting of equal parts of Zinc Ointment, Turpentine and Ichthyol, and dusts in a powder during the day composed of 15 grs.powdered Mustard and 1 oz. Talc. Kaposi applies a solution of 24 grs. Naphthol, 48 m. Glycerin, and 1 oz. Alcohol, twice a day, and afterwards dusts on 16 grs. Naphthol, mixed with 3 oz. Starch Powder. Formalin painted over the sole of the foot in 5 per cent. solution and a weaker strength (1 per cent.) applied

to the dorsum is also efficacious. Resorcin diluted with starch makes a good antiseptic powder.

Dry Boracic Acid will often effect a cure when ulcers and abrasions occur, but the use of a 5 to 10 per cent. Solution of Chromic Acid as a preventive before ulcers break out was adopted in the German Army for tender feet. The writer has seen trouble follow the use of this solution in cases where blisters or ulcers had already formed, and several cases of serious poisoning from the absorption of the acid are reported. A 2 per cent. Ointment of Salicylic Acid is now used in army practice.

Neebe places the soles of the feet and heels in crude Nitric Acid for a few seconds or in Hydrochloric Acid for ten minutes, taking care not to let the acid come in contact with the dorsum of the foot. As soon as pain is excited the immersion is stopped. The skin, especially between the toes, is then carefully washed in soap and warm water. Applications of the hydrochloric acid are repeated twice weekly for five to eight weeks, when a permanent cure may be confidently expected after exfoliation has been completed. A 10 per cent. solution of Nitrate of Silver may be used in the same manner.

BRONCHIECTASIS.

The patient should be treated by outdoor living, improved hygienic surroundings, abundant nutritious food, Cod-Liver Oil, and such climatic conditions as are usually indicated in wasting disease caused by chronic disease of the lung inducing dilatation of the bronchi. In all cases an atmosphere as free from septic organisms as possible should be selected, hence an Alpine or a bracing seaside resort is desirable, while the primary disease, as fibroid phthisis, asthma, bronchitis, emphysema, &c., should be dealt with by the remedial agents suitable to each affection.

The special indications for the treatment of the bronchiectasis itself are to sterilise as far as possible the contents of the cavities and to facilitate their thorough evacuation.

For the former purpose volatile antiseptics internally are employed; the best of these for routine administration by the mouth is Creosote, which may be given in 2-3 min. capsules 3 or 4 times a day or oftener; Guaiacol in double these amounts, Eucalyptus Oil, Eucalyptol, Thymol, Terebene, Myrtol and other agents of the same class are also valuable when creosote is objected to on account of its unpleasant odour. Allyl Oil obtained from the leek may also be given in 1-2 min. capsules. W. C. Minchin has demonstrated the great value of Garlic swallowed or used in the form of the volatile oil on a Yeo's inhaler. It is not only an invaluable germicide, but a most reliable expectorant, and, moreover, it is practically innocuous. The garlic may be mixed with the food, taken in capsules of 30 mins. of the juice or in cachets containing the dry bulblets. By keeping the blood saturated with these volatile substances the multiplication of the putrefying organisms present in the cavities can be considerably retarded, their action being supplemented by the next-mentioned class of agents.

Inhalations.—Any of the before mentioned may be employed; the best is Creosote volatilised by heat. Chlorine, Iodine, Menthol, Eucalyptus, Carbolic Acid, Terebene, Thymol, or Oil of Peppermint may be given as an inhalation with hot water, or placed in any of the respirators made for the purpose. It is a good plan to saturate the air of the patient's room with the vapour of Turpentine or of the Oleum Pini Pumilio or Oleum Krummolzol. Most of the above-named antiseptics may be administered also in the form of spray.

Chaplin's method consists in sterilising the sputum by inhalation. A small evaporating dish is partially filled with the so-called crude creosote obtained by the distillation of coal tar, a small chamber is selected with a closely fitting window and door, and as the fluid is heated by a spirit lamp, dense white pungent fumes are given off which excite severe coughing, whereby the cavities soon become thoroughly emptied and their lining membranes disinfected. The eyes and nasal mucosa must be protected from the severe irritation; half an hour will be sufficient in length for each sitting, but if the chamber be large and the vapour of the creosote thereby diluted, the inhalation may be extended to double this time or longer. After 5 or 6 weeks in many cases the results are most successful, and where the dilatations have not been extensive a complete cure may be expected to follow.

Oxygen inhalations by Stoker's continuous method have given excellent results, and in a case reported by Herringham, the fetor which had persisted after the use of the creosote chamber disappeared almost completely, and the amount of sputum fell from 10 or 12 oz. to 1 oz. daily.

Chloride of Ammonium formed by sprinkling salt upon strong vitriol, placed in vessels alongside those containing strong ammonia, is a valuable method of treatment, and the patient can be kept living in a room impregnated with the nascent fumes for long periods. The formulæ usually employed for sprays containing creosote, carbolic acid, menthol, &c., are as a rule worthless, the drugs being in such diluted solutions, and, moreover, the antiseptic spray is liable never to reach the infected cavity at all, and the liquid preparations for sprinkling upon inhalers or for use with boiling water are little better. It is a good plan to have a flannel binder, moistened with Oil of Eucalyptus, placed round the chest and abdomen; the odour of the oil is given off slowly all day, and is inhaled by the patient constantly.

Intratracheal injections have been used with advantage. 5 grs. Menthol and 1 min. Guaiacol dissolved in 54 mins. Olive Oil may be injected twice a day into the trachea through the laryngeal opening, care being taken to secure the flow of the oil into the cavity by arranging the patient's posture on the affected side.

This method and the dangerous one of injecting disinfectants through the chest wall are rendered unnecessary by the employment of the creosote chamber, and the continuous saturation of the blood with garlic as carried out by Minchin.

Where there is one large cavity, especially if near the middle or base

of the lung, which cannot be reached by inhalations and which the patient cannot empty by severe coughing, the propriety of making a free opening from the outside, and providing thorough drainage (especially if the physical signs show that it is near the surface of the lung), is established, though on the whole surgery has failed in this disease, owing to the formation of the permanent sinuses which are liable to follow.

The patient should be educated to assume such a position as will upon coughing enable him to empty the cavity by the force of gravity. This he may do lying in bed and almost inverting his body supported by his hands placed on the floor, whilst his head is lowered almost to the level of his hands. The pus sometimes flows out in a stream when this posture is assumed, and many patients have discovered this plan for themselves in some act of stooping as in the tying of their boot-laces. After the evacuation of the cavity contents it is a good plan to administer the internal dose of creosote or garlic, which will thus exert its full power over the lining of the empty dilatation.

BRONCHITIS, Acute.

There is little indication for active drug treatment in acute catarrh involving the upper portions of the respiratory tract in otherwise healthy subjects. Where the patient persists in going about and attending to his ordinary duties, the physician should be careful not to prescribe the remedies indicated where the affection is more severe and where the patient is confined to his room. Thus diaphoretic remedies, sprays and inhalations render the patient more susceptible for the time, and should he expose himself immediately afterwards, a mild attack of nasopharyngeal tracheal or bronchial catarrh may be converted into one of capillary bronchitis. A hot bath at bed-time, followed by a large Mustard poultice and one dose of Morphia, $\frac{1}{4}$ gr., upon lying down, will give relief during the night and sometimes will shorten the attack. For administration during the day, when there is much unnecessary coughing, 3 or 4 mins. of Liquor Morphinæ and 10 of Vin. Ipecac. may be given every few hours. Attempts to abort the attack upon the first appearance of nasal symptoms by large doses of Quinine, Morphia, Carbolic Acid, &c., or by snuffs and sprays are generally futile, but the vaccine treatment referred to later on is often highly successful.

When the catarrh, though limited to the larger bronchi, is more severe and is ushered in by some feverishness and dry, harassing cough, with sense of constriction and rawness in the chest, or where the affection is bronchitis of the middle-sized tubes from the first, the patient must be confined to his bed or to his room, which should be kept at an even temperature a little over 60° F., and the air should be rendered moist by the vapour of hot water. For this purpose the ordinary bronchitis kettle placed upon the fire is best, or a few feet of tin tubing attached to the spout of any kettle will do. The numerous petroleum and spirit-lamp contrivances so much used should be strongly condemned. The unwholesome products of combustion escaping into the confined dry air of the

room aggravate the cough, and add to the bronchial irritation, and it is not an unusual event to find the cough cease when they are discontinued. Much benefit has been obtained in the treatment of acute bronchitis and all forms of catarrh of the upper air passages by inhaling a fine spray containing Adrenalin. Zuelzer states that its action in some cases is really marvellous when asthma is present.

Diluents should be administered, and there is nothing more grateful than home-made lemonade mixed (just before being swallowed) with kali water, the resulting Citrate of Potash formed by the combination being a valuable diaphoretic and expectorant. Sweet Spirits of Nitre in drachm doses is a good diaphoretic at this stage, or the following mixture may be prescribed:

℞ *Pot. Bicarb.* ʒj.
Tr. Aconiti min. xx.
Aquæ ʒxij. *Misce.*

Capiat cochlearia duo magna cum cochleare uno magno succi limonis quarta quaque hora.

In the early stage the chief indication is to alter the dry, swollen and congested condition of the bronchial surface, and "to cause the tubes to sweat," and there is no remedy equal to small and repeated doses of Tartar Emetic, which may be administered after the first 24 hours combined with Morphia to great advantage, thus:

℞ *Antim. Tart. gr.* j.
Liquor. Morph. Tart. ʒiss.
Vini Ipecac. ʒij.
Aquæ Camph. ad ʒvj. *Misce.*

Fiat mistura. Sumat cochleare mag. tertia quaque hora.

A large poultice of Linseed and Mustard should be applied to the front of the chest to cause thorough redness of the skin, and when it becomes so irritating that it can no longer be borne with comfort, it should be replaced by a layer of warm cotton-wool, and another poultice of the same kind applied to the back between the shoulders, after which a warmed extemporised jacket of cotton-wool or Gamgee tissue may be worn or Thermogene applied if the skin be not too tender. The poulticing may be continued throughout the attack by applying plain Linseed poultices every 2 or 3 hours after the Linseed and Mustard have caused redness should there be much constriction of the chest or dyspnœa.

In the case of children the same treatment may be carried out, only Morphia or Opiates should not be given. Young patients will, however, bear almost as large a dose of Antimony and Ipecac. as an adult. For a child two years old the following may be given in teaspoonful doses every 2 hours:

℞. *Vini Antim.* ʒij.
Vini Ipecac. ʒij.
Aquæ Ammon. Acet. ʒiv.
Syr. Tolu. ʒiv.
Aquæ ad ʒii. *Misce.*

A previous hot bath assists the action of the expectorant; a smart purge is of use, and in gouty subjects affords marked relief. A teaspoonful of Rochelle Salt, preceded by 1 or 2 grs. of Grey Powder for children, and for adults a 5-gr. Blue Pill, followed by a wineglassful of Rubinat Water, may be given.

The dry, harassing cough under this treatment gives place to a moist, easy, and loose expectoration, after which the Antimony may be discontinued, and the following administered in teaspoonful doses after meals: Pot. Iodidi, 1 dr.; Vini Ipecac., 3 drs.; Spt. Chlorof., 3 drs.; Inf. Senegæ ad 4 oz.; misce. Or, Ammon. Carb., 1 dr.; Spt. Ammon. Arom., 4 drs.; Aquæ Chlorof. ad 6 oz.; misce. A tablespoonful, with water, every four hours.

Carbonate of Ammonia in full doses may also be given in the first stage of the affection with advantage, if there be any indication for a stimulant. Should the cough appear to be out of proportion to the amount of expectoration present, it can be allayed with anodynes, but no greater mistake can be made by the physician than simply to order Morphia or Chloral to quiet cough when the tubes are filled with secretion. In young and also in aged patients this practice may be followed by fatal results. It checks the expectoration, and renders it more tenacious; at the same time the sensitiveness of the mucous surface and of the respiratory centre being diminished, the cough does not occur, and the secretion gathers in the tubes.

Murrell gave 5 gr. doses of Terpene Hydrate in combination with Tar Syrup and flavouring ingredients, and Ringer advocated Tincture of Belladonna in 10 min. doses.

If these measures fail and the accumulation of mucus in the smaller divisions threatens asphyxia, an emetic dose of Carbonate of Ammonia may be given, and Strychnine hypodermically will be indicated with Alcoholic stimulation; Oxygen inhalations may be resorted to. The prominence of suffocation symptoms will probably be due to extension of the catarrhal inflammation to the finest ramifications of the bronchial tree, when the treatment indicated for the capillary type of the disease must be promptly instituted. Galli-Valerio has shown the great efficacy of Arsenic and Salvarsan in the acute spirochæte bronchitis of the East.

The *preventive* treatment of acute catarrhs is an important matter; perhaps quite as much mischief is done by the coddling system as by the craze of "hardening" children by indiscriminate cold bathing and indiscreet exposure in all weathers. The medical adviser should strike the happy mean and insist upon a rational amount of warm clothing and an

abundant supply of pure air. The dread of "draughts" is the most serious difficulty to contend against, as may be continually witnessed by those who travel much in crowded public conveyances where many timid individuals insist upon tightly closed windows, and are ignorantly happy and content in breathing a vitiated atmosphere laden with the microbes which inevitably produce catarrh of the nasopharynx and bronchi. In very susceptible individuals the use of the Combined Vaccine for colds every 3 or 6 months is a most effective preventive, and when injected at the commencement of an attack often speedily causes its abortion or modifies its intensity considerably. Doses of 3 million *M. Catarrhalis* have been given.

CAPILLARY BRONCHITIS.

Catarrhal inflammation of the fine bronchial tubes must be treated more actively owing to its greater gravity and urgency, especially as the disease is more commonly met with in children, who may rapidly succumb to the asphyxia liable to supervene upon the blocking of the small bronchi by secretion and by collapse of the air cells as in the form of the affection liable to follow the bronchitis of measles and whooping-cough, which is usually designated catarrhal pneumonia. Here, in addition to warmth in bed and copious steam inhalation in a room whose temperature must be kept at 65° F., Morphia must be most cautiously exhibited, if given at all, and in the old or very young it must be withheld altogether.

If the tubes are found already full of liquid secretion the administration of diaphoretics and expectorants is not indicated. An emetic should be given without delay; in the case of a child a teaspoonful of Ipecac. Wine, and for an adult 30 grs. of Carbonate of Ammonia well diluted may be given. In urgent cases Apomorphia may be given hypodermically, but not till a previous injection of Strychnine has been employed to avert cardiac depression. Sinapisms to the front and back of the thorax should be applied, and as a rule continuous poulticing by Linseed Meal is not advisable, though it may be resorted to from time to time if the breathing be found to be benefited.

Where the secretion is tough or adhesive, expectorants are clearly indicated, and Antimony as in the milder form of bronchitis is the most reliable; it should always be prescribed from the first in combination with full doses of Ammonia or Ammonium Chloride, and continued till liquefaction of the sputum is effected, and a mild degree of nausea is excited.

℞ *Vin. Antim.* ℥iv.
Spt. Ammon. Aromat. ℥j.
Spt. Chlorof. ℥iv.
Aquæ Ammon. Acet. ℥ij.
Aquæ ad ℥viij. *Misce.*

Ft. mist. *Cpt.* ℥ss. *secunda quaque hora ex aqua.*

A safe expectorant for children is Ipecac. Wine in 20-30 min. doses.

The condition of the sputum will give valuable information as regards the dosage of expectorants. When this becomes excessive their use should be suspended, to be resumed again when the secretion becomes scanty. As a rule emetics are seldom indicated in the acute suffocative catarrh of adults, but their use must be a part of the treatment in every case of the disease occurring in children where usually the mechanical expulsion of bronchial secretion is often defective. The child should be made to vomit occasionally by doubling or quadrupling the dose of the expectorant mixture containing the Ipecac., and this may be repeated once or oftener during the 24 hours, as little depression follows the act of emesis in childhood, and sometimes it may be found necessary to awake the patient, should the breathing become laboured during sleep.

Ewart advocates mechanical aiding of the expiratory act by the pressure of the attendant's hands placed over the axillary bases of the lungs at the end of the expiratory act. It may be sometimes necessary in very young children to resort to artificial respiration or alternate hot and cold douches or to dash a little cold water over the chest to assist inspiratory effort in the presence of suffocative or cyanotic symptoms. Dry-cupping or the application of a small blister often does good, and should symptoms of pulmonary engorgement occur in the adult a vein may be opened; leeching is valueless. Sometimes the breathing difficulty may be relieved when spasm is present by causing the patient to inhale the vapour of boiling water to which a teaspoonful of Tr. Benzoini or Succus Conii has been added, and sprays are often useful.

Asphyxia is to be anticipated in all severe cases, and Oxygen should be ready for administration as soon as the cyanotic condition gives warning that the aeration of the blood has become seriously interfered with; the rubber tube attached to a cylinder of the gas may be held a few inches from the patient's mouth, and the inhalation from this small jet may be continued for ten minutes at a time at frequent intervals.

The condition of the heart will require careful attention all through the attack, especially in adult patients, and Strychnine hypodermically will often be indicated all through the illness. For the same reason Alcohol is sometimes required, but should never be administered in doses sufficient to tranquillise the respiratory centre, and 5 oz. Whiskey daily should be seldom exceeded even in patients who have accustomed themselves to the drug. Wine whey in the case of children and feeble infants affords the best means of supplying the stimulant, and may tide them safely over periods of extreme debility and danger.

To patients with valvular disease or marked cardiac weakness Digitalis should be administered from the start, whilst Strychnine is given twice a day hypodermically. The following is a good combination affording a means of supplementing the expectorant with a cardiac tonic and a stimulant, viz.: Tr. Digitalis ℥ij., Spt. Amm. Ar. ℥j., Spt. Ætheris ℥iv., Sodii Iod. ℥ss., and Aquæ ad ℥viij., of which ℥ss. may be given every 4 hours.

Lobelia should be employed only when much spasm is present, owing to its depressant action on the heart, and Pilocarpine should never be used.

The physician will be wise in dealing with such a serious disease to confine himself to the use of the well-tried and older expectorants as ammonia, tartar emetic, and ipecac., with the peculiar effects of whose action he is most intimately acquainted. Quinine, frequently recommended as a tonic in the different types of bronchitis, is best avoided; it often dries up the sputum and increases the difficulty of expectoration in adults, though Measham relies solely on this drug given hypodermically in doses of 1 gr. for a child one year old morning and evening. In the resolving stage no drug is of such value as the Iodide of Sodium; after a few days under its use the thick purulent expectoration may often be observed to become transparent and almost liquid. Chloride of Ammonium in the opinion of the writer ranks next in efficacy.

The nature of the affection obviously demands that the diet should be of liquid and highly nutritious food administered in small quantities at a time and very frequently. Thus milk, strong soups, beef essences, and meat juice with beaten-up eggs are clearly indicated. Flatulence and constipation must be guarded against. Sleeplessness is best met by Paraldehyde; all hypnotic drugs which depress the respiratory centre must be avoided. During convalescence great care must be taken to avoid chills. After a serious attack it is advisable when possible to send the patient to a warm seaside resort as Torquay, or on a trip to Madeira or the Canaries.

Croupous or *Plastic* bronchitis is often little influenced by ordinary expectorant drugs, and there is no treatment known which exercises a specific action over the formation of the fibrinous casts, though steam inhalations and sprays of Lime Water and of solutions of Lactic Acid, Papain, Trypsin and Pepsin have been employed with the view of causing their solution. In the acute attacks Pilocarpine and Tartarated Antimony may be tried along with other agents, especially Citrate of Potash, useful in the treatment of acute bronchitis, and emetics are useful for dislodging mechanically the fibrinous plugs.

BRONCHITIS, Chronic.

When any cause of bronchial irritation is discovered, the first step in the treatment should be its removal when such is possible. Thus, if dependent upon the inhalation of foreign particles, the patient must change his environment and any occupation necessitating the breathing of a dusty atmosphere. If his means permit, removal to a warmer and drier climate is necessary; the selection of a residence will be referred to later on. If gout be the cause (this is frequently so in *dry* catarrhs), this malady will require careful attention. Should the chronic catarrh be caused by long-standing congestion of the bronchial mucous membrane, the result of valvular lesion or cardiac failure, much can be done by strengthening the heart and improving the circulation. In those cases where faulty elimination of effete matters by the kidney appears to aggravate bronchial trouble, the treatment for chronic uræmia will give relief. The presence of emphysema will be an indication for tonics and measures directed to the maintenance of the general health.

Acute attacks supervening upon the chronic condition are very frequent, and must be met promptly by the measures already discussed. A rational supervision of the clothing which will prevent chilling of the surface of the body and temporary congestions of the bronchial surface is essential.

Drug treatment resolves itself into the administration of such substances as will alter the action of the diseased bronchial surface. Iodide of Sodium or Potassium is the most valuable agent for this purpose; not only does it afford a means of rendering tough adhesive sputum liquid and easy of expulsion, but its alterative action over the mucous membrane may be seen in its power of often changing the purulent into a purely mucous sputum, and it is by far the best drug for the routine treatment of asthma and emphysema, which are often associated with chronic bronchitis.

The nature of the cough which is always present requires careful consideration; should it be dry and the efforts at expectoration difficult the physician will have to satisfy himself, by close examination of the symptoms, whether the patient is not coughing much more than is really necessary to get up the expectoration. This is a point of vital importance in the treatment of chronic bronchitis. Upon the decision arrived at will depend the administration or prohibition of narcotic remedies. By checking cough much good will be done, if the cough is useless, but if, by checking cough, expectoration accumulates in the tubes, much harm may result.

Opiates or Morphia should, therefore, in the chronic as in the acute disease, be administered with great caution, and if the physician is in doubt he should order only small doses, to be suspended if lividity or drowsiness appear, and by prescribing a stimulating expectorant along with the sedative the minimum of risk is encountered. Heroin possesses the sedative action of opiates without checking the bronchial secretion in amount. Dionin, another morphia derivative, acts similarly.

In *dry* catarrh, with much difficult cough and little expectoration of a thick adhesive kind, the best treatment will be a mixture like the following:

℞. *Potassii Iod.* ʒiss.
Spt. Ammon. Aromat. ℥j.
Ammon. Chloridi ʒiij.
Heroin Hydrochlor. gr. j.
Aq. Chlorof. ad ℥xij. *Misce.*

Fiat mistura. Signa.—"*A tablespoonful* 3 *or* 4 *times a day.*"

Or a teaspoonful of the following may be given 3 times daily after food: Apomorph. Hydrochlor., 2 grs.; Codeinæ, 3 grs.; Vini Ipecac., 6 drs.; Glycerini et Aquæ ad 3 oz. Misce.

Alkalies have the power of diminishing the viscidity of the expectoration and hence the value of various mineral waters as Vichy, Ems, &c. Where from any cause there is fever present, as in bronchial attacks in phthisical patients, there is no combination gives such relief as a solution

of Bicarbonate of Potash in effervescence with Lemon Juice, the Citrate of Potash being a valuable expectorant; 3 drops of Morphia solution may be added to each dose when the cough is unnecessarily frequent.

When *profuse* purulent or muco-purulent expectoration is present, sedatives of all kinds are contra-indicated which tend to depress the respiratory or coughing centre; as pointed out by Yeo, remedies must be used which have a specific action upon the inflamed membrane, and to this important class belong all the volatile expectorants and those containing some active ingredient excreted by the bronchial surface: Turpentine, Ammoniacum, Asafetida, Balsams of Peru and Tolu, Copaiba, Creosote, Guaiacol, Petroleum, Cubebs, Eucalyptus, Sulphur, Garlic, Tar, Terebene, Oil of Sandal Wood, Myrtol, Camphor, Terpine Hydrate, Terpinol, Ammonia, and many others.

Tar may be given in capsules, pills or mixture, emulsified with suitable excipient, but Tar Water (1 to 10), taken in wineglassful doses, is an inelegant but efficacious preparation, or pills containing 3 grs. may be given every four hours. Yeo advises inhalations of Tar by forming a spray of the water by means of a Seigle's spray producer; he adds 10 per cent. of Carbonate of Soda to good ship's Tar, to neutralise the irritating pyroligneous acid, and boils the mixture on a plate over a spirit lamp in the patient's room for fifteen minutes once or twice a day.

Creosote may be given in capsules, and the internal administration supplemented by inhalations, fumigations, or sprays. The creosote chamber is the best remedy where there is fœtor in the expectoration. There are few routine remedies which give better results than a course of Sulphur when taken alternating with Cod-liver Oil.

In aged patients Ammoniacum relieves wheezing and promotes expectoration. A valuable stock mixture may be cheaply prepared for hospital use by adding Ammonium Chloride and Compound Camphor *Liniment* to the official mixture of ammoniacum.

In winter cough and in bronchitis with emphysema, Terebene, in doses of 10-15 mins. in capsule or upon sugar, is a good remedy. It may be used also as an inhalation.

Senega, Squill, Ipecacuanha, Actæa, Cocillana, Lobelia, Serpentaria, Chekan, Grindelia, Hydrastis, Physostigma, Sanguinaria, Stramonium, Hyoscyamus, and Belladonna have been all tried with success from time to time in the treatment of chronic bronchitis.

The most convenient and safest expectorant in the chronic as in the subacute attacks of childhood is a mixture of equal parts of Wine of Ipecac. and Syrup of Squill; for a child 1-2 years old 10-15 drops may be given every 3 hours, and as an emetic 1 teaspoonful. Perhaps no combination or mixture is so universally used as the following in chronic bronchitis with emphysema. Patients continue its use for years after discarding all others. It owes its virtue probably to the Ammonia contained in it, whilst the senega keeps the cough centre wide awake, so that the tubes are being continually freed of their secretion, which is also rendered more easily evacuated.

℞. *Ammon. Carb.* *gr.* lxxx.
Tinct. Camph. Co. ℥vi.
Tinct. Senegæ ℥iv.
Infus. Senegæ *ad* ℥viij. *Misce.*

Fiat mist. *Capiat* ℥ss. *quater in die ex paululo aquæ.*

When *exceedingly* profuse discharge exists—*i.e.*, in cases of bronchorrhœa—an occasional emetic and full doses of a mixture of Ammoniacum, Ammonia, and Senega afford the best routine treatment. Copaiba is a valuable drug in some cases; it may be given in capsules or in a mixture with Liquor Potassæ, or in the form of the paste mentioned under Gonorrhœa. Opium or sedatives are fatal if given in even fair doses, and Ipecac., Tartar Emetic and Iodides which increase the amount of the sputum are only indicated where this is very adhesive or ropy.

By stimulating the respiratory centre, Strychnine becomes a valuable expectorant. It may act also, according to Gairdner's theory, by stimulating the "scavenger" muscles and increasing the activity of the expulsive mechanism in the bronchi. It can be combined with Belladonna with great advantage where there is much secretion and *weakened expulsive powers*, and should be an ingredient in every mixture prescribed in chronic bronchorrhœa, especially when the heart is weak.

Though the list of expectorants contains more than 100 remedies of undoubted value, the physician will find that most of the cases of chronic bronchial trouble can be well combated by one or more of the following list, beyond which the writer seldom finds it necessary to travel:—Alkalies, Ammonia, Tar, Squill, Ammoniacum, Ipecac., Creosote, Apomorphia, Pot. Iod., Senega, and Sulphur compounds, of which Ichthyol, Onions, and Garlic are not to be forgotten.

Inhalations and sprays occasionally prove useful. Ringer and Murrell obtained excellent results from a spray of Vin. Ipecac. in winter cough. This spray is used by atomising the ordinary Ipecac. Wine with a Richardson's apparatus or with a steam atomiser; generally the wine does best diluted with an equal bulk or more of water. About 2 drs. of the wine are sufficient for each sitting, and after a few trials the patient succeeds in taking it in deeply. Lobelia, Terebene, Pinol, Antimonial Wine, and Iodide of Potassium, 2 per cent. solution, have all given excellent results in chronic winter cough when used in the same manner. The spray produced by using in an atomiser or nebuliser a 10 per cent. Menthol solution in pure liquid paraffin is of much value in relieving unnecessary cough, but it is a mistake to use Cocaine for this purpose, as it tends to set up after a time a congestive state of the upper respiratory tract.

The Ammonium Chloride Inhaler is of undoubted value, especially in cases of chronic catarrh of the trachea, larynx, and larger bronchi. It is, however, inferior to the method of filling the sick room with the fumes of the nascent salt as mentioned under Bronchiectasis.

Creosote, Eucalyptus, Carbolic Acid, and most of the volatile expectorants and antiseptics are of value when administered as inhalations, especially where there is marked fœtor or decomposition of the bronchial secretion.

All the volatile expectorants can be used as an inhalation by simply adding them to very hot water and then inhaling their vapour in combination with that given off by the water. Compound Tincture of Benzoin and Hemlock Juice are the most frequently employed.

Air saturated with Turpentine is a good agent, and if hæmorrhage be present there is no remedy to equal it. It can be poured upon the surface of hot water in large open vessels placed about the patient's bed.

Dry respirators moistened with volatile antiseptic expectorants may be worn for hours daily. The following is a good formula: Thymol, half a part; Carbolic Acid and Creosote, of each one part; Spirit of Chloroform, six parts. The Oleum Pini Pumilio is an agreeable and efficient alterative and expectorant when inhaled.

As in acute bronchitis, oxygen inhalation should be resorted to when any degree of cyanosis supervenes, and though the theoretical objection is promulgated that it can be of no use since the asphyxia is caused by the shutting out of the air from the pulmonary vesicles by mucous secretion, nevertheless unmistakable relief nearly always is secured by judicious administration, the gas obtaining admission to the air-cells through many unblocked bronchi.

Compressed air inhalations administered in a specially constructed chamber have been vaunted, but unless much emphysema be present their use is contra-indicated.

Counter-irritation is of value, and it may be accomplished by Iodine, Acetic Acid, Croton Oil, Capsicum, Cantharidin, Mustard, Tartar Emetic Ointment, or the actual cautery as practised in France, or any other irritant, but as a rule the volatile expectorants, which are also revulsives, are very much superior. Thus Oil of Eucalyptus or Pinus Pumilio with Camphor, or the Lin. Tereb., or Lin. Tereb. Acet., or Stoke's favourite application, of which the following is a modified formula, may be employed:

℞. *Spt. Tereb.* ℥iii.
Acid. Acetici ℥xii.
Ovi Vitellum i.
Ol. Limonis ℥j.
Aquæ Rosæ *ad* ℥vj. *Misce.*

Fiat linimentum.

Such local applications act (1) by their revulsive action; (2) the friction assists the expulsive efforts, and dislodges collections of mucus; (3) the vapour clings to the skin and clothes of the patient, and is gradually inhaled; and (4) some of the drug also is absorbed through the unbroken skin, and reaches the pulmonary tract through the blood.

Manual compression or massage of the chest and abdomen in expiration is useful where, owing to bronchial dilatations, or cavities, or weakness in the expiratory apparatus or mechanism, accumulations of secretion are liable to occur.

Climatic treatment is important for those whose means permit, and a sojourn at any of the Home or Continental Spas, where the free use of alkaline waters or where natural sulphur water may be had, as at Harrogate (in the summer). If the patient finds that a moderately warm winter climate suits his breathing, he may go to Mentone or San Remo, where, however, chills must be carefully guarded against, or if a still drier atmosphere is desired, Egypt or the Nile, Algiers, or Tangiers will be best. Should, however, a soft or sedative air be desired, Madeira, Pau, Torquay, Penzance, Bournemouth, or Isle of Wight may be recommended.

A prolonged residence at the pine forests of Arcachon, or nearer home—at Bournemouth—is very advisable in young bronchitic patients where phthisis is dreaded.

BRUISES.

When the contused part is seen immediately after injury before extravasation has occurred, this may be sometimes prevented by firm pressure over a pad of cotton-wool or by the application of ice or an evaporating lotion. A cold saturated, recently prepared, solution of Chloride of Ammonium is a good application to orbital contusion where a "black eye" is dreaded. The juice of the fresh root of Convallaria and Solomon's Seal is reputed to be of value for the same purpose. Arnica is of little or no benefit, and often produces dangerous erythematous rashes, which may spread from the site of application over the entire body.

When ecchymosis already has taken place, warm Spirit Lotion, covered with oiled silk, and padded over with thick layers of cotton-wool, and bandaged moderately tightly, is the best practice. Absorption is always hastened by massage. The surgeon should be very slow to incise the skin when even extensive extravasations of blood have occurred; these as a rule, if let alone, will become absorbed in a short time, while the admission of air is fraught with great danger. The aspirator may, however, be safely used where the removal is absolutely necessary. Large hæmatomas may be incised under aseptic conditions; bullæ should be snipped and an antiseptic dressing or dusting powder applied. Where large doughy extravasations remain under impervious skin, their absorption may be hastened by mild counter-irritants as Camphor Liniment, &c., combined with massage and pressure. Pain should be relieved by local anodynes like Aconite or Belladonna Liniment. Leeching should be avoided owing to the danger of sepsis through the punctures, as the damaged tissue has its resisting powers much weakened.

BUBO.

Suppuration of the lymphatic glands in the groin is usually a complication of the soft sore caused by Ducrey's bacillus, and the gonococcus

acts sometimes in a similar manner. The resulting swelling or bubo is to be differentiated from the true syphilitic gland swelling, which is of almost stony hardness and is painless and non-suppurative. The possibility of a dual infection must always be borne in mind.

Rest to the part is essential, and sometimes the pressure of an elastic bandage over a firm padding of cotton-wool may prevent suppuration. This may also be effected in the early stage of the bubo by painting the skin over it with Tr. Iodi Fort. or Iodized Phenol (1 part of iodine dissolved in 4 of carbolic acid), or by coating it with strong solution of Nitrate of Silver, or even by the use of ice or an evaporating lotion. Leeching is objectionable at all stages owing to the danger of infection through the bites. The application of a Klapp's suction bell over the swollen gland for 10 to 15 minutes causes hyperæmia of the skin, and may produce abortion of the swelling. Where much acute inflammatory pain is present hot fomentations may be applied or warm poultices used. A good routine application is Ichthyol and Glycerin (1 in 4). In all cases the penile sore should be cleansed and treated with antiseptics.

Some surgeons inject a few minims of Carbolic Acid, a 1 per cent. solution of Benzoate of Mercury or Tr. Iodi Mit. with the view of preventing suppuration, but often these aggravate matters and hasten the breaking down of the gland tissue.

If pus has already formed a small incision should be made parallel to Poupart's ligament through the tissues down to the swollen gland without waiting till the skin becomes infected. Through the opening the softened gland may be removed when its contents are found not to be entirely liquefied or the cavity may be curetted and packed with Iodoform gauze. Thomson and Miles recommend one or more small incisions and the application of the suction bell afterwards.

If the skin has already become undermined, the edges of the wound may require to be excised in order to facilitate healing and prevent sinus formation, the resulting sore being treated as a chronic ulcer after cleansing with Hydrogen Peroxide, 1 in 500 Sublimate solution, or by dusting with Iodoform. When sinuses remain these should be filled with Bismuth Jelly. See also under Chancre.

BUNION.

Preventive Treatment.—The cause of this condition (which is usually associated with hallux valgus or deviation of the great toe from the inner line of the body) is the wearing of narrow boots or shoes. These must be discarded for wide-soled boots with square roomy toes and low broad heels.

By a simple device the writer has prevented the development of the affection in cases coming early under notice. He directs the patient to place the tendo Achillis of one foot between the great and second toe of the opposite one before going to sleep on his side; this plan is applicable when only one foot is affected. A splint of leather moulded to the inner side of the foot to which the great toe can be bandaged at night, " Digi-

tated" socks with a separate compartment for the great toe, and boots containing a toe-post on the same principle should be worn through the day.

The induration constituting the developed bunion is often painful and may require the application of soothing lotions or counter-irritants. Strong Iodine or pure Carbolic Acid may be applied to the inflamed thickening, and rest must be prescribed. In mild cases pain may be relieved by wearing a suitable felt plaster with a large central opening; this gives considerable relief when rheumatoid arthritis complicates the case.

Where marked deformity, pain and lameness are present, the only treatment of any use is to make a free incision by Mayo's method, and remove the head of the metatarsal bone by forceps, after which the end of the shaft of the bone is trimmed as smoothly as possible, and the flap of the bursa secured by sutures, so as to separate it permanently from the cartilaginous surface on the base of the first phalanx.

Where the deformity is marked but not associated with pain in the joint, the latter may be retained by removing a wedge from the shaft of the first metatarsal bone behind its head.

Where the sesamoid bones are tender on pressure, they, or one of them, should be removed.

BURNS AND SCALDS.

Preventive treatment in the ordinary sense of the word need not be considered, but the consequences of a burning accident may often be so minimised that a fatal issue may be prevented by presence of mind and prompt action at the time. The victim should be instantly rolled over on the floor, or enveloped rapidly in a heavy loose garment, rug, or carpet, so as to exclude the air and stop the combustion of his clothing, instead of permitting him to rush frantically through the air fanning the flames, and to plunge him into water is a grave error. In the case of limited burns, when the skin has been for a short time submitted to even an intense heat, if a saturated Solution of Bicarbonate of Soda be *instantly* applied, no vesication or destruction of cuticle occurs, and pain is almost instantly relieved. In this simple way, what would otherwise have been a troublesome and painful burn will be effectually prevented. But the application must be made without delay, and before the cuticle is raised, and the quickest way is to apply the dry salt made into a paste with a little water, and gently rubbed over the smarting spot for a few minutes, adding a few drops of water from time to time.

For severe and extensive burns the first treatment required is to relieve the shock and collapse, and bring about reaction, by enveloping the patient in flannel or wadding and administering liberal doses of hot stimulants, whiskey punch, or wine whey; warm saline solution by the rectum or subcutaneously may be necessary, and a hypodermic of Morphia when the pain becomes intense as the symptoms of shock begin to pass off; and whilst this is being done only very limited attention should be bestowed upon the burn itself.

As soon as shock is relieved the clothing must be carefully cut off, piecemeal, and only a limited portion of the surface of the body should be exposed at one time. Corrosive liquids, if they have been the cause of the burn or scald, should be washed off with an appropriate solvent or antidote. Thus, scalds by boiling acids should be lightly washed with warm water or weak alkaline solutions, and boiling tar scalds may be gently cleaned with any warm bland oil or lard.

In the case of extensive burns and scalds, even when only of the first or second degree, which are often the most painful, and especially in all degrees of extensive burning occurring in children, a general anæsthetic is essential during the first dressing, and may be required also at subsequent dressings.

The selection of the application is important, and since the recognition of the grave part played by sepsis the use of the old-fashioned soothing and emolient Carron Oil is being abandoned for antiseptic solutions. But where the burn is of the first degree and the cutaneous surface is unbroken, no better dressing can be employed than lint, linen cloths, or a layer of cotton-wool soaked in the emulsion and kept in place by a light bandage. Slight superficial burns may be treated by the application of powdered Starch or wheaten Flour. In burns of the second degree where vesication is always present, and in the deeper degrees of burning and scalding, the surface should be carefully cleansed by a warm antiseptic, as solution of Boric Acid, Condy's fluid, or other unirritating germicidal liquid before applying dressings. Where a *very large* surface of the body is superficially burned and the patient is suffering great pain, relief may be obtained by immersing the patient in a bath at about 98° F., consisting of Boric Acid Solution or weak Permanganate of Potash Solution, and this plan with advantage may be continued throughout the treatment from time to time when the dressings require removal and sloughs are slow of separating. There is no doubt about the value of external warmth; in most cases the temperature of the body may be found depressed, and recently good reports have been obtained from the use of the hot-air bath.

All bullæ or blebs should be pricked at their most dependent point to evacuate the contents, which are always full of micro-organisms; some authorities for this reason snip away their epithelial envelopes, whilst others prefer to preserve these as a covering for the inflamed skin beneath them.

The experience of recent years has proved that a good routine antiseptic dressing for burns and scalds of every degree of severity is a solution of Picric Acid, 1 part in 100 water; this is practically a saturated solution, but some prefer to use 1 in 200, with 10 per cent. rectified spirit. Boiled or sterilised lint or cotton-wool soaked in the solution should be placed in contact with the burned part, and covered with a layer of cotton-wool, the strips being so applied that they can be removed with the least degree of difficulty or pain to the patient. No impervious dressing should be applied over this, and on every third day the application can be removed

and fresh lint applied. A 1 to 2 per cent. ointment is sometimes used instead of the aqueous solution, and Picric Acid Wool is also supplied ready for use.

The experience of the late war has shown the value of Ambrine, a mixture of hard and soft paraffin. This is melted and either sprayed on the part from a special sprayer, or painted on with a soft camel's-hair brush. It prevents evaporation from the surface, prevents dressings sticking to the raw surface, and promotes healing. It is especially suited to burns or scalds in children, and can be used for burns of any degree of intensity.

Loose dead and charred fragments may be removed by scissors during the first dressing, and at subsequent dressings the dead skin can be removed in a similar manner without employing any traction or force.

The danger in all cases after the patient has been tided over the grave period of shock is sepsis from the absorption of toxic products contained in the charred tissue, or produced by the multiplication of extraneous micro-organisms; hence the necessity of the use of sterilised dressings and thorough cleansing with mild antiseptic solutions between the times of dressing. The indiscriminate use of strong antiseptics like Hyd. Perchlor., Iodoform, Carbolic Acid, &c., is to be condemned where the burned surface is extensive, since poisoning from their absorption is liable to occur, and, moreover, they tend to retard the separation of the sloughs. To facilitate the removal of the latter nothing is better than hot Boric Acid fomentations; where there is much moist discharge Boric Acid may be freely sprinkled in fine powder, or Iodoform Gauze may be employed in thick layers. The dressing, which by its absorptive and antiseptic qualities renders frequent changes unnecessary, is always to be preferred, hence ointments as a rule are to be avoided, though dressings of these are more easily removed. The long list of these preparations still recommended and used should be condemned; most of them contain antiseptic substances insoluble in their fatty basis, and while the heat of the body liquefies the latter, it soaks into the superimposed dressing, forming a casing which keeps the injured tissues bathed in their unhealthy secretion, and the crude insoluble antiseptic acts as an irritant.

After all sloughs have separated or been cautiously removed, the granulating wound is to be treated upon general surgical principles, and where this is extensive skin grafting by Thiersch's method should be resorted to early in order to hasten healing, diminish the danger of septic absorption, and minimise the risks of future deformities. Flabby granulations may be destroyed by solid Copper Sulphate, or by any stimulating lotion, by mild bandage pressure, or by the application of perforated green protective dressing. The complication or sequela of duodenal ulcer must be watched for and treated accordingly.

Care and attention must be bestowed during the healing process of deep burns when these occur in the vicinity of joints so as to avoid the deformities liable to occur as the tissue slowly contracts. In the face also this is to be carefully watched, and continual massage applied, skin grafting, and the division of bands, followed by stretching of the parts

and other plastic operations, may be necessary. When the constituents of a limb have been hopelessly charred the only resource may be amputation after the shock has been treated.

Burns produced by electricity, X rays and lightning are to be treated upon the above principles; the milder X-ray dermatitis may be soothed by the use of any of the emollient ointments suitable for acute eczema, but the slowly separating sloughs of the deeper type of the accident must be treated like burns of the fourth degree, and will usually require skin-grafting.

Burns of the conjunctiva are generally the result of sparks of hot metal or caustics; the best treatment will consist in the introduction of Atropine and the repeated flushing of the conjunctival sac with warmed Boric Acid solution applied by means of the eye-douche. When much inflammatory swelling and œdema are present the external canthus may require incision, and the greatest attention should be paid in order to prevent adhesion of the eyelid to the globe. Iritis and corneal ulceration must be treated by suitable agents and Eserine instilled occasionally. When the lids or adjoining portion of the face have been involved the resulting cicatricial ectropion can only be remedied by a plastic operation, the best of which is that devised by Wolfe, who inserts a skin graft from the inner side of the arm after a free incision exposing a considerable raw surface beyond the free margin of the lid.

BURSITIS.

For acute inflammation of bursæ following injuries and wounds, rest of the limb on a padded splint, and the application of cold lotions or ice, generally suffice to bring about resolution. If much pain be present, poultices smeared with Green Extract of Belladonna, or hot fomentations may be applied; and if suppuration occur, which is liable when septic wounds are present, a free incision and subsequent syringing with very weak Sublimate Solution, followed by Boric Acid compresses, will be required.

The most frequently met with type of bursitis is that due to kneeling, and known as "housemaid's knee," from the peculiar swelling on the front of the patella. When acute it should be treated by rest and ice, or evaporating lotions. The chronic variety usually yields to daily application of strong Iodine tincture, applied freely (as each layer is allowed to dry it may be followed by a fresh one), so that blistering occurs. Should this fail, the fluid may be aspirated, and if it soon collect again, strapping or a splint and tight bandage may be applied after a second aspiration. Should the fluid again collect, 1 c.c. of the following should be injected after removing the fluid from the interior of the sac:

Ac. Carbolici 45.
Camphoræ 45.
Alcohol Absoluti 10.

Or a small syringeful of weak Tincture of Iodine may be injected and allowed to remain in for a few minutes.

When loose and irritating bodies are present within the bursa no expectant treatment will be successful, and the sooner the patient submits to excision the better.

In performing excision care should be taken to place the scar in such a position that it will be free from pressure. The bursa should be removed entire so as to prevent recurrence of the swelling.

CAISSON ILLNESS.

The suddenness of change from the much higher pressure of the atmosphere in the diving-bell or caisson to that of the ordinary atmosphere is the cause of this condition, which is also known as Diver's Paralysis.

Before reaching the surface the diver is made to enter an intermediate chamber, or air-lock, where the pressure is gradually reduced, and when this decompression has been very carefully performed, and a sufficient time spent in the lock (15 minutes or more), usually no symptoms occur. When they do show themselves, which may be some hours afterwards, the paraplegia, and intense muscular and joint pains, vomiting, epistaxis, &c., can be relieved at once by replacing the patient in the lock and increasing the pressure. This is known as the process of recompression followed by decompression.

A suitable air-chamber on the bank, in which the pressure can be diminished very slowly and accurately, and in which divers liable to suffer from Caisson illness may be kept for a few hours if necessary, prevents effectively all trouble and relieves distress when this has already appeared. The pressure should be reduced at the rate of half a pound per minute in the act of decompression, after having been gradually raised to the ordinary working pressure and kept there for a few minutes.

Before entering the high pressure on first descending, the operative is submitted to a process of gradual compression in the lock, and in this other symptoms of the illness may appear; these, such as severe earache and giddiness, usually pass off when the diver is made to swallow air with the view of keeping open the Eustachian tube.

The severer symptoms on reaching the surface after passing through the air-lock before decompression has been thoroughly accomplished are usually seen in stout plethoric subjects, and Morphia hypodermically is often necessary owing to the agonising pain. Venesection may be resorted to where unconsciousness supervenes. Where the paresis continues, rest with massage and electricity and the usual remedies indicated in chronic spinal myelitis must be employed.

CANCER.

There is no treatment for this disease save earliest possible removal of the tumour by surgical methods. It must not be denied that very occasionally a success can be attributed to X-ray or radium treatment, nevertheless these two popular agents seem to be finding their true place as adjuvants to surgical treatment either immediately before, at the conclusion of an operation, or for many weeks or months after healing of

the surgical wound, with the view of destroying any stray cancer cells which have escaped the knife. Much contention still exists as to the relative merits of radium and X rays, which can only be settled by future observation, but the increasing penetrating power of hard X rays by improved methods of application seems to be turning the scale against radium.

In *inoperable* cases there cannot be a doubt that relief to pain, amelioration of all the symptoms, and even retardation of the progress of the growth, are frequently observed, and most authorities report cases where the use of these agents have after a few weeks brought inoperable examples of the disease within the zone of the operable. (It may be here remarked that splendid results have been obtained by X rays in inoperable sarcomatous tumours of the round-celled type.)

Superficial cutaneous cancers, especially rodent ulcers, have been successfully cured by a few massive doses of the X rays and radium; unfortunately the best results obtainable in epitheliomata are in those cases which also can be most successfully treated by the knife.

High-frequency currents have been employed by the method known as *Fulguration*. Its best results have been obtained in those cases where the surgeon has been unable to remove the entire growth by the knife or curette, in which case excellent effects have followed by drawing from the exposed raw surface numerous sparks by the use of a powerful high-frequency apparatus. This treatment destroys the superficial cancer cells and acts as a painless escharotic, but any specific selective action over the diseased cells is denied, though the method has given curative results in such cases as cancer of the tongue and bladder and superficial inoperable carcinoma of the breast. Coley's Fluid has proved useless in cancerous tumours, but its curative action in many cases of a purely sarcomatous nature must be regarded as proven. Trypsin, Pepsin and Papain have been tried as injections into the tumour or its immediate neighbourhood with the view of causing digestion or disintegration of the cancer cells, but the method has proved a failure, and the same may be safely said of injections of antiseptics and every attempt at serum therapy.

A survey of all recent experience conclusively proves that early operation, affords the best means of treating cancer. Not only the growth itself, but the widest possible extent of surrounding tissue with all the neighbouring lymphatic glands and vessels must be removed, and the greatest care taken that no cancer cells are implanted in the wound. This latter result may be effected by avoidance of cutting into the diseased mass during operation, and by flushing the wound with unirritating antiseptics, or better still by exposure of the raw surface to the X rays before suturing and the systematic exposure for short periods of the site of the operation to their influence after healing has been accomplished.

The method of removing epitheliomatous growths by Caustics (Lime, Arsenic, and Zinc Chloride) has but one plea in its favour—viz., the fact that many patients consent to this form of operation without hesitation or delay who would otherwise postpone operations of a cutting nature till

too late. If the X rays be skilfully employed after the separation of the slough it is possible that better results may be obtained than by the use of the knife in some cases.

CANCER OF THE BLADDER.—The malignant growths in the female bladder or the villous type of organism which is liable to take on cancerous action may be removed under Chloroform by dilating fully the urethra and thoroughly curetting the tumour, whose base should be then freely cauterised.

The male patient should be placed in the high Trendelenburg position as recommended by Mayo, and after a free median incision the intestinal cavity and lips of the wound are protected by gauze pads in order to prevent the possibility of transplantation of cancer cells. The bladder being brought forward by tenaculum forceps is opened by a moderate incision, all urine withdrawn and sponged out, and the growth excised with the entire thickness of the bladder wall when this has been found infiltrated, and the gap is then closed by a double row of catgut sutures. Where the tumour is superficial in extent it may be cut out along with its underlying healthy submucous layer by scissors, and the resulting raw surface thoroughly cauterised. Large portions of the bladder may be removed, and one or both ureters may be implanted into the fundus of the organ when their orifices or the neighbouring region is involved.

Complete cystectomy has been performed by Fenwick and others with success, the ureters having been dealt with by a previous operation which enables their lower extremities to be brought out and fixed by a small incision in the iliac region. In the female the ureters may be transplanted (previous to removal of the bladder) into the vagina, which can be afterwards closed so as to constitute a new vesical cavity.

In unremovable cancer of the bladder much relief has been obtained and the prolongation of life maintained under comparatively comfortable conditions by a bilateral ureterostomy which drains the kidneys through the loins or in the iliac region.

Where the patient is unable to bear the shock of a serious operation, catheterisation and the use of local or constitutional anodynes, or free drainage of the bladder by a small perineal or suprapubic incision, may be resorted to.

CANCER OF BONE.—This is always secondary, and hence is often beyond the reach of operation, though amputation may be resorted to early when a limb bone has become affected, or the lower jaw may be excised sometimes successfully when the disease has spread from the lower lip. In mild cases of the latter infection, where only the surface of the bone is invaded, free gouging may be all that is required.

CANCER OF THE BREAST.—The only justifiable procedure is the entire removal *en bloc* of the whole gland, with its skin and surrounding fatty tissue, both pectoral muscles, or the greater portion of each, the muscular aponeurosis and the axillary glands; the supraclavicular lymphatics, when these latter are found to be involved, must also be removed.

Broadly speaking, there are two methods of attacking this operation:

(1) Rodman's. This consists in beginning at the apex of the axilla, clearing the latter completely, and then dealing with the breast. (2) Halstead, Handley, and others begin by removal of the breast itself, tracing upwards the lymphatic vessels and removing the contents of the axilla last.

The preliminary incision and the various steps of this radical operation may be modified according to the dimensions of the diseased gland and the practice of the operator. The usual skin incision is one commencing about the middle of the clavicle, with the arm abducted and extending across the anterior fold of the armpit into the axilla, and at a later stage continued so as to remove a large oval of skin overlying the gland and finally ending below the costal arch as far as the line of the sternum.

The dissection of the mass from the apex of the axilla (the insertions of both pectoral muscles having been divided) is commenced, everything being removed, including the fascia of the serratus magnus, and the axillary vein exposed for its entire course. In like manner the origins of both pectoral muscles are cut and the fascia dissected from the surface of the lower ribs. sternum and the upper part of the rectus and external oblique, after which the entire mass is separated and removed in one piece; it should contain all the tissues between the subcutaneous fat and the ribs, and extending from across the middle line to the apex of the axilla and the axillary border of the scapula.

The removal of the glands above the clavicle in the triangle bounded by the clavicle, trapezius and sterno-mastoid must be effected when any sign of infiltration of these is found; by altering the position of the arm this can usually be accomplished without division of the clavicle.

Drainage is provided by the insertion of a tube pushed up into the apex of the axilla, its lower end left projecting from a buttonhole at the scapular angle and a moderately tight bandage being applied to the thorax over the dressings; the unbandaged arm is abducted and supported upon a pillow.

The mortality of this formidable operation is almost nil, and a fairly useful arm results, though œdema may remain for a considerable time owing to injury of the axillary vein. The results are incomparably better than those obtained by the older and now abandoned plan of merely excising the mammary gland, and in a fair percentage of cases no return of the disease follows; when this does occur, the carcinoma appears in the bones, pleura or internal organs, and seldom in the scar tissue. The practice of following up the operation by the use of the X rays as a prophylactic against recurrence is gaining favour.

In inoperable mammary cancer relief may be obtained by local and general anodynes, the use of the X rays and antiseptics when ulceration has occurred. The progress of the disease is retarded by removal of the ovaries, but this is contra-indicated when the climacteric has been reached.

Cancer of the Gullet.—Extirpation of the growth is generally impracticable, and the use of dilating bougies is fraught with such danger of perforation and hæmorrhage that they never should be employed. When the patient is still able to get his food through the narrowed tube

he may be long kept in a tolerably comfortable state by judicious feeding; all nutriment must be liquid and administered at short intervals in small quantities and in concentrated form. Often the substitution of rectal feeding permits spasm, pain and irritation to subside after a few days' rest from swallowing, when liquid food by the mouth may be again resumed.

When the obstruction becomes so complete as to prevent the entrance of even liquid food to the stomach, a Symond's Tube should be gently introduced through the stricture upon the point of a flexible bougie, and its funnel-shaped end made to rest upon the margins of the ring of diseased tissue above the obstruction; it is then left *in situ*, with its attached thread hanging out at the angle of the mouth, which should be fastened so as to avoid its being swallowed.

Upon failure to insert the tube there is usually no resource left but to perform gastrostomy and feed the patient through the opening made into the stomach, but this operation is often too long delayed; it should be performed before his strength has been undermined by starvation.

Kuester has reported favourably on the effect of Fibrolysin injections as a palliative administered with the view of inhibiting scar tissue growth in cancers of hard nature.

By the aid of the œsophagoscope it is now possible to remove small malignant growths by œsophagotomy when these are located in the cervical portion of the tube. The introduction of the principle of operating under differential pressure by the technique worked out by Meyer raised the hope that malignant growths in the lower part of the gullet might be removed by the mediastinal route. The essential feature in his suggested scheme consisted in implanting the proximal stump of the œsophagus into the stomach after the latter had been pulled up into the thoracic cavity through a rent in the diaphragm.

Cancer of Intestines.—When the diagnosis of malignancy has been decided upon and acute symptoms of obstruction are absent, the surgeon may open the abdomen, excise between clamps the portion of bowel affected and secure anastomosis by suturing. Anastomosis should be end to end in the small intestine, lateral in the large intestine, and end to side when small is inserted into large bowel. Thus after total excision of the cæcum the ileum may be implanted into the transverse colon after the obliteration of the free end of the ascending portion by sutures. Where the extent of the growth contra-indicates its removal, the intestine may be divided and its proximal end joined to the colon, the distal extremity being inverted and closed permanently by sutures. Where the descending colon is found diseased in its lower part the only resource will be to establish an artificial anus.

Where carcinoma of the intestine in any part of its course has already given rise to symptoms of acute obstruction, the surgeon must open the abdomen and incise the intestine above the strictured part; should the patient survive the acute attack, an attempt may be afterwards made to excise the obstructed portion of the tube by a radical operation. In all cases where this latter is undertaken a complete removal of the lymphatic

glands in the region supplied by the artery feeding the diseased segment of the bowel is necessary.

Cancer of the Kidney.—When by cystoscopic investigation the opposite renal organ is found to be in a quite healthy condition, the cancerous kidney should be removed. The operation of nephrectomy for this purpose should be performed by the transperitoneal route, and not by the loin unless the growth be small. Sarcomatous tumours should be excised in the same way, and in all cases drainage of the extraperitoneal pouch from which the organ has been removed must be provided by a counter-opening in the loin.

Cancer of Lip.—When the patient consents to early operation all that is necessary in many cases is to excise the growth with a V-shaped portion of the entire thickness of the lip, cutting wide of the epithelial tumour, and to bring the edges of the gap together with sutures. When the disease is of considerable standing the glands below the jaw will be found to be involved, and not only will the removal of a larger portion of the lip be necessary, but the submaxillary and submental glands must be entirely extirpated and the lower jaw carefully examined and a portion or even the whole of the bone may require removal. In such cases plastic operations will be necessary, the skin below the jaw or that obtained by dissecting flaps above the angle of the mouth being utilised to prevent deformity.

In inoperable cases much benefit is obtainable by the use of the X rays and Radium emanations even when the deep cervical glands are invaded.

Cancer of the Prostate—see under Prostatic Enlargement.

Cancer of the Rectum.—The only treatment holding out the prospects of cure is the complete removal of the lower end of the bowel, and in some instances success has followed the removal of the entire rectum and sigmoid. The most apparently hopeless cases sometimes succeed when the growth can be completely eradicated. No better instance can be quoted of the value of the operation than the following: A lady under the care of the writer early in 1886 suffered from mild symptoms of obstruction of the bowel for several weeks, caused by a malignant stricture just within the reach of the finger-tip; the case was pronounced as hopeless and unsuitable for operation by one of the most eminent and experienced surgeons in London. Mr. Cripps excised the lower end of the bowel from the perineum in May of that year, and the tumour was demonstrated to be malignant; this was further shown by a return of the disease in the colon many years afterwards, requiring colotomy. The patient survived in comparative comfort till 1918.

The operation is only contra-indicated when the tumour is immovable and the neighbouring organs and glands implicated.

If the cancer be near the lower end of the rectum it can be excised through the perineum, and the sphincters usually will require removal; if high up, either the sacral or the combined operation should be selected and the sphincters preserved.

For the *perineal* operation a deep incision is made round the margin

of the anus and prolonged in front to the middle of the perineum and backwards to the tip of the coccyx. The levator ani muscles are cut and the lower end of the gut is then dissected out, divided well above the growth, and the free end of the divided bowel is brought down to be attached by sutures to the margins of the anus when the tension of the parts justify suturing. The wound is then packed with gauze, and the bowels locked up for several days.

Kraske's operation is necessary to reach high growths; the incision of the former operation is prolonged backwards beyond the coccyx and over the middle of the sacrum for half its length; the coccyx, and if necessary the lower portion of the sacrum, is removed, and after the gut has been freed from all its attachments and brought down, it is cut across, the lower end being sutured to the sphincter when practicable. This latter desideratum is facilitated by division of the mesenteric attachment of the upper end of the rectum or lower portion of the colon. Some surgeons insist upon the necessity of a preliminary colotomy or colectomy with the view of preventing contact of the extensive wounded surface with the bowel contents during the slow process of healing; it should always be resorted to when the bowel cannot be emptied before operation and when symptoms of acute obstruction have supervened.

When evidence exists of involvement of the lower end of the colon the *combined* operation is selected. The abdomen is opened in the middle line, and after freeing the attachments of the rectum and sigmoid, cutting the bowel across and applying ligatures, the abdominal wound is closed and the divided bowel with its contained tumour is withdrawn through the perineal incision as before described, and the lower end of the divided bowel brought down.

Miles, after opening the abdomen in the middle line, performs a colostomy and removes the whole bowel below this point. This evades the difficulty so often experienced of bringing the bowel after removal of the growth down to the anal orifice.

In all cases beyond the hopes of excision much relief may be obtained by judicious feeding and enemata, and when obstructive symptoms supervene the operation known as colotomy, or colostomy, should be performed. This consists in opening the sigmoid flexure of the colon, and securing it to the lips of the skin wound in the left groin, thus establishing an artificial anus. When the symptoms are not acute this operation should be performed in two stages, the coil of bowel withdrawn being opened by the thermo-cautery three or four days afterwards in order to permit the formation of adhesions.

Cancer of the Stomach.—The treatment of this affection, owing to the advances in abdominal surgery, is rapidly passing from the domain of the physician to that of the operating surgeon. The palliative treatment by drugs, restricted dietary, lavage, &c., should only be undertaken when the decision to abandon operative procedure has been arrived at. By persevering in any form of treatment which merely has for its aim the relief of symptoms valuable time is lost and the disease passes beyond

the reach of removal, whilst an early operation affords a justifiable hope that a permanent cure may be obtained, or a considerable prolongation of life under comfortable conditions effected. Dancel's statistics show that life is prolonged for a period of fourteen and a half months on the *average* by the operation of gastrectomy, and 11 patients out of 73 were found in good health three years and later after the operation. Spencer and Gask conclude that with early diagnosis and operation 50 per cent. of all cases of cancer of the stomach may obtain an average prolongation of life of two years. An exploratory incision skilfully performed for diagnostic purposes, where no attempt is made to break down adhesions, may be regarded as devoid of risk. The disease when found by exploration to be very circumscribed and confined to the duodenum is sometimes removed by *pylorectomy—i.e.*, excision of the pylorus—but this is usually unsuccessful and should always embrace the removal of a considerable portion of the stomach with all enlarged glands.

Partial gastrectomy is the recognised operation in all cases where the entire stomach is not to be removed, and is suitable for the removal of all tumours near the pylorus. It is performed after ligature of the stomach arteries and the detachment of the gastro-hepatic and gastro-colic omentum by cutting the stomach vertically in two from the smaller to the larger curvature after a posterior gastro-jejunostomy has been first effected with the sound cardiac end of the organ and all diseased glands removed. The cut ends of the stomach and duodenum are then closed and invaginated.

Total gastrectomy has been several times successful; the preliminary steps of the operation are the same, only that the entire organ is removed and the end of the divided duodenum or a portion of the jejunum is attached end to end with the lower end of the gullet.

Where the stomach on exploration is found to be diseased along with the glands on the front of the spine, or where the pancreas, liver or other organ is invaded, any attempt at a radical operation is unjustifiable. The only resource is to perform the operation of *gastro-enterostomy*, the variety known as *posterior* gastro-jejunostomy being the most suitable in nearly all cases. The rationale of this procedure is to make an anastomosis of the commencement of the jejunum with the stomach so as to do away with the pylorus and duodenum and permit the food to pass directly from the gullet into the intestine without being retained in the stomach. It is clearly indicated in all cases of pyloric obstruction which cannot be remedied by a radical operation.

The *palliative* treatment of gastric cancer consists in the exhibition of remedies for the relief of the different symptoms as these show themselves. Appetite failure is one of the very earliest and most frequently observed features; it may be met by vegetable bitters given before eating, and by far the best of these is Strychnine given with a few minims of Ac. Hydrochlor. Dil. The dietary should be as varied as possible, owing to the intensity of the anorexia; it should consist mainly of concentrated liquid foods which will pass rapidly through the stomach, but in the very early

stage fish, chicken and eggs may be freely given. At a later stage, when symptoms of ulceration of the growth occur, the dietary must be identical with that suitable for gastric ulcer, but peptonised preparations as a rule are seldom relished, and liquid nourishment must be given in small amounts and frequently. The appetite may be somewhat improved, and the gastric discomfort lessened by the administration of digestives which hasten the absorption of the food and curtail its stay in the diseased organ. In the early stages Pepsin is valuable when given with Hydrochloric Acid, which is usually deficient; later on Papain with Sodium Bicarbonate and a trace of Morphine is highly useful when ulceration has occurred.

Symptoms of pyloric obstruction with great discomfort, organic acidity and flatulence may be often markedly relieved by lavage and the administration of Creosote in the capsular form.

Vomiting may be relieved by ice, Morphia in moderate amount combined with Bismuth and Hydrocyanic Acid, or by Creosote. Often sour buttermilk or Koumiss is retained when everything else is rejected, and occasionally a small blister over the centre of the epigastrium gives relief.

Pain must be relieved by Morphia, and Alcoholic stimulants, when these afford relief, should not be forbidden; a small quantity of good brandy or whiskey may be administered frequently in milk.

Sleeplessness, constipation and other complications are to be met by appropriate remedies. As a rule the presence of a palpable or visible tumour in the epigastrium is a clear indication that the case has passed beyond the stage at which a radical operation can be successfully attempted, but the performance of a gastro-enterostomy should always be insisted upon when the pain, vomiting and distress are severe. All these symptoms may entirely disappear after the operation, and life may be prolonged for a considerable period in comparative comfort. In deciding upon the advisability of the earlier operation the error of excluding malignancy by detecting the presence of a fair amount of hydrochloric acid in the gastric contents should be always guarded against, and the fact should be also borne in mind that a very considerable percentage of cases of the disease as insisted upon by Moynihan occur in connection with old gastric ulcer.

Cancer of the Testicle.—All malignant tumours, including sarcoma in this region, should be met by a complete removal of the diseased organ, with the overlying skin of the scrotum, the spermatic cord as high as the internal ring, and any glands found to be enlarged in the course of the iliac vessels. In prostatic cancer the entire gland, vesiculæ seminales and even the bladder trigone have been removed through a free perineal opening. In advanced cases the only palliative is to drain the bladder by a suprapubic or perineal opening.

Cancer of the Tongue.—Small superficial patches of malignant growth which have supervened upon leukoplakia, especially when caustics have been employed in its treatment, should be excised (after oral sepsis has been met) by pulling the organ forwards with a ligature inserted into its

tip and cutting out a V-shaped or elliptical piece of tissue containing the growth, after which the edges are to be secured with suture, and, as in all tongue operations, local antiseptic mouth washes must be continuously used.

When the growth is situated in the anterior part of the tongue and has involved the deeper parts, but has not extended beyond the middle line of the organ or invaded the floor of the mouth, Whitehead's operation meets all requirements. Oral antiseptics having been previously used for some days, the mouth is gagged and a ligature is inserted well behind the tip of the tongue on each side, so as to enable the organ to be pulled forwards. The tongue is next split along the median line, its attachment to the floor of the mouth and palate cut through with scissors, and the half of the organ containing the growth cut across well behind the tumour, after ligature of the lingual artery.

Where the growth involves the entire organ without invading the floor of the mouth, this may be completely removed by the last-mentioned operation, each half of the tongue being divided separately.

Where the tissues in the floor of the mouth have been invaded, these with the diseased tongue and all the affected lymphatic glands, with a portion of the lower jaw, have been successfully removed. The operation is varied to the requirements of each case, the most frequently employed being that of Syme, which consists of a median incision through the middle of the lower lip and extended to the hyoid bone, the symphysis being afterwards divided by saw and the diseased tissue dissected out and removed *en masse*. Sometimes a preliminary laryngotomy is essential. Butlin insists upon the *routine* removal of all the glands in the anterior triangle of the neck by a second operation after the removal of the cancerous tongue by the mouth; he never divides the jaw and always performs a preliminary laryngotomy. Operative measures in the hands of Butlin show that 57 patients were cured out of 200, and remained free from recurrence of the disease for periods of from 3 to 22 years after the operation, and 10 per cent. died as the result of the operation.

The after-treatment is of importance, and since this must sometimes be left in the hands of the ordinary attendant his attention to the following details is essential. The great danger is that of an aspiration pneumonia setting in from the secretions of the mouth finding their way down the trachea and into the air cells. Hence the necessity for antiseptic mouth washes, the best of which is Permanganate solution, Carbolic sprays, Hydrogen Peroxide, or even weak Perchloride of Mercury, the latter only to be used occasionally, whilst the former are employed every hour.

Feeding must be effected by milk and soups administered from a feeding cup to which a short rubber tube is attached.

The ligature attached to the stump of the tongue should be carefully fixed outside the mouth so as to prevent the stump falling backwards and causing obstruction to the admission of air to the larynx.

CANCER OF THE TONSIL.—Removal of the organ, to be successful, must

be resorted to at a very early stage of the disease, whether the affection is carcinomatous or sarcomatous. Whilst the latter type of malignant tumour can often be removed by the mouth, the operation for removal of a cancerous tonsil can generally only be effected after reaching the growth through an incision in the neck, as in the formidable operation for cancer of the tongue, the lower jaw often requiring division.

Palliative measures will consist of gastrostomy when swallowing is impossible, and tracheotomy may be required for the relief of larnygeal obstruction. Little can otherwise be done save by the almost continuous use of antiseptic washes and sprays.

Cancer of the Uterus.—Delay in diagnosis explains the unsatisfactory results of operative treatment in this disease. With the late attempts to bring under the notice of the profession in all European countries and in America the serious importance of an earlier recognition of the affection, and with improvements in the technique of the operation itself, already marked progress has been achieved. As in all other forms of carcinoma, the tendency towards a more radical operative treatment has been rewarded by a steadily increasing percentage of cure.

Preventive treatment is being placed upon a firm basis. Cancerous disease of the cervix being very seldom met with in virgins, Bonney and others insist upon the causal influence of a chronic inflammatory condition of the cervix so common in married women. Hence the importance of the early treatment of simple erosions and ulceration by curetting, by tracheloplasty, or by supravaginal amputation of the cervix when these do not at once heal under milder treatment. But such measures are useless when cancer has already supervened, the only resource justifiable then being a radical removal of the entire organ.

Cancer may affect either the body or, more commonly, the cervix uteri. When the practitioner meets with a case he should first of all consider the possibility of a radical operation, as affording the patient the only hope of staving off the inevitably fatal result, and if he has any doubts on the subject he will do well to avail himself of the opinion of an expert.

The present position in regard to radical operation may be summed up as follows: The first operators on cancer contented themselves with a high amputation of the cervix, which is now universally admitted to be a totally insufficient operation and to afford only the most slender prospect of permanent relief. The operation of vaginal hysterectomy was then introduced, which was attended by a very low immediate mortality in capable hands. The after-results, however, were not particularly satisfactory, and although there are few operators who cannot point to cases of cancer of the uterus which still remain well years after vaginal hysterectomy, so great an authority as Pozzi has expressed doubt as to whether any case can be regarded as permanently cured, and the majority of honest observers would confess that at the best the ultimate results are disappointing. Things were in this condition when Wertheim, in 1906, strongly advocated abdominal hysterectomy, which had been abandoned by all but a few operators on account of the appalling operative mortality which

had attended its performance. Wertheim was able to bring forward a long series of cases with an immediate mortality of 19 per cent., and a freedom from recurrence after 3 years of about 40 per cent. These results were the more remarkable, as in his practice he operated on cases which would be regarded as much too far gone to afford any prospect of cure by the vaginal route. The result has been to stimulate greatly the performance of abdominal hysterectomy for cancer of the uterus, but it is, perhaps, still too early to say whether this operation offers a greatly enhanced prospect of cure to the patient suffering from uterine cancer.

At first the abdominal operation was reserved for cases which were not considered suitable for vaginal hysterectomy—*i.e.*, for the more advanced cases—and the immediate mortality in consequence of the very severe operation necessary was very high, ranging with most operators from 20 to 25 per cent. Gynæcologists have now recognised that as the abdominal operation offers an opportunity of more complete removal both of the vagina, which is usually affected by direct extension of the growth, and of the connective tissues of the broad ligaments and the iliac glands, which represent the line of lymphatic extension of the cancer cells, and as at the same time it affords complete immunity from the possibility of infecting the vaginal wound with cancer cells, advantages such as these may well be taken in the case of comparatively early cases of cancer, and afford a reasonable probability of more complete immunity from recurrence than the vaginal operation can possibly give. As the abdominal operation in these early cases can be performed with much more ease and rapidity than in cases where extension to the vagina, broad ligament, or lymphatics has already appeared, the operative mortality is lower, and at the same time the prospect of cure is greater.

The criteria which should be fulfilled to rank a case of cancer of the uterus among those suitable for a vaginal hysterectomy are—

1. The uterus must be freely movable—*i.e.*, the cervix should be capable of being drawn down to the vulva.

2. There should be no extension of growth beyond the limits of the cervix on to the vaginal vault.

3. The broad ligament should be free from gross extension of the tumour.

4. The uterus should be of such a size as to be delivered through the vagina without mutilation or undue traction.

By the adoption of the abdominal route there is added to the list of operable cases those which have a limited extension of growth on to the vaginal fornices, and possibly a few with extension into the broad ligaments, but I feel that it is neither in the interests of the patient nor of the surgeon to attempt the removal of a uterus when it is as certain as can be that the line of separation must pass through instead of outside tissues already infected. It exposes the patient to a very grave immediate risk for no possible remote benefit, as experience shows that such operations are followed by death within a period as short as if they had not been touched at all. On the other hand, I feel strongly that in cases which

afford even a slender chance of successful removal the patient should be given the benefit of the chance. Even on the most pessimistic calculation she obtains in return for the operative risk a prospect of freedom from recurrence for a period of anything from six months to five years, and the reasonable probability that the recurrence, if it does come, will take the form of an internal growth, and that she will be spared the misery of death from exhaustion and chronic sepsis due to a sloughing vaginal cancer, with probably a vesico-vaginal or recto-vaginal fistula.

It does not come within the scope of this volume to describe the operations of vaginal and abdominal hysterectomy, but the practitioner who is called on to carry out the after-treatment of cases which have been operated upon will find some hints as to treatment in the article on Operations, After-treatment of.

From time to time it will fall to the lot of the practitioner to attend an inoperable case of uterine cancer. The three main symptoms which he will have to combat are sepsis, hæmorrhage and pain. There are two main lines of treatment, the one of active interference, the other of masterly inactivity, and which of the two should be adopted in any particular case will depend partly on the condition of the patient and partly on the physician. If the growth is sloughing extensively, with copious foul discharge and probably a good deal of hæmorrhage, it is wiser to adopt active treatment, which should take the form of curetting away under antiseptic precautions all the growth which can be removed. A copious douche is then administered and the vagina packed with iodoform gauze, wrung out of an antiseptic solution, in order to check hæmorrhage, which is usually fairly free. On the removal of the gauze a daily vaginal douche of 1 in 4,000 perchloride or drachm to the pint lysol or creolin is instituted and should be kept up till the end. The result is usually very satisfactory as regards freedom from sepsis and hæmorrhage.

Some authorities prefer to use a caustic after the curetting. The actual cautery may be applied to the raw surface. Or gauze wrung out of strong formalin solution, 50 per cent. zinc chloride solution or acetone, may be packed in through a speculum against the affected area, the lower part of the vagina being protected against the caustic by packing with dry gauze. The immediate result of such cauterisation is the formation of a slough which separates in the course of a week or ten days, leaving a granulating surface behind. The pack should be removed in twenty-four hours and a daily douche instituted. It is worth mentioning that when the growth has extended on to the recto-vaginal or vesico-vaginal septum, the slough may extend to the wall of the bladder or rectum and a vesico-vaginal or recto-vaginal fistula be the result.

When there is little sloughing or sepsis, many cases get on fairly comfortably if a daily antiseptic douche is used, without any operative interference. In such cases the growth certainly appears to progress more slowly than in those in which the stimulus of active treatment with its accompanying increased blood-supply has been adopted.

For the hæmorrhage, if excessive, cauterisation and packing with

gauze are the best lines of treatment. For the pain morphia must be given. It is best to give it at first only at night, but as time goes on larger and more continual doses are required as a rule. Aspirin in large doses is also useful in many cases.

Treatment with X rays and radium has been tried; although there is, in my opinion, no prospect of a cure by the use of this form of treatment, there is no doubt that in many cases it relieves suffering and prolongs life. If a large fungating or sloughing growth is present, it is better to remove as much as possible with the curette before commencing radiotherapy, but in the harder and more scirrhus-like types the treatment is best instituted without any preliminary operation.—R. J. J.

Cancer commencing at the vulva, in the labium, clitoris, or female urethra should be removed by a free cutting extending well beyond the diseased area, after which the glands in the groin should be thoroughly dissected out in all cases.

CANCRUM ORIS—see under Stomatitis.

CARBUNCLE.

Since this is the result of the introduction of the *Staphylococcus aureus* into the orifice of the cutaneous ducts, as in boils, the general indications are identical for the treatment of both affections, though the gravity of carbuncle owing to the danger of sepsis, pyæmia, and exhaustion is very much greater.

Constitutional treatment will include the administration of large amounts of liquid nourishment in a concentrated form, and often alcoholic stimulants are clearly indicated. Since the disease frequently supervenes upon the diabetic condition, the dietetic measures suitable in glycosuria are indicated. Fresh air, Quinine and Iron in full doses, and in the presence of cardiac debility Strychnine hypodermically and Morphia for the relief of pain will be required.

Local treatment in the early stage will consist in the relief of tension by warm fomentations. Poultices, owing to the danger of sepsis, are contra-indicated, but hot compresses of lint saturated with strong Boric Acid solution and covered over with impervious tissue meet all requirements. Some surgeons recommend at this stage the injection through the skin of a 1 in 10 Carbolic solution in glycerin and water deeply into the underlying brawny tissue, about 1 dr. being introduced in all at several spots, with the view of aborting the necrotic process. At a further stage a free crucial incision through the skin down to the sloughing mass may be made, or, better still, a series of incisions which will connect the several openings together, and the warm antiseptic solution reapplied under oiled silk.

In the majority of cases healing will be expedited and the dangers of sepsis minimised by a free curetting of the slough after the incisions have been made, the scraping being extended till the removal of all indurated tissue down to the exposed fascia is accomplished. Strong Carbolic Acid

is then to be applied to the walls of the resulting cavity, which should be thoroughly flushed with weak warm antiseptic solution, swabbed with Peroxide of Hydrogen and the wound covered over by boric compresses. This is becoming the routine treatment in the hands of most surgeons, though not without some protests regarding the danger of septic emboli being forced into the divided vessels during the scraping process.

Small carbuncles have been often completely excised by an oval or circular incision made wide of the diseased tissues, the cavity then swilled with hot boric solution, and packed with iodoform gauze.

The older plan of inserting caustics such as Chloride of Zinc, Caustic Potash, or Silver Nitrate through the natural openings is being abandoned; strapping the part encourages the retention of septic products.

The above local measures may be advantageously supplemented by Wright's Vaccine treatment as described under Boils, p. 87.

CARIES

Is the term applied to a process in bone when the osseous tissue disintegrates piecemeal, corresponding to ulceration in the soft tissues. The disease being nearly always the result of tubercle, constitutional treatment is invariably demanded, and the indications are the same as in tuberculosis and scrofula—viz., Cod-Liver Oil and Malt Extract; overfeeding; the removal of the patient to a seaside place sheltered from east winds and protected from the north; open-air life; Iodides (chiefly Ferri Iod.). Phosphates, Hypophosphites, Calcium Chloride, and other remedies mentioned under Scrofula and Tuberculosis.

Local treatment in the early stage will consist of absolute rest, and this is of great importance when the caries is in the vicinity of joints, and the application of splints should be so arranged that the entire limb is placed in a state of repose, whilst the appliance will be such as will enable the patient to move about or be carried in the open air. In cases where pus has not formed and the diagnosis of tubercle is made clear, sanatorium treatment supplemented by the Vaccine method, which consists in the injection of minute doses of Tuberculin, will often effect complete resolution. Some surgeons report excellent results from the use of the plan of producing a local congestion of the part by constricting the vein without retarding the supply of arterial blood by the application of an elastic bandage to the limb for short periods daily. The local application of a weak Oleate of Mercury Ointment with gentle friction acts in a similar manner by increasing the flooding of the diseased area with lymph, bringing the protective fluids of the body into more immediate contact with the diseased area, which is comparatively shut out from the general circulation.

When, in spite of these conservative measures, pus formation supervenes, more active local treatment is demanded, and the surgeon is never justified in waiting for the spontaneous discharge of matter, as this inevitably leads to the infection of the abscess cavity with pyogenic organisms. The skin having been sterilised, a free incision should be made and the softened or carious bone completely removed by curetting or

gouging, every portion of diseased tissue being taken away, the cavity treated with iodoform emulsion, or wiped dry, and the skin incision sealed up by fine sutures without drainage in order to secure complete union by first intention without sinus formation. That this form of treatment may succeed it must be undertaken before the skin becomes red. Redness indicates a secondary infection, which will prevent primary union and ultimately end in sinus formation.

Walton has improved the old technique. After making the skin wound the lips of the incision are protected by gauze to prevent their infection by the contents of the abscess cavity, which after evacuation is swabbed out with Carbolic Acid and treated by a 1 per cent. Gelatin and Formalin solution, after which it is next dried by pumping in hot air, and then filled with sterilised Paraffin which melts at 120° F. The lips of the incision in the periosteum being sutured the skin wound is likewise stitched, and primary union thus effected without the delay of healing by organised blood-clot being necessary. Some surgeons prefer Moorhof's mixture, which consists of Iodoform 6, Spermaceti 4, and Sesame Oil 4. In all these methods it will be noted that the fundamental point is to do away with the necessity of drainage. Stiles advises the total removal of the lower end of the diaphysis when the disease is situated in a long bone, and most surgeons do a complete resection when the small bones of the carpus and tarsus have become carious. When sinuses have already formed the case must always be regarded as a septic one; pyogenic organisms plus the tubercle bacillus have then to be dealt with. Formerly there was no alternative left to the surgeon but to cut down upon the bone, removing the sinus tissue by careful dissection, and after gouging or curetting all carious osseous tissue and removing sequestra, should such be present, the cavity was packed with iodoform gauze and drained, healing occurring by granulation from the bottom. The results were generally unsatisfactory owing to infection of the newly incised surfaces. A very distinct advance has been made by Beck, who fills the cavity with warm Bismuth Jelly instead of gauze packing, and in many cases the sinuses have been made to heal up completely without any operation save the injecting of the sinuses through a fine syringe of the emulsion so as to penetrate every recess in the sinuous track. This plan does away with the numerous antiseptics and caustics formerly employed for this purpose as described in previous editions. Should failure follow the injection, diseased bone is sure to be found at the bottom of the sinus, and a radical removal is essential to success before further attempts to excite healing by the Bismuth Jelly. Vaccine treatment as in the non-suppurative cases with open-air treatment should always be resorted to, and repeated investigations of the opsonic index made.

CARIES OF SPINE.

The constitutional treatment is identical with that of phthisis or other tuberculous affection—viz., open-air life when possible, overfeeding, the use of Cod-Liver Oil, Iodide of Iron, Creosote, Hypophosphites, &c.

Complete rest and immobilisation of the spine must be insisted upon from the first with the view of hastening repair and preventing angular deformity. The patient should be kept in the supine position upon a firm mattress without a pillow, and this position must be maintained for many months, in some cases for a period of 1 to 2 years, till all symptoms have disappeared. The practice of fixing the spine in an immovable plaster jacket as introduced by Sayre and allowing the patient to walk about should be abandoned. When the symptoms are acute, with much pain or paraplegia, such an appliance is of much value, but only when the recumbent position at the same time is rigidly enforced. A moulded leather or poroplastic jacket is, however, preferable, and in the case of dorsal caries in children Jones' abduction frame. In cervical caries the frame should be fitted with a headpiece. The use of these mechanical contrivances enables the patient to be safely transferred to a couch which can be wheeled out into the open air, and sometimes a carriage drive may even be permitted when the supine position is strictly maintained. Their employment is also imperative in all cases where the child is restless and tosses or turns over in bed. They are a valuable help during the convalescent stage of the disease, when the patient is first permitted to assume the vertical position, especially in low dorsal or lumbar caries, in which case the jacket should embrace the pelvic bones, reaching downwards to the great trochanters.

For the application of a plaster of Paris jacket, the patient should be stripped of all clothing, and a neatly-fitting woven merino vest, without buttons, should be put on. It should reach below the buttocks. He is then suspended by the usual pulley and cord appliance, by means of a strap passing below the chin and occiput, and another under each armpit. It is not necessary to raise him entirely off the ground; his toes should be left touching, as it gives confidence to him, and if absolutely complete extension be needed, by flexing the knees very slightly the toes will, of course, leave the ground, or the jacket may be applied in the recumbent position by using Davy's hammock.

The vest is gently pulled downwards and all wrinkles removed, and a pad placed inside it over the pit of the stomach. This is to be slipped out afterwards, its object being to leave room for distension of the abdomen after meals. It can be dispensed with if a window be cut in the jacket before hardening is complete. Coarse muslin (crinoline muslin) bandages, thickly sprinkled over with dry Plaster of Paris, are to be rapidly immersed in warm water containing a little alum, slightly squeezed out and applied over the vest in layers, extending from about an inch below the iliac spines to the armpits. An assistant smoothes down each layer of bandage as it encircles the trunk, and from time to time applies with his hands some more plaster, made into a cream with water; or, if the bandage appears to have been too well moistened, he rubs over it a little dry plaster as the operation proceeds.

In thin patients small pads of wadding may be placed over any bony prominences outside the vest before the application of the first bandage,

which may be passed round the pelvis and brought obliquely upwards as it encircles the abdomen, fixing permanently in their position all woollen pads over the iliac spines or prominent vertebræ. After the application of the last bandage the assistant applies some fresh plaster, rubs it down with his hand, and finishes the jacket off, leaving a smooth and even surface. It sets in a few moments, and the patient may be taken down and laid flat upon a hard mattress before the fire for a short time before being carried to bed. By turning up the tails of the merino vest over the plaster, near the end of the operation, a more presentable finish off is obtained. The jacket may be cut up, punched with holes, and laced on again if found quite satisfactory.

The abduction frame of Sir Robert Jones has to a considerable extent done away with the Plaster of Paris jacket in the treatment of spinal caries.

Small children can be nursed in a Phelp's box or any extemporised flat wooden structure with shallow sides in which they can be carried about from room to room or out into the open air and sunshine. This contrivance may be combined with the wheelbarrow splint, which tends to correct deformity and allays muscular spasm by extending the spine.

The use of tuberculin in spinal caries is still a moot point. Gauvain claims to get better results without than with tuberculin, but where the other forms of treatment cannot be perfectly used (as is difficult in all large towns) the cases seem to do better with small doses of tuberculin given once a week.

Poroplastic Felt Jackets, ready-made, of various sizes and shapes, may be obtained from any instrument maker, and rapidly adjusted to the patient's body when suspended. The Felt Jacket is put into a steam oven, and in a few minutes it becomes quite soft and pliable, in which condition it is moulded to the chest and abdomen, fastened with buckles, and the setting process is complete in 5 to 10 minutes, during which time the suspension is to be kept up. It can, every 4 or 6 weeks, be reheated and applied again, as it yields a little with the heat of the patient's body. It has the great advantage of being easily taken off and put on, and allows of daily inspections if abscesses are feared.

When already some prominence of the spine has developed in the early stage, an attempt should be made to lessen it by carefully adjusting a firm cushion or sand-bag under the curve, so that the weight of the upper and lower parts of the trunk may be utilised as a slowly extending force. The wheelbarrow splint meets these requirements. The use of any form of extension apparatus should only be entrusted to an experienced surgeon, and the plan of forcibly straightening out the angularity under anæsthesia is reprehensible.

When the cervical vertebræ are involved the neck must be rigidly supported; if the disease affects the first and second vertebræ a dislocation forwards of the atlas may speedily cause death. Sand-bags should be placed on each side of the head, so as to effectually prevent all rotatory or lateral movements. In the presence of acute symptoms of threatening paralysis immobility must be further procured by attaching a band to

the chin and occiput and passing the cord from this over a pulley at the head of the bed, a small weight being used as an extending force. Later on, a leather or poroplastic support may be moulded; seldom does the jury-mast apparatus prove of any use, but it may be employed in disease of the lower cervical region. In young subjects the best mechanical appliance for high cervical caries will be afforded by an abduction frame, the upper extremity of which bears a leather head rest.

Paralysis usually passes off when prolonged rest has been strictly carried out; when, however, the power seems to be steadily getting less, the operation of *laminectomy* may be undertaken. The pathology of tuberculous spondylitis must be always kept in mind; the symptoms of paralysis are very rarely caused by mechanical compression by the displaced segments of the spinal column, but by a low form of myelitis arising from the presence of granulation tissue inside the osseous canal. Hence laminectomy (or removal of the diseased posterior arches) or transversectomy (removal of transverse processes) should be undertaken more with a view of clearing out the tuberculous detritus than of removing bone deformity. Where severe pain arises from pressure on the nerve roots the operation of *costo-transversectomy* may be demanded and a portion of the rib removed.

For the spastic condition which sometimes remains after recovering from the tuberculous process the operation of resecting the posterior roots of the second, third and fifth lumbar nerves has given excellent results.

When suppuration occurs, the resulting spinal abscess should be opened under strict antiseptic precautions without waiting for the skin to be involved, the abscess cavity should be thoroughly scraped, flushed, and pressed empty, after which iodoform emulsion may be injected and the skin sutured without drainage being provided for, as in the treatment of carious bone described in the previous article. (See also Psoas Abscess.)

Where old sinuses have already become established an attempt may be made to heal these by the injection of Bismuth Jelly with or without previous curetting, and the removal of diseased laminæ and spines, transverse processes, or necks of the carious ribs.

The treatment of retropharyngeal abscess will be found under Pharyngitis.

The treatment of spinal caries has in recent years been revolutionised by Albee through the introduction of his method of employing autogenous Bone Grafts cut from the tibia down to the marrow. Having exposed the affected vertebræ by suitable incisions and splitting of the interspinous ligaments, the spines are incised down to the osseous tissue and each is split with the chisel, causing a greenstick fracture on one side; into the gutter so formed the graft, $\frac{1}{4}$-$\frac{5}{8}$ inch broad and of the required length, is inserted with its medullary surface touching that of the unfractured spines. A series of kangaroo tendon sutures passed through the split interspinous ligaments fix the graft. This procedure, by preventing the separation of the spinous processes, checks the crushing of the vertebral bodies, thus removing or preventing deformity and accelerating the healing process,

which is usually complete in six months. Several hundred patients have been treated by this method in the hands of different surgeons, and E. Jones has secured success in 96 per cent. of his cases. Finkelstein has applied this method to the treatment of spondylitis deformans.

CATALEPSY.

The treatment is identical with that of hysteria. If there be loss of consciousness associated with the muscular rigidity, the patient should be aroused by a good dash of cold water thrown suddenly over the head and face. Should this fail, a smart electric shock from a frictional machine, or, what is much more convenient, a pretty severe induced current may be passed through the arms. It should be suddenly applied in full strength, and not turned on gradually. One pole may be applied to the upper part of the spine, and the other to the rigid limb. Gowers states that a pinch of snuff may soon restore consciousness, but the vapour of strong Ammonia or Acetic Acid is better, or Hare's plan of closing the mouth and nostrils for about 30 seconds, or the method of pouring a little water down the throat or nostrils so that some may get into the larynx and provoke coughing. Emetics often dispel all symptoms, but the patient is either unwilling or unable to swallow them, and it is best to administer $\frac{1}{10}$ gr. Apomorphine hypodermically. Cannabis Indica in small doses (2 to 5 mins. of the tincture) is credited with special virtues.

Drachm doses of the Ammoniated Tincture of Valerian, with a little Asafetida, may be prescribed for their moral effect after the attack has been subdued. Should there be a very distinct series of attacks, the removal of the patient from her surroundings and a good course of massage and forced feeding will prevent a return. In the presence of meningeal irritation, delusions, or other forms of insanity, the administration of severe electric shocks or cold douches must be avoided.

CATARACT.

Senile cataract is the most commonly met with type of opacity of the lens. It can only be remedied by operation, as no known agent exerts any influence in preventing the progressive blindness, though when the opacity is greatest in the nuclear part of the lens some improvement of vision may be maintained by keeping up dilatation of the pupil by the use of tinted glasses and Atropine, and should myopia have occurred from increase in the refractive power of the lens distant vision may be considerably improved by using weak concave glasses.

Plans for hastening the ripening of the cataract by tapping the anterior chamber and inducing changes in the epithelium of the anterior capsule whereby the aqueous humour may cause disintegration of the fibres of the lens are seldom resorted to; the best practice is to wait till the ripening process has spontaneously advanced to such a degree as will justify operation.

The patient having been put into the most favourable condition of health by judicious dietary, &c., and a mild purge having cleared out the

bowel, the operation is now usually performed under the local anæsthesia of a 2 per cent. Cocaine solution. Of the numerous operations in use, the most satisfactory one for general purposes is the *combined* operation, which consists of a flap operation and an iridectomy, so-called in contradistinction to the *simple* operation, in which the lens is extracted without section of the iris. After the conjunctival sac has been thoroughly flushed by sterilised saline solution, an incision is made by entering the point of the cataract knife at the visible margin of the cornea through the anterior chamber, and after the exit of its point at the opposite corneal margin a semicircular flap is cut upwards, the curved portion being constituted by the margin of the transparent cornea. A portion of the iris is next removed with the view of preventing prolapse and subsequent incarceration of the iris in the corneal wound; the capsule of the opaque lens is freely incised by the cystotome, after which by gentle pressure the lens is extracted. The wound is finally cleansed and a dressing consisting of a pad of dry lint adjusted evenly over the eye and secured by bandage; the patient must be kept as quiet as possible after the operation, till healing has become established; atropine should be instilled on each daily removal of the dressing; he may be permitted to sit up on the third or fourth day, and bandages may be dispensed with at the end of a week from operation and dark glasses worn. Both eyes should be kept bandaged from the first.

In the *simple* operation the steps are the same, but the corneal flap is larger; there is no portion of the iris removed, and the circular pupil resulting gives a better appearance. The iris must be watched, however, and if at the end of 24 hours it is found to have prolapsed the corneal wound must be opened up and an iridectomy performed.

M'Keown's *irrigation* method aims at the removal of the residual cortical débris by means of fluid pressure. A stream of sterilised saline solution is made to gently flush out the interior of the capsule, removing all cortical fragments without the usual assistance of manual pressure, the scoop or massage. The advantage of the method lies in its applicability to the removal of unripe senile cataracts, which consequently can be operated on at an earlier stage than formerly. The method is used in India, where, however, the favourite operation is extraction of the lens in its capsule—a practice seldom resorted to at home owing to the danger of loss of the vitreous.

Cataracts occurring before the age of 25 years, whether complete or lamellar, may be effectively dealt with by the operation of *needling* or *discission*. This consists in inserting a needle through the cornea and lacerating the anterior capsule of the lens so as to expose the lens fibres to the absorptive action of the aqueous humour after the instillation of atropine, care being taken that the iris is left untouched. Repetition of the operation is usually necessary, and atropine must be daily instilled.

Linear extraction is employed for fluid or soft cataracts in subjects under 25 or 30 years of age, and is suitable after the failure of discission. It is performed by making a short incision within the margin of the cornea by a triangular keratome, after which the capsule of the lens is incised by

the cystotome; and, gentle pressure being applied, the softened lens is evacuated through the corneal wound. The iris is left untouched unless prolapse occurs, when an iridectomy may be necessary if this cannot be satisfactorily reduced.

Congenital cataract should be operated upon early—*i.e.*, before the end of the first year—especially when the opacity is complete, though often other serious ocular defects are also present. Needling is usually satisfactory when the cataract is fluid; in hard opacity the linear operation will be required, and the capsule may require removal by forceps.

The lamellar cataracts occurring in young subjects may be treated by an iridectomy when the periphery of the lens is clear and the opacity is limited, otherwise needling must be resorted to, the iris being left intact; in either case often a considerable defect of vision may be usually anticipated.

In traumatic cataract as little operative interference as possible should be undertaken; atropine may be safely instilled only so long as the tension in the injured eye is low. After the lapse of several months needling or linear extraction may be resorted to, but binocular vision must not be expected. When a foreign body in the lens complicates the condition the lens with the contained substance demands immediate extraction.

In all cataract operations for senile or other types only one eye should be operated upon at a time, and extraction should not be undertaken in the presence of conjunctivitis and of lachrymal tumour or mucocele, and when the projection of light is indicative of deep-seated disease in the fundus, but the presence of glycosuria need not prohibit operative measures, and sometimes albuminuric cases make a satisfactory though slow recovery.

CATARRH—see also **Bronchitis.**

This affection is but the first stage of a laryngeal or bronchial attack, the inflammatory process extending downwards as in ordinary catarrhs or "colds." When confined to the nasal membrane it is known as Catarrhal Rhinitis.

Preventive treatment consists in the use of Anticatarrhal vaccines prepared from the Friedländer bacillus or of the Wimpole Institute "Combined vaccine for colds," immunity being securable for some months after the injection of a tube containing 125 to 500 million organisms.

Any cause of the susceptibility should be sought out and removed; thus adenoids, hypertrophied turbinates, polypi, deviation of the septum, or pharyngeal tonsils, &c., may be the chief factors, and their treatment may entirely remove the tendency towards recurrence of acute attacks of catarrh.

The wearing of too heavy clothing and living in heated rooms owing to the dread of draughts is a fertile source of attacks, and can only be remedied by an education in the principles of open-air living and general hygiene. When an attack has already occurred undoubtedly the only reliable method of causing its speedy abortion is the injection of a full dose of

the combined vaccine previously mentioned. This vaccine has been also given by the mouth with success. A hot bath followed by a full dose of Morphia at bedtime is a favourite remedy with some, and Benzoate of Soda in one dose of 45 grs. is often efficacious. A popular method of treatment is to give teaspoonful doses of the Ammoniated Tincture of Quinine, and the equivalent of this dose can be procured in the capsular or tabular form combined with Camphor and Atropine with a little Morphia. A local spray of Carbolic Acid is sometimes efficacious at this early stage.

When free secretion has already appeared the latter-mentioned abortive remedies should not be employed, the best treatment at this stage being that indicated at the beginning of an attack of acute bronchitis. After a hot bath the patient should go to his bed, and perspiration should be encouraged by a smart diaphoretic like Sweet Spirit of Nitre in ½ dr. doses with double this amount of Mindererus Spirit and not more than 3 mins. of Liquor Morphia administered every three hours. By these means the catarrh may often be prevented from extending downwards to the larynx and bronchi.

Local applications for the relief of sneezing and other symptoms of irritation may be demanded. The most efficacious of these is an inhalation of the vapour of very hot water to which a little Carbolic Acid, Hemlock Juice, or Tr. Benzoin. Co. has been added. Ordinary inhalers are of little use; a large basin of almost boiling water should be placed under the patient's head, and a sheet thrown loosely over him; the air becomes rapidly saturated by the vapour. Dry heated air is always irritating, and the sick-room atmosphere should be kept saturated with moisture.

For mild attacks Ferrier's Snuff, consisting of Morphine Hydrochloride 1 gr., Powdered Gum Acacia 1 dr., and Oxynitrate of Bismuth 3 drs., may be insufflated frequently. Cocaine usually gives speedy but dearly purchased relief, as the irritation returns in an aggravated form. The best local anæsthetic is Menthol; this may be added with advantage to Ferrier's Snuff (5-10 grs. per oz.). A spray for use in the atomiser consisting of 1 per cent. Menthol in pure liquid Paraffin to which a little Camphor is added makes a valuable local soothing application. Plugs of cotton-wool saturated with a 5 per cent. ointment of Menthol in lanolin may be inserted up each nostril, or the ointment can be smeared over the nasal membrane by the finger tip. Relief is often afforded by frequently sniffing the vapour of Eucalyptus Oil from a small phial warmed by the heat of the hand.

Chronic nasal catarrh is best treated by the Ammonium Chloride Inhaler; the posterior nares may be washed out frequently by a 1 per cent. solution of Ammonium Chloride, which is sniffed up from the palm of the hand. Half a teaspoonful of the following powder dissolved in a tumblerful of warm water may be used in a similar manner several times a day: Sodii Bibor., Sodii Bicarb., Sodii Chloridi, ana ʒss. Where the discharge continues, though no obvious local cause can be detected, a cautious cauterisation of the posterior wall often arrests the inflammatory process.

CEREBRO-SPINAL FEVER—see Meningitis, Cerebro-Spinal.

CHANCRE—For Hard Chancre see under Syphilis.

Soft Sore.—The treatment of this affection has been already dealt with incidentally on p. 116 in the description of the methods of treating the bubo which commonly accompanies it.

The surface of the sore should be destroyed by a strong caustic, the most manageable being Carbolic Acid, Pernitrate of Mercury Solution or Nitric Acid applied on a little cotton-wool twisted round a piece of matchwood. In this way any infecting organisms which have not buried themselves deeply are effectually destroyed. After thorough cleansing and drying, the ulcer is sprinkled over with Iodoform and covered with gauze or lint, which should be changed at least twice a day.

Iodoform unfortunately has its tell-tale odour; as a rule far more is applied than is necessary, and with neatness in dusting, when the patient has a long prepuce, its odour need not be diffused, but when the sore is outside the prepuce the drug may be mixed with Tonquin bean or coumarin (1 gr. to 1 dr.) to disguise the odour. Aristol, Dermatol, Iodol, Europhen, Orthoform, Xeroform, Antifebrin, or Di-Iodoform may be used when odourless preparations are indicated. Canazzani treats all soft sores by applying a mixture of 5 drs. Chloral Hydrate, 3 drs. Camphor, and 3 oz. Glycerin. Where there is much swelling or pain about the prepuce cooling lotions may be used. Wielander keeps the sores covered by lint maintained at a temperature of 41° C. to destroy the virulence of the secretion, but flushing with Hydrogen Peroxide answers all purposes better.

Connell treats all venereal sores by the Ionic method. The surface of the ulcer being covered with a layer of lint soaked in 2 per cent. Hyd. Perchlor. solution, the current, 2 to 4 ma., is turned on for 5 minutes.

Circumcision is often necessary where the prepuce is tight, and this must not be delayed if any signs of sloughing should appear, caustics being applied freely after the operation. For the phagedænic sore the best remedy is strong Nitric Acid.

CHAPPED HANDS.

Prevention consists in protecting the skin from sudden variations of temperature and especially by guarding against the practice of washing the hands in very hot or very cold water, and then drying them by the heat of the fire after an imperfect use of the towel. A superfatted soap should always be employed. The following ointment applied after light washing usually renders the skin smooth and healthy. It should be rubbed in freely at night and chamois gloves worn afterwards.

℞ *Liquor. Carb. Deterg.* ℥iss.
Hydrarg. Ammon. Chlor. *gr.* xxv.
Lanolin. ℥ij. *Misce.*

Fiat Unguentum.

Other good applications are—Glycerin and Rose Water (1 to 5), Glycerin and Friar's Balsam (4 to 1), Glycerin and Eau de Cologne (2 to 1), Glycerin of Starch, Glycerin and diluted Lead Solution (1 to 8). Glycerin and Hydrastis (Glycerin, 3; Hydrastis Tincture, 1; Rose Water, 10); Boracic Ointment, Vaseline, Cold Cream, or Vinolia Cream are generally successful preventives when used after washing.

CHICKEN-POX—see Varicella.

CHILBLAIN.

Prevention consists, as in the case of chapped hands, in the avoidance of frequent washing with very hot or very cold water and exposing the imperfectly dried hands to the heat of the fire, and of exposure to cold winds, followed by injurious warming methods. Vigorous open-air exercise, even in coldest weather, during which the hands should be protected by loosely fitting thin woollen gloves, is imperative. When the feet are attacked, woollen stockings and roomy boots with cork insoles should be worn; night-socks may be used in bed after vigorous towelling, but hot-water bottles must be condemned.

Internal remedies (Iron and Quinine, &c.) are usually necessary, especially when anæmia is present, and in many chronically susceptible patients there appears to be a well-defined diathesis, as pointed out by Wright, in which constant headaches, chilblains, an erythematous state of the general cutaneous surface and slight œdema of the legs are present. This condition can only be relieved by increasing the coagulable power of the blood by administering Chloride of Calcium (15-gr. doses) for short courses, a practice which the writer has many times found to give most unmistakably good results. Ichthyol internally has many advocates.

If the lesion has already appeared, local treatment in the early erythematous stage may effectually prevent ulceration, by restoring the tone of the vessels through vigorous friction and the use of any stimulating application as the following:—

℞ *Tr. Capsici* ʒj.
Tr. Cannab. Ind. ʒj.
Olei Cajuputi ʒj.
Spirit. Camphoræ ad ʒij. *Misce.*

Fiat Linimentum.

Lin. Camph. Co. is a good application, as is also the following:—Lin. Saponis, ʒiij.; Chloroformi, ʒj.; Lin. Belladonnæ, ʒiv.; misce.

Mansel Symp on recommends bathing of the affected parts in 10 vol. Peroxide of Hydrogen Solution diluted with an equal quantity of hot water for 15 to 20 minutes twice daily.

Tr. Iodi Fort. freely painted over the parts often acts well, and when severe pain and tingling are complained of Belladonna Liniment, Menthol,

Oil of Peppermint, or of Eucalyptus, may be employed, but these agents should not be applied when the skin is broken.

Electricity in every form has its advocates; the X rays and also high-frequency currents have proved a valuable means of improving the tone of the cutaneous vessels. Flexile Collodion painted over the erythematous skin often acts well, and a 20 per cent. Formalin Ointment applied at night acts as a local tonic.

When ulceration has occurred the sore must be treated upon general surgical principles, the main fact being kept in mind that as the local vascular condition has its tone reduced stimulating ointments are indicated. One of the best routine applications is the following:

℞ *Tr. Benzoin. Co.* ʒij.
Lanolin. ʒiv.
Ungt. Zinci Ox. ʒj. *Misce.*

Friar's Balsam may be replaced by Balsam of Peru in the above: Ichthyol 1 part and Lanolin 4 parts make an excellent ointment. For very sluggish sores there is nothing better than Basilicon (Ungt. Resinæ), to which a few grains of Camphor to each oz. may be added. Should healing still remain slow, 5 grs. per oz. solution of Chloral Hydrate should be tried. Caustics are to be avoided, especially Argent. Nit., which is very painful, but occasionally flabby granulations may be lightly touched with a smooth crystal of Copper Sulphate. The ointments used in the ulcerating stage should be of firm consistence, and should be applied thickly spread upon lint and blebs snipped as they form, so as to bring the unguent into direct contact with the ulcerated surface.

CHLOASMA.

The pigmented patches often seen on the upper part of the face of pregnant women and those suffering from uterine or ovarian troubles, which constitute the affection known as chloasma uterinum, usually disappear when the primary condition is removed and the skin is treated by Perchloride of Mercury or Permanganate solution, as in case of freckles. The allied affection known as Freckles or Ephelides caused by the deposition of pigment in the cells of the rete, usually in the exposed parts of the skin, may be dealt with in various ways by agents which destroy the film of epidermis. Hebra's method was to apply a lint compress for four hours, soaked in Solution of Perchloride of Mercury (1 in 100), letting out the blister formed, and dressing the resulting raw surface with powdered Starch; or 8 grs. of the Mercurial Salt may be dissolved in 8 oz. of Almond Emulsion, and sponged over the spot several times daily till desquamation occurs. This plan obviously cannot be resorted to when the patches are extensive. Unna applies a plaster made with Hydrarg. Ammon. Chlor. for 12 hours, and dresses afterwards with an ointment of Bismuth (1 dr. to 1 oz.); sometimes his method of effecting exfoliation of the epidermis by applying an ointment of Resorcin 1 in 10 for a few hours at a time is

very convenient. Strong Tincture of Iodine, Carbolic Acid, Sulphurous Acid, Peroxide of Hydrogen, Acetic Acid, and many other mild counter-irritants are also successful. Crocker uses an ointment of 10 to 20 grs. of Veratrine to 1 oz. Lard. Pringle uses Salicylic Acid either as a paste, plaster, or muslin, or saturated alcoholic solution.

Large patches may be dealt with by applying a strong solution of Pot. Permang. and washing off the discoloration by solution of Oxalic Acid, as practised for sterilisation of the hands before abdominal operations. Preventive measures will obviously lie in the use of tinted veils to intercept the direct rays of the sun. Excellent results may be obtained by exposure to ultra-violet rays.

CHLOROFORM NARCOSIS AND CHLOROFORM POISONING — see under Poisoning by Chloroform.

CHLOROSIS.

The treatment of this condition has been referred to under Anæmia and Amenorrhœa; it consists mainly in the exhibition of iron. Blaud's Pills, 2 four times daily; 30 to 60 mins. of Dialysed Iron; or 3-gr. doses of Reduced Iron are the best preparations. The dose of the metal, in whatever preparation selected, should be large and often repeated. Failure in treatment is owing to the too early cessation of Iron administration and too small dosage. Allbutt rightly insists that it must be given continuously for at least three months; his method is to give 1 gr. Sulphate three times a day for the first week, 2 grs. in the second, and 3 grs. in the third week, 9 grs. being taken daily for two months, after which the dose is gradually lessened.

It sometimes occurs that the results of Iron soon cease after stopping its administration, and it will be well to leave off for a period, in which Arsenic may be given, or Iron and Arsenic may be given together. In these cases the nature of the food-supply should be carefully investigated; it will often be found that the patient is living upon a dietary poor in iron, such as rice, potatoes, and milk, fish or veal. Undercooked red meat with spinach or fresh peas and lettuce should be freely administered and the condition of the teeth carefully seen to. In some instances it may be discovered that the patient is intentionally keeping up the condition by imbibing vinegar with the view of producing pallor, or she may be daily resorting to large doses of antipyrine or other analgesic to relieve headache, or there may be unsuspected melæna from a duodenal or gastric ulcer. In all intractable cases absolute rest in bed for a few weeks is essential, but a free open-air life should be a routine in ordinary examples of the diseased condition.

Organic Iron salts and enemata of defibrinated blood of oxen have been advocated, but the common experience is that it is not the nature of the preparation, but the amount of iron introduced into the blood, which is the potent factor in treatment.

Sir Andrew Clarke insisted upon the necessity of giving purgatives, and

gave ⅛th part of the following twice a day:—Ferri Sulph., 24 grs.; Mag. Sulph., 6 drs.; Ac. Sulph. Arom., 1 dr.; Tinct. Zingib., 2 drs.; Inf. Gent. Co. ad 8 oz.

The auto-intoxication theory of chlorosis has led to the advocacy of purgatives and intestinal disinfectants, and the discovery that the mass of the blood is increased has led some physicians to advocate purgatives. The universal experience is that the routine use of disinfectants is unnecessary and continual purgation decidedly injurious. Iron alone meets all the demands of the condition as far as drugs are concerned. The questions of food, exercise, change of scene, environment, oral sepsis, &c., are all discussed under Amenorrhœa and Anæmia, where various formulæ are given. When the condition of the gastric membrane resents Iron, the writer gives reduced Iron and Arseniate of Iron in a Keratin-coated pill (Ferri Redact. gr. ii., Ferri Arsen. gr. ½). Pepsin may be indicated and peptonised foods are often beneficial. Often resort to a chalybeate spring is efficacious, and some patients with feeble digestive powers can take the Iron in such waters as Schwalbach in Nassau and Spa in Belgium when ordinary ferruginous preparations are badly tolerated at home. Manganese salts sometimes succeed where iron fails.

CHOLERA ASIATICA.

Preventive treatment is of vital importance; in epidemics the purity of the drinking water must be assured. Boiling and filtration afford perfect protection as regards this source of infection; the addition of even large amounts of alcoholic liquors is useless without heat. All foods and drinks should be quite recently cooked or boiled; fruits must be most sparingly used, and only those in best condition eaten. Water for cleansing purposes should be boiled. Rigid isolation of those suffering from the disease and disinfection of their apartments, linen, and clothing, and free bathing in weak disinfectant solutions are necessary. The excretions from the body should be destroyed instantly, and the greatest personal cleanliness in every respect insisted upon; every possible method should be employed to prevent the pollution of the water-supply in wells and reservoirs, and in India excellent results have been obtained by the routine practice of adding Permanganate of Potash to the water in the wells. Everything that lowers the vitality of the healthy, as over-work, fashionable dissipation, irregular meals, &c., is to be guarded against.

Recent research has demonstrated that the disease is largely propagated by "*carriers*," in whose excretions the vibrios are easily detected; these individuals should be rigidly isolated when possible and their fæces destroyed.

Diarrhœa, constipation and indigestion are to be met by appropriate agents without delay in cholera times. The use of astringents like Catechu, Kino, Tannin, &c., in combination with Laudanum or Chlorodyne is generally approved of for the preliminary diarrhœa, but such agents are useless when the disease has already set in.

Inoculation with cultures of the vibrios causing the disease has been

successfully employed during epidemics as a prophylactic. The usual method is to inject a dose of an attenuated culture, which should be followed in 5 days by a dose of the germs intensified by being grown in the peritoneal cavity of the guinea-pig. The protection from the vaccine usually lasts for about a year, but Haffkine advocates the plan of at once resorting to the injection of pure culture in the presence of an active epidemic. In the Balkan War Savas states that in Greece only 1 per cent. of those receiving two injections contracted the disease, and when the malady did attack those inoculated it ran a mild course. Kolle's vaccine consists of a standardised emulsion of the killed germs preserved in weak carbolic solution, and consequently possesses advantages over Haffkine's, which must be freshly prepared. As regards Eastern statistics, Colonel G. Thomson remarks shrewdly that it is the individuals who least require protection who most readily avail themselves of the injections; these are largely immune owing to their social environment.

Intestinal antiseptics of the old type have proved futile in the treatment of the established disease, the only one worth trial being Calomel when given early, and it is probable that in those cases where the drug has proved valuable its good effects were due to its purgative action in clearing out of the alimentary canal the germs and their products, as Castor Oil and Salines do when administered at the beginning of the attack. Rogers believes in the value of Permanganate of Calcium by the mouth; he gives a 2-gr. keratin-coated pill every 15 to 30 minutes till the stools become green; by this treatment in combination with intravenous hypertonic injections uræmia is prevented and the mortality has been reduced to less than one-third its former rate.

A good plan is to wash out the bowel by a copious enema of a warm solution of Tannin (1 in 80), and Catani maintained that by a careful manipulation the liquid could be made to pass into the small intestine and so flush out the intestinal tract from the stomach to the anus.

The same flushing principle is more effectually applied by administering a full dose of morphia hypodermically, which relieves vomiting, cramps, &c., and permits the patient to swallow and retain a large quantity of water if administered in small amount at a time at brief intervals. Saline Solution is employed with great advantage in the collapse stage, and the mortality has certainly been considerably reduced by it. Owing to the condition of the bowel it is of little use attempting to introduce the solution by the rectum, and even the hypodermic or subcutaneous method must be laid aside for the intravenous one. There is a difference in practice as regards the strength of the saline; most authorities recommend the so-called normal, physiological or isotonic solution of ·9 per cent., whilst O'Meara employs a ·625 per cent. saline and insists upon its very slow injection till the normal S.G. of the blood is reached. The density of the saline was thought not to be a material point, since the mortality seemed to have been reduced equally by the use of the different strengths of the solutions when these are injected at about 105° F. Rogers, however, maintains that the *hypertonic* intravenous injections have reduced the

mortality when uræmic symptoms had supervened from 11 to 3·4 per cent. His fluid is made by dissolving 160 grs. Sodium Bicarbonate and 60 grs. Sodium Chloride in 20 oz. water. In a later report he claims that, owing to the alkalinity of the blood being nearly always greatly reduced in severe cases of cholera, the routine administration of Sodium Bicarbonate has reduced the death-rate from post-choleraic uræmia to one-fourth its former rate. The results show the close relationship between acidosis and the later stages of severe cholera. Under the action of the saline the pulse returns in the radial, the urine begins to flow and all the symptoms improve; opium and calomel must not be given at this stage, and any food, antiseptic or astringent drug, if swallowed, is either rejected or remains unabsorbed in the intestines. The hot saline injection usually renders the hot baths or hot packs unnecessary, but when the algid condition is very marked they may be also used.

In the reaction stage little should be done in the administration of drugs, the patient being left to nature's method of resolution, which requires absolute repose, a little iced milk or meat juice being occasionally given. When the typhoid supervenes upon the algid or collapse stage the symptoms must be met by the administration of drugs, sponging and saline injections, or diuretics upon recognised principles indicated in the treatment of typhoid or other long-continued fever.

Thus the disease may be best treated throughout the entire attack by small quantities of liquid administered by the mouth at short intervals, one preliminary dose (5 grs.) Calomel, one or more hypodermic doses of Morphia and the intravenous injections of Alkaline Saline Solution, and should cardiac failure threaten, Strychnine hypodermically and Oxygen inhalation when respiration becomes difficult. Vomiting and hiccough may sometimes be relieved by minute doses of Cocaine.

CHOLERA INFANTUM—see Diarrhœa.

CHOREA.

Till the exact pathology of chorea be demonstrated specific treatment is not to be expected. Only three or four of the host of remedies recommended from time to time for the treatment of chorea are of real value. A disease so liable to get well in many cases if left to itself is certain to have scores of specifics, and whatever drug the observer had chanced to give, he is liable to attribute the spontaneous cure to its influence. Whilst many cases of chorea will recover if left alone without any medicine whatever, it is equally certain that many will go on from bad to worse if not treated. It is also certain that we have drugs which, if judiciously administered, possess considerable power over the duration of the disease.

Rest, suitable clothing, ventilation, tepid sponging, good food and abundance of it carefully administered, will go a great way to effect recovery. Absolute rest in bed and freedom from all excitement is essential in bad cases.

Anæmia is often associated with it, and when this is remedied the chorea passes off. It will be wise, when a mild case comes before the physician

for the first time, at the very commencement of the symptoms to attend to rest and feeding, and abstain from very active drugging. A small quantity of Tincture of Iron, with Cod-Liver Oil, cannot fail to improve the general health when associated with a few mild doses of a saline purgative. If the movements, however, have lasted for any time—a week or more—the patient should at once be placed upon a course of Arsenic.

This drug is the best routine remedy for the disease, and the writer is convinced from large experience in a children's hospital that when failures result these may be accepted as a general rule as caused by improper dosage, the error being nearly always made of prescribing arsenic in too minute amounts. The ordinary rules for appropriating dosage according to age should be discarded in the case of the treatment of chorea by arsenic, since choreic children bear larger doses of this drug than would, at first sight, seem possible. These large doses are also necessary to produce an effect upon the disease. In the ordinary doses, say of 1 min. of Fowler's Solution for a child 3 or 4 years old, or of 2 to 3 mins. for a child of 6 or 7, arsenic probably produces little or no benefit, and the writer has seen several cases where the drug was said to have failed which have rapidly improved when the proper dose was administered. Something very like this was seen in the treatment of anæmia and chlorosis with small doses of iron. It is a well-established fact that these affections may be for a long time treated by ordinary doses of some iron preparation without any appreciable benefit, but almost immediate improvement is noticed after the administration of large doses—doses much larger than can possibly be assimilated. The same fact is constantly observed in the treatment of tertiary syphilis by iodides. Seguin gives up to 25 or 27 drops of Liquor Arsenicalis after each meal in a large tumblerful of Alkaline Water in divided drinks during the hour following the meals, but such colossal dosage is seldom required. Gordon Sharp's dosage more nearly reaches the limits of safety; he begins with 10 mins. thrice daily for children between 8 and 15 years, and increases the dose to 12½ mins. after the end of a week if improvement is not manifest. Where the stomach is irritable the drug may be given hypodermically. Rarely have any evils been recorded from these large doses, but the physician should be on the watch for pigmentation and signs of neuritis.

Liq. Arsenicalis for a child of 7 years old may be commenced in doses of 3 mins. three times a day, and the dose may in a week be brought up to 10 mins. thrice daily without producing any untoward symptoms, and this dose can be taken for many weeks. Iron may be combined with it, but not in doses proportionately large, and it should always be given after a full meal. The following is a good working formula:

℞ *Liq. Arsenicalis Hydrochlor.* ℥iiss.
Tincturæ Ferri Perchlor. ℥ij.
Glycerini Purificati ℥j.
Aquæ Chloroformi ad ℥iv. *Misce.*

Fiat. mist. Capiat ℥j. *ter in die ex aqua post cib.*

Should improvement be very slow, the Arsenic may be pushed till griping and indigestion, or signs of irritation of the conjunctiva or nasal mucous membrane, show themselves.

The new organic Arsenic compounds—Arsamin, Atoxyl or Soamin; Cacodylates; Arrhenal or New Cacodyle, &c., have been vaunted, but the physician will be wise who refuses to employ these compounds in full doses, since optic atrophy and other forms of peripheral neuritis may supervene without warning. All that arsenic can accomplish may be more safely obtained by gradually increasing the dose of the official liquor, but where the stomach cannot be made to retain this preparation Cacodylate of Soda may be given hypodermically in moderate doses. Several cures have been reported where Salvarsan had been injected.

Poynton and Paine discovered the *Micrococcus rheumaticus* in the brain cortex of choreic subjects; since then Salicylate of Sodium has been extensively tried, but the results have been unsatisfactory save in those cases where the disease has made its appearance during an attack of acute rheumatism. In mild cases it may be used as a routine, since it is very desirable to have a non-toxic agent which may be freely prescribed in the extern departments of hospitals for children whose mild symptoms do not warrant detention in the wards, and there is always in prescribing concentrated arsenical mixtures for the children of the poor the danger of a large overdose being swallowed by mistake. Aspirin has, however, given better results than the salicylates, and may be dispensed in powder form with sugar.

In acute chorea complicating rheumatic fever, arsenic should only be commenced after the febrile disturbances have been subdued by free doses of the salicylate. In all cases of very severe chorea where the movements are such as seriously to interfere with feeding and sleep, their violence must be alleviated by agents which have a quicker influence over the disease than that possessed by arsenic. The best routine under such circumstances is a combination of Bromides with Chloral Hydrate, 1 gr. of Chloral for each year of the child's life (up to 8 years old) may be given every 4 hours with 1½ grs. bromide till drowsiness supervenes, the child being kept at rest in a carefully padded cot and nursed by a skilled attendant, who should administer small quantities of concentrated liquid nutriment at short intervals during the waking hours, and who should specially guard against the possibility of bedsores. Harley's remedy consisted in such cases of the administration of large doses of Hemlock Juice till the physiological action of the drug became apparent; thus Ringer has pushed the drug in the case of a child till 7 drs. were given every hour. The hot pack is very valuable and often induces sleep. Several authorities recommend that in intractable cases the Chloral should be pushed till deep sleep is induced, and Bastian has carried this treatment so far as to keep the patient asleep for several weeks except at half-hour intervals for feeding. Lichtschein has given 120 grs. daily to a girl of 12 years for 3 weeks, keeping up a continuous state of somnolency.

Bacelli extols Monobromide of Camphor; he commenced with 5 grs. ter

die, increasing to double the amount when necessary, and this drug may be employed as a routine method in milder cases.

In these gravely acute cases chloral hydrate may be combined with other drugs, and the following combination may be given to a six-year-old child:

℞ *Chloral Hydratis* *gr.* cl.
Sodii Bromidi ʒiv.
Succi Conii ʒij.
Aquæ et Syrupi *ad* ʒvj. *Misce.*

Fiat mistura. *Capt.* ʒij. *quartis horis.*

Morphine should seldom be resorted to, but excellent results are sometimes obtained by the hypodermic use of Hyoscine Hydrobromide in doses of $\frac{1}{200}$ gr. in grave cases. In a few cases Cannabis Indica has given rest; more frequently it is useless.

Chloroform or Ether inhalation is indicated when the movements do not cease during natural sleep or that induced by hypnotics.

Eserine, Curara, Picrotoxin, Lobelia, Tartar Emetic, and other powerful antispasmodic drugs have fallen into disuse, since their action cannot safely be kept up save for very brief periods.

A spray of Ether or Methyl Chloride or an ice-bag along the spine has sometimes aided in controlling the movements and inducing sleep. High-frequency currents and other forms of electrical treatment have not given encouraging results.

Chloralamide, Sulphonal, Trional and Veronal are inferior to the bromide and chloral hydrate combination. Antipyrine has often been useful, and some authorities push the drug till 100 grs. have been given daily—a practice open to serious objection. Lumbar Puncture has successfully been resorted to in this severe type of the disease.

Forced restraint by bandaging the upper limbs to the trunk and the leg to its fellow very seldom can be tolerated, but it may be tried, and if well borne may be persisted in; the bony prominences should be protected by cotton-wool.

In the grave form of chorea occurring during pregnancy absolute rest in bed and the avoidance of all excitement must be insisted upon. The best results are obtainable from full doses of Chloral Hydrate (30 grs.) combined with 60-gr. doses of Sodium Bromide. Abortion should not be induced unless as a last resource; overfeeding or even forced feeding may have to be resorted to.

A course of Arsenic is indicated in all severe cases of chorea after the violence of the movements has been controlled by sedatives.

Alternating with the arsenic treatment, or taking its place when for any reason arsenic cannot be tolerated, Zinc salts have been advocated. 3 to 5 grs. Sulphate or Oxide may be given thrice daily after food to children of 5 to 8 years old. The Phosphide ($\frac{1}{20}$ gr.), Valerianate ($\frac{1}{2}$ gr.) and Bromide ($\frac{1}{2}$ gr.) may be employed. Silver, Gold and Copper salts

have also been advocated. Little can be said for Wood's Quinine treatment and Strychnine (Trousseau's remedy) has fallen into disuse, though the latter drug may be employed with advantage in the grave forms of the disease when heart failure threatens, and it may be given with Chloral Hydrate in order to counteract the depressing influence of the latter drug on the cardiac muscle.

In the convalescent stage generous feeding to the fullest extent compatible with the digestive powers, an open-air life and abstention from all school lessons, games and excitement of every kind and a change to a bracing seaside resort are all most desirable or necessary. Where weakness of the muscles or local wasting supervenes, a course of massage and Swedish movements is clearly indicated, but electricity, if employed, must be in the form of the mildest constant currents, else the movements are apt to return through the excitement produced by painful shocks. In some chronic cases where through habit or the loss of co-ordinating power some purposeless movements continue, the child must be daily taught to use the affected muscles, as in the treatment of ataxia, by graduated exercises short of inducing fatigue. Every source of reflex irritation should be carefully sought for in such patients, adenoids, errors of refraction, round-worms and dental caries being removed by suitable treatment. Frights must be sedulously guarded against.

In the hopeless form of congenital or Huntington's chorea, drugs are of no avail in combating the fatal issue, though occasionally some relief may be obtained by the administration of Hyoscine. In senile chorea first appearing after the age of 50 where there is no mental deterioration or hereditary history occasionally Arsenic has been found efficacious.

CHOROIDITIS.

This is often of syphilitic origin, and yields to active Mercurial treatment; if got at an early stage, mercurial inunctions are especially indicated, and should be continued for a considerable period. In acute cases occurring late in syphilis, large doses of Iodide of Potassium may be tried first. In acute, or subacute cases, where sight has recently been failing from areolar or diffused choroiditis, where no history of syphilis is obtained, and where the kidneys are sound, the hope lies in small doses of the Perchloride of Mercury ($\frac{1}{15}$ gr. four times a day), commenced after a brisk saline purgative.

Subconjunctival injections of 1 c.c. of a 2 per cent. solution of Chloride of Sodium should always be resorted to in combination with constitutional remedies, and some ophthalmic surgeons report most favourably of the Cyanide of Mercury 1 in 5,000 injected every second or third day under the conjunctiva, especially in those cases where choroido-retinitis is present. The pain of the injection is prevented by the addition of a little Acoin.

Leeching of the temples, followed by the application of a small cupping-glass, or preferably by the use of Heurteloup's Leech, often affords relief. Absolute rest to the eyes must be insisted upon and dark glasses worn.

Pilocarpine hypodermically, in doses of $\frac{1}{6}$ to $\frac{1}{4}$ gr., is the best remedy where recently effused products have to be dealt with.

For the chronic disseminated choroiditis, chiefly observed in children, the offspring of syphilitic parents, little or nothing can be done, unless there chance to be some recent or active inflammation going on. Generally the defect in vision is only noticed long after the active stage is passed, and when the period has expired during which the treatment would be of any use. The necessity of treating every departure from the normal standard of health in such subjects need hardly be referred to.

For the acute purulent form of choroiditis following injuries little can be done save for the relief of pain by warm fomentations and anodynes; when these fail, a free incision of the globe and irrigation by weak sublimate solution should be resorted to, as enucleation of the eye is liable to be followed by meningeal infection.

CHROMIDROSIS.

When the sweat or sebaceous secretion is found to be coloured in neurotic women it is supposed to be due to the absorption of some derivative of indol from constipation. The obvious treatment lies in free purgation and the most thorough cleansing of the skin by Permanganate baths and the antiseptic agents mentioned under Bromidrosis. The hysterical condition or menstrual disorder which may underlie the condition should at the same time receive attention. The yellow discoloration of the sweat which sometimes follows ingestion of rhubarb and other drugs and the green discoloration observed in coppersmiths disappear after the removal of the cause. The white powdery residue left on the skin after crystallisation of urea sometimes met with in cholera and chronic Bright's disease is a clear indication for eliminatory treatment by the bowel.

CHYLURIA.

The presence of Chyle in the urine is nearly always due to filariæ which live in the lymphatics of the trunk and extremities; these block the thoracic duct, and the lower lymphatic vessels in the urinary tract become varicose and finally rupture from time to time, causing the chyluria. No known drug has any lethal effect upon the parasites in the body. The only treatment available is to keep the patient at absolute rest in bed with the pelvis well raised to diminish the pressure upon the dilated and ruptured lymphatic vessel and hasten its closure. The food should be as free as possible from fats and albuminoids; as soon as the chyluria disappears a tumblerful of milk may be administered with the view of testing the patency of the leak; should fatty matter be absent in the next urine passed the patient may be allowed to move about.

Thymol, Gallic Acid, Rhizophora Racemosa, Benzoate of Soda, Iron, Iodides, Arsenic compounds, &c., have all been extolled, but are of no practical value.

Chylocele should be treated like hydrocele, and when the dilated or varicose condition of the lymphatic vessels is confined to the scrotum it

may be practicable to excise the entire mass. The operation of lymphangeioplasty may be tried in some cases, and when elephantiasis follows the limb must be dealt with by the methods described in the article on Elephantiasis.

Chylous ascites is referred to under Ascites.

CLAVICLE, Fractures of.

The deformity or displacement in fractures of the shaft is mainly if not entirely due to the depression of the shoulder which causes the outer fragment to be drawn downwards, forwards and inwards by the weight of the arm, whilst the inner fragment is held in its position by the rhomboid ligament or at the most but slightly if at all elevated by the action of the sterno-mastoid muscle.

By placing the patient upon his back on a firm hair mattress with a small cushion between the shoulders and the arm supported upon a pillow by the side with the elbow elevated the fragments are at once brought into apposition. If this position be maintained continuously for about 18 days no other treatment is required, but even when sand-bags are employed some occasional movement of the body will produce slight over-riding of the fragments with consequent pain and uneasiness. Hence further support is necessary, especially in patients who refuse to consign themselves for so long a period to the recumbent posture.

To shorten the sojourn in bed in the horizontal position various devices are resorted to. Hood's plan of strapping is the simplest, but no method of treatment which allows the patient to move about will give a result free from some deformity save the application of Gordon's original clavicular apparatus, which proved, however, so cumbrous as to be now almost discarded.

Hood's Method.—Three pieces of stout adhesive rubber plaster each about one and a half to two inches wide are vertically applied to the chest at a level below the angle of the scapula behind and brought over the clavicle in front to be attached as low down as the level of the nipple; the middle strip should be applied first and should cover the site of the fracture, being strengthened on each side by the overlapping edges of the lateral strips. After the application of these the patient should be placed in bed in the position above described and daily gentle friction or massage applied to the muscles. Passive movements at the joints of the fingers, wrist, elbow and shoulder should be commenced, and after a few days active gentle movements at all these joints, the shoulder-joint being cautiously exercised by a slight swinging motion.

In a week or eight days the patient may be permitted to get up and move about with his arm supported in a sling.

Sayre's Method.—This method is devised with the view of permitting the patient to move about from the start, but a pad must be placed in the axilla. Two long strips of stout rubber plaster each measuring $3\frac{1}{2}$ inches in width are required. One is stitched with the adhesive surface outwards so as to form a loop for the arm at the insertion of the deltoid; when this

strap is in position traction is forcibly made on it to draw the arm backwards and the strapping, heated or moistened with turpentine, is applied to the back of the chest and brought round the side beneath the opposite axilla and over the front of the chest till its free extremity reaches the spine. A second long strip is taken and a slit made in its centre for the reception of the olecranon; this is attached at one extremity over the point of the sound shoulder and applied behind obliquely downwards, securing the elbow on the injured side as in a sling, and its free end is turned upwards on the back of the flexed forearm and hand to join its upper extremity to which it becomes adherent above the sound shoulder. Whilst this second piece of plaster is being made to envelop the elbow the latter should be drawn or pushed forward so as to force the shoulder backwards and upwards upon the fulcrum supplied by the loop of the first strip. A three-inch bandage is applied over the strapping to prevent the plaster adhering to the clothes, and to keep the arm from slipping down under the plaster.

Duncan's modification of Sayre's plaster method consists in applying the principles of Sayre, but using a broad domette bandage instead of the adhesive strapping, the bandage being applied in one piece, and at the overlapping places fastened with safety pins or stitches. It has the advantage of being more easily reapplied should the support become slackened and the over-riding of the fragments return.

Fractures at the acromial end of the bone beyond and between the ligaments may be treated upon the same lines; when fracture occurs in the latter situation, there is no deformity and the patient may be permitted to move about with his arm in a sling.

CLEFT PALATE.

The sooner the cleft can be closed by operation the better, and if possible in all cases this should be done before the patient learns to speak.

When the cleft only involves the soft palate and uvula the operation of *staphylorrhaphy* may be performed in a few weeks after birth. The infant being chloroformed, the head is permitted to hang backwards, a gag is inserted between the gums, the edges of the cleft are neatly pared after the uvula has been seized with forceps. Sutures of horsehair, silk, or silkworm gut are inserted and the margins of the cleft are brought together. Should there be much tension, an incision may be made through the levator palati a short distance outside the line of interrupted sutures on each side or the posterior pillars of the fauces may be snipped.

The hard palate is closed by the operation of *uranoplasty*, an incision internal to the alveolar border is made down to the bone on each side of the cleft, avoiding the palatine arteries; the soft parts are next separated by a raspatory from the underlying bone and the mucoperiosteal flaps freed so as to avoid tension, and for this purpose it is advisable also to sever the attachment of the soft to the hard palate. The margins of the original cleft are made raw by paring the edges with a cleft palate knife, beginning at the junction of hard and soft palate and cutting each side forwards and

backwards from this point. Sutures of hair, silver wire or gut are then inserted so as to bring neatly into apposition the raw surfaces of the pared edges. Should tension exist from the stitches the original deep lateral incisions should be prolonged backwards to the anterior pillars of the fauces and forwards towards the central incisor teeth.

Lane and Davies-Colley form a long flap on one side of the cleft by making a deep incision internal to the alveolar border, dissecting this from the bone (but leaving its inner uncut margin to act like a hinge), folding it over and inserting it under a small mucoperiosteal flap made by raising the tissue from the bone on the other side of the cleft in the hard palate, after which the raw surfaces of each flap are sutured together.

Brophy's operation for closing wide clefts in the hard palate of infants consists in drawing the upper maxillæ together by stout silver wires before suturing the pared edges of the cleft, the wires being afterwards removed when union has occurred.

The after-treatment of cleft palate requires great care; the child should be fed with sterilised milk from a spoon in small quantities at a time to obviate vomiting and as far as possible to prevent crying and coughing. The stitches need not be removed for 3 weeks, and the mouth should be kept sweet by spraying with a Borax or weak Carbolic lotion if this does not cause crying. At a later stage great patience may be required in teaching the child to speak and to exercise the palatal muscles properly so that the air is forced through the mouth and not through the nose. When hare-lip complicates the case the lip is operated on at once and the palate repaired at a second operation. Usually the lip is operated on when the child is a month or two old, the palate at the end of 6 to 12 months or even later. The repair of the lip is important, because it produces considerable narrowing of the cleft, making some inoperable cases operable.

Early operation gives better results as regards phonation than if the interference be delayed till the child has learned to talk.

In cases where operation has failed or where the nasal tone of the voice renders articulation very defective much good may often be achieved by fitting the roof of the patient's mouth with an obturator consisting of a thin gold or vulcanite plate held in position by suction; to this a tympanum of rubber may be attached posteriorly, and it may be made in front to carry any artificial teeth necessary to close up gaps in the incisors.

CLUB FOOT.

Congenital club foot is commonly of the equino-varus type, and the deformity can be effectually dealt with when not severe without any cutting operation. A few days after birth systematic manipulations of the distorted foot should be patiently and perseveringly undertaken by a trained nurse. The anterior portion of the foot being grasped by one hand and the heel by the other, the sole is everted and the foot turned outwards and held for a few moments in this position, the operation being repeated many times till the greatest degree of correction is obtained.

Then by flexing the foot upon the leg the tendo Achillis and its muscles are stretched in a similar manner, after which both manipulations may be combined and the muscles of the limb carefully massaged, these operations being carried out many times each day.

After some degree of correction of the deformity has been achieved for several weeks by these means, splints may be utilised; a padded poroplastic, malleable iron or aluminium splint with a foot-piece should be applied after bending it or moulding it to the position of the limb, whilst the latter is firmly held in the best corrected position without causing pain and a bandage is applied. Several times during the day the splint is to be removed and the manipulations and massage with douching repeated, the apparatus being from time to time further bent or remoulded as the deformity becomes less, and it may be kept on at night. By persisting with this treatment, in all mild cases the deformity may be so reduced that when the child commences to put its feet upon the ground the tendency of the foot to regain its abnormal position may have disappeared and walking movements will further advance the cure, but still great attention must be given to prevent relapse and a splint must be applied at night and so bandaged as to cause rotation outwards of the leg in order to correct the tendency of the toes to turn inwards. A walking boot with steel supports is also usually necessary for a time.

In severe cases the correction of the distortion cannot be effected by manipulation with the hands, and then tenotomy under anæsthesia must be resorted to, and the deformity overcorrected by forcibly twisting the foot into its normal position. The best practice is to first cut the structures which produce the varus distortion—viz., the tendon of the tibialis anticus, the plantar fascia, a portion of the internal ligament of the ankle-joint and sometimes the tendon of the posterior tibial muscle. The foot is manipulated until the varus deformity is overcorrected. Tenotomy of the tendo Achillis is now carried out and the equinus position overcorrected. The foot is then put in plaster in the overcorrected position and not disturbed unless for special reasons for 3 to 4 weeks. At the end of this time the plaster is removed and either reapplied or reapplied after further manipulation. The repetition of this treatment over several months will usually result in cure of the deformity. To prevent recurrence it will be sufficient to allow special boots, if necessary fitted with iron supports, to be worn by day and Jones' club-foot splints at night. Mechanical appliances may be used for control of deformities, but not for their cure.

In very severe cases where the distortion cannot be remedied by the above measures and in relapsing cases *Phelp's* operation of dividing all the constricting structures by an open incision down to the bone on the inner side of the foot has been practised.

When the bones in neglected cases have become deformed, the operation of *tarsectomy* is advocated, by which a wedge-shaped mass of bone consisting of portions of the astragalus, cuboid, scaphoid and os calcis is removed or Lund's *astragalectomy* must be used. It is the best operative measure where manipulation and tenotomy fail. Ogston's alternative

plan has found favour; this consists in cutting down upon the tarsus and gouging out the osseous nucleus of the astragalus, anterior part of the calcis and cuboid, leaving behind their cartilaginous shells.

The other types of congenital club foot rarely call for operative procedures, and yield usually to manipulations, massage and the use of splints when treatment is commenced during the first week of infantile life. Ogston condemns promiscuous tenotomies in ordinary cases of all types and trusts to a plaster of Paris bandage applied after straightening out the deformity under chloroform, but he divides the tendo Achillis after the varus position has been treated for six weeks by the plaster splint, which is then to be applied from the toes to the middle of the thigh.

Acquired club foot or paralytic talipes is nearly always, as its second name implies, the result of infantile or spastic paralysis.

Preventive treatment is of primary importance; since the deformity results from the permanent contracture of the muscles from loss of power in their opponents, much can be done by massage of the weakened muscles and passive movements which will exercise the unopposed muscles and prevent their contracture. But, above all, faulty positions of the foot resulting from the paralysis must be corrected whilst the limb is in the flaccid stage, otherwise permanent shortening not only of the muscles but of the ligaments and fasciæ with changes in the bones is certain to occur. Thus it will be obvious that the early treatment of acquired talipes will be that of the infantile paralysis which causes it. In addition to massage, douching, and passive movements mechanical appliances are required to keep the foot in its normal position when at rest and a boot with irons worn when walking can be attempted. The use of electricity is doubtful. In unskilled hands it may be positively dangerous either by causing over-action in paretic muscles, or by acting on sound muscles overstretching the paretic ones.

When the loss of power in the paralysed muscles has become permanent the secondary shortening and deformity must be met by operative measures as tenotomy, division of the plantar fascia, excision of bones, arthrodesis of the ankle, tarsal and metatarsal joints and transplantation of tendons. By employing the above operative measures suitable to the indications in each case the deformities of acquired equino-varus, talipes equinus, calcaneus and the other compound types of acquired club foot and pes cavus or claw-foot may be remedied.

COCAINE HABIT.

The treatment of this condition will be described in the article on the Opium Habit.

COCCYDYNIA, OR COCCYGODYNIA.

This condition is generally due to injury of the coccyx, often the result of difficult delivery or trauma; it may be caused by a true neuralgia of the sacral nerves which will only yield to persistence in the use of anti-neuralgic remedies. Occasionally it may be the local manifestation of the

hysterical condition, in which case it will rapidly disappear after a few applications of the actual cautery or galvanic current. When the pain is due to rheumatism of the sacro-coccygeal joint Aspirin or Salicylates will be indicated. Relief may sometimes be obtained by wearing a Belladonna Plaster, cut to the shape of the parts, and terminating in a pointed end or tail, which covers the skin over the lower part of the sacrum and coccyx, coming forwards to near the anus. Any local anæsthetic may be employed from time to time to give temporary relief, and occasionally benefit is derived from the application of blisters or counter-irritants like strong tincture of Iodine, or Corrigan's Iron.

In traumatic cases Yeomans injects 10-20 mins. 80 per cent. Alcohol in the middle line over the most tender spot, as in severe facial neuralgia, and he maintains excision is seldom necessary; 4 or 5 injections may be required.

Ménière uses the following suppository at bed-time:

R. *Extracti Belladonnæ V.* gr. $\frac{1}{4}$.
Extracti Hyoscyami gr. $\frac{3}{4}$.
Iodoformi gr. $\frac{3}{4}$.
Olei Theobromatis gr. xx. *Misce.*

Or Chloral Hydrat., 1½ grs.; Extract. Valerianæ, 1½ grs.: Olei Theobromatis, 20 grs.

When pain continues in spite of rest in the recumbent posture and the use of the above agents the coccyx must be dissected out through a free median skin incision and excised with its periosteum—an operation which gives better results than Simpson's plan of subcutaneous section of the muscles attached to the coccyx. Where the coccygeal pain is associated with difficulty of defecation, the condition will often be found to be due to fracture and displacement of the lower fragment, which should be removed without delay. If due to the presence of anal fissure or hæmorrhoids, these should also be dealt with surgically.

COLIC, Intestinal.

Intense pain calls for immediate relief by sedatives; afterwards the cause of the attack will often afford the best indication for the nature of the treatment required. Thus the colic of infancy generally depends upon an error in feeding, and in the majority of cases will be found to depend upon the presence of indigestible milk curd, which, if not speedily remedied, may give rise to rapidly fatal enteritis. A smart purge (one teaspoonful of Castor Oil), combined with carminatives and a change of diet, will give permanent relief. If the milk of the mother or a healthy wet nurse is not available, peptonised milk or a predigested liquid food must be employed, or ½ gr. Papain may be added to each bottleful of diluted cow's milk.

The colic of very young infants should never be treated by Laudanum. Oil of Anise, 1 to 2 drops on sugar, may be given every hour. Peppermint

is more suitable for older children and adults. Dill Water, with a little Magnesia, is a favourite domestic remedy.

℞ *Magnes. Carb.* gr. xx.
Syrup. Zingib. ʒiij.
Spt. Chlorof. ♏xx.
Aquæ Anethi ad ʒij. *Misce.*

Fiat mistura. Sumat ʒj. *omni hora si opus sit.*

Yeo recommends Gregory's Powder, 1 dr.; Fetid Spirit of Ammonia, ½ dr.; Tinct. Card. Co., 3 drs.; Spt. of Chloroform, ½ dr.; Caraway Water to 1½ oz. 1 to 2 drs. every hour.

Eustace Smith recommends Resorcin as an antiseptic administered in combination with carminatives and alkalies; he gives 2 grs. resorcin every three hours to a child 6 months old.

In adults, if the colic depends upon the presence of irritating, indigestible, or fermenting food, a smart purge, with Opium combined, should be given. Castor Oil is the safest of all cathartics in such cases, as there is always the remote possibility of some underlying organic trouble being present.

The following is a well-tried formula:

℞ *Ol. Ricini* ʒiv.
Tinct. Rhei Co. ʒij.
Tr. Opii ♏xx.
Aquæ Cinnamomi ad ʒij. *Misce.*

Fiat haustus statim sumendus p.p.a.

Five grs. Calomel with ⅙ gr. Morphia may be placed upon the tongue and washed down with a little water when castor oil is rejected by the stomach; it is a good plan to administer a large enema of warm water, and when scybalous masses are detected in the rectum these may require to be broken up by mechanical means. Before the cathartic acts the patient may have a hot bath (temp. 104°), and a large Linseed and Mustard Poultice applied to the abdomen after he is put to bed, or hot Turpentine stupes may be used instead of the bath. The ordinary India-rubber bottle, half filled with hot water, and laid against the stomach region, affords great comfort in all cases.

If the pain continues, a hypodermic of ⅓ gr. Morphia, with 1 min. of Solution of Atropine, may be given in conjunction with a glassful of hot punch. Chloroform has been administered where the suffering has been acute, but in simple colic it is seldom required. The following may be tried in chronic cases, or where the attacks recur:

The tincture of Asafetida or fetid spirit of ammonia in doses of 1 dr. Sal Volatile—In teaspoonful doses, largely diluted or combined with whiskey or brandy. Ether—In teaspoonful doses of the spirit, or of Hoffman's Anodyne, or even teaspoonful doses of the pure ether might be

given alone or in a little spirit. Belladonna—15 mins. of the tincture may be administered at one dose. Ginger or Cardamoms—In teaspoonfuls of the tinctures diluted. Essential Oils—Cajuput (5 mins.), Chamomile (3 mins.), Peppermint (5 mins.), Cinnamon, Cloves, or Caraway (3 mins.), or Camphor (3 grs.)—every two or three hours. Chlorodyne—15 to 30 mins.—is a popular remedy of great power and certainty of action.

COLIC, Lead.

Morphia hypodermically should be administered when the pain is very severe and persistent and does not yield to warm poultices to the abdomen and a hot bath. The colon must be emptied by a large enema of hot water as soon as the patient comes under observation, after which a smart purge should be administered; 1 oz. Sulphate of Magnesia is the most suitable. Castor Oil acts satisfactorily, but the sulphate can be repeated every 3 hours in teaspoonful doses if the first dose fails to act, whilst repeated doses of the oil cannot be tolerated. Should the pain be moderately severe, any of the remedies mentioned upon the previous page may be administered with the view of giving temporary relief. After the evacuation of the bowels the patient should be put upon a course of Iodide of Potassium to cause elimination of lead from the system. This course may be well supplemented by a morning purge caused by the Sulphate of Magnesia, the rationale of the treatment being to attack the insoluble lead stored up in the system, convert it into the soluble iodide which is eliminated by the urine and by the mucous membrane of the intestinal tract, and then by meeting this in the intestines it is rapidly converted into the less soluble sulphate and at once thrown out by purging with the Epsom salt before it has time to be reabsorbed.

Olive Oil in large doses has been extolled; in addition to its laxative properties, doses of 5 oz. seem to possess some striking analgesic effect, so that constipation and pain pass off in a few days. Where the oil is vomited, 2 or 3 grs. of Thymol given before the next dose generally suffice to prevent this. Oliver recommends the administration of Sodium Monosulphide in $\frac{1}{4}$ to $\frac{1}{2}$ gr. doses with Tr. Card. Co. 15 mins. in 1 oz. water every three hours when the colic remains after purgation.

Alum, in full doses, sometimes purges in the obstinate constipation of lead colic, and it is also said to relieve the pain when purging does not occur. It may be given in doses of 20 grs.

Diluted Sulphuric Acid, in 20 min. doses, may be taken in half a tumblerful of water as a drink frequently during the day, or Lemonade made with sulphuric acid instead of citric and tartaric acids, as ordinarily employed by lemonade makers. This beverage is a valuable prophylactic, and may be given with the Iodide in bad cases.

Sulphur, Harrogate Water, Onions, Garlic, and other sulphur-containing bodies have been used successfully with a view of causing elimination. Sulphur baths have been recommended for the same reasons, and a diet of milk in large quantities favours convalescence. (See also under Plumbism, where the prophylaxis is fully discussed.)

COLITIS.

The *catarrhal* form of the disease manifesting itself mainly by the presence of diarrhœa is to be treated as any ordinary form of irritative diarrhœa by rest in bed, a diet of milk and lime water, with egg albumin, arrowroot, cornflour or other smooth farinaceous food given in small quantities. Abdominal pain is best relieved by the application of the hot-water bag, and tenesmus by a small enema of starch containing 15 mins. Laudanum. Unless the symptoms be very acute it is a good plan to administer 2 to 4 drs. Castor Oil at the start in order to expel any irritant in the intestines, and when this cannot be borne the colon should be once a day washed out with a copious enema of warm water. The routine method of administering vegetable astringents like catechu and tannin is irrational, as these upset the stomach and may never reach the colon. The best practice is to give a mixture containing 30 grs. Carbonate of Bismuth suspended in freshly prepared mucilage and chloroform water with 5 mirs. Liquor Morphiæ every two or three hours. When the diarrhœa persists and the motions keep profuse and watery, astringent treatment must be tried. The best remedy is Tannalbin—a drug which passes unchanged through the stomach; it may be given in doses of 20 grs. with the same amount of Bismuth in a cachet. The alternating attacks of constipation are best avoided by large doses of Liquid Paraffin or Olive Oil.

Mucous or *membranous* colitis occurring in neurotic subjects is a most intractable affection. The treatment must be varied from time to time, since the frequent painful membranous discharges usually alternate with periods of obstinate constipation. During the attack of pain and diarrhœa the patient must remain in bed and a hot-water bag or poultice is to be applied to the abdomen; the colon should be flushed out with a weak warm Boric Acid solution or a large enema of warmed Olive Oil should be given and retained if possible. The writer's routine practice is to inject into the colon warm strained Linseed decoction as much as the patient can tolerate so as to thoroughly sluice out the bowel.

Narcotics are to be avoided; owing to the neurotic condition the opium habit is very liable to be induced. The best routine drug treatment is large doses (30 to 60 grs.) of Carbonate of Bismuth every four or six hours; it should be given in freshly prepared mucilage. Purgatives as a routine are contra-indicated; the spells of constipation are best cut short by enemata, but occasionally a mild cathartic must be administered, and Castor Oil is preferable to all others, but there is great difficulty in gauging the dosage; a teaspoonful at one time purges freely, whilst at other times 1 oz. has no effect, and this is even more noticeable with salines. Intestinal antiseptics are as a rule useless, but ½ gr. Calomel twice daily may be given in courses of about a week with advantage. Hale White recommends Cyllin, which may be administered in 3 min. Keratin capsules. Large doses, 1-3 oz., Liquid Paraffin may be administered daily for long periods.

Two opposite systems of dietetic treatment are vaunted. Thus Langenhagen insists upon a dietary affording the least possible indiges-

tible residue, all fat, green vegetables and fibrous constituents being strictly forbidden, and in severe cases he gives milk only with eggs, beef tea and pounded raw meat.

Von Noorden's dietary, on the other hand, aims at leaving the largest amount of cellulose residue to pass through the intestines. Fat is to be freely given—viz., ½ pound of butter and ¾ pint cream daily—coarse green boiled vegetables mashed with butter and brown bread of the coarsest kind of wholemeal flour containing the largest possible percentage of bran or husk. Thick vegetable soup containing all the insoluble envelopes of the dried peas and lentils employed in its manufacture; baked fruits and potatoes are also freely administered and Kissingen water allowed in small amount, massage being daily performed, both local for the abdominal wall and general for its sedative influence.

The writer has tried both methods of dieting, and believes that the routine employment of either is bad practice. In cases where obstinate constipation with the passage of hard scybalous masses is a frequent complication Von Noorden's plan is a good one, and in those where frequent loose mucous discharges associated with great pain and griping are constantly wearing down the patient's health the soluble diet of Langenhagen is more suitable. The best procedure on the whole is in the acute diarrhœal paroxysms to keep the patient upon a diet of Koumiss (p. 19) and gradually to introduce a free and mixed dietary containing abundance of fats and cellulose.

The Plombières treatment carried out at the spa in Vosges consists in free intestinal lavage with a copious use of the soft thermal water by the mouth, for bathing purposes and for douching. The underlying neurotic condition is, moreover, generally markedly improved by the thermal water and spa regimen.

Hypodermic injections of fresh sea-water Plasma, as carried out by Robert-Simon, sometimes afford excellent results. He recommends an injection of 50 to 75 c.c. behind the trochanter every second or third day as described under Eczema. Larat, assuming that this type of colitis is due to nervous and arthritic causes, has recommended as of primary importance active exercise in games, walking, gymnastics, rowing and mountain climbing.

The greatest practical difficulty next to the management of the bowels in mucous colitis is the treatment of the insomnia which is often a prominent feature, and morphine must be seldom employed; the newer hypnotics only should be used. Where in spite of dietetic and other measures the case continues intractable, good results have been achieved by colotomy and by establishing an opening in the appendix through which the colon can be daily flushed out with weak antiseptic or saline solutions.

Ulcerative colitis is often of dysenteric origin, though Ipecacuanha in every form is generally useless in its treatment. The best routine is free lavage of the colon with weak antiseptic solutions—Boric Acid being the best, or 1 gr. to each pint of Silver Nitrate. These should be followed by the introduction of a 1 per cent. Argyrol solution injected in the knee-

elbow position. Nitrate of Silver (3 to 5 grs. to 4 oz.), Methylene Blue (4 grs. to 4 oz.), Creolin and other antiseptic solutions are also in use. By the mouth small doses of Calomel (¼ gr.) twice or thrice daily or a full dose followed by Castor Oil once a day gives the best results.

Serum treatment should always be employed; the Lister Institute Serum, prepared by immunising the horse with Shiga's and other types of bacilli and their toxins, is both antitoxic and bactericidal; it may be injected in 40 c.c. doses and upwards, and Antidysenteric Serum has been successfully employed in cases of non-amœbic variety.

Colotomy affords the only hope of saving life in most chronic cases, and there can always be the hope held out that the artificial anus may ultimately be closed as the colon heals by rest; but a cæcal anus should be always provided. After colotomy constant flushing of the bowel with antiseptics will be required daily. The establishment of an opening in the appendix with the view of irrigating the colon by antiseptics has proved efficacious, but in severe cases colotomy is preferable.

The diet should be such as leaves the minimum of residue to pass through the colon; strong clear soups, milk, Koumiss and scraped raw meat may be freely administered.

COLLAPSE AND SHOCK.

Collapse is generally due to loss of blood from hæmorrhage or to profuse diarrhœa as in cholera, which reduces the vascular tension throughout the body. The treatment is obvious: the vessels must be filled by the introduction into the system of Normal Saline Solution. In mild cases large saline enemata may suffice, but when the collapse has become established neither this nor hypodermic injection of the fluid is to be relied upon. The patient being placed in a bed, the feet should be raised and the head lowered, and a bandage having been applied to each lower extremity to press the blood out of the limb into the large vessels, intravenous injection of saline solution should be performed. The breathing being liable to fail, Artificial Respiration may be demanded. In the sudden collapse following blows over the splanchnic area the paralysed vasomotor centres may be stimulated as in syncope, by the inhalation of strong Ammonia or Acetic Acid vapour, and later by Alcohol given by the mouth. The hypodermic injection of Strychnine is rationally indicated. The Japanese method of treatment consists in making a number of sharp blows over the seventh cervical vertebra till reaction occurs.

Shock is due not to paralysis of the vasomotor centres, but to exhaustion of these, and hence strychnine or other stimulant is contra-indicated, but in mild cases of shock the condition of severe collapse may supervene as in a secondary hæmorrhage following a prolonged surgical operation. Fortunately, however, the main indication is the same in both cases: the head and shoulders of the patient should be depressed, the limbs bandaged and Saline Solution given by the veins, hypodermically or by the rectum, the venous channel being selected in all severe cases. Artificial respiration should be kept up when the breathing shows signs of failure.

Adrenalin Solution is indicated in all cases of severe shock, and it should be introduced along with the saline; its action being exerted on the vessels independent of the influence of the vasomotor centre, the blood-pressure is at once raised. 15 mins. adrenalin chloride solution should be added to the intravenous saline injection. Ergot principles as Tyramine and Ernutin act in a similar manner. Morphia hypodermically is valuable; by diminishing or cutting off the centripetal stimuli it tends to reduce the extent of the shock.

The treatment of the profound condition of acid intoxication following chloroform anæsthesia is detailed under Acidosis.

Shell Shock will be referred to under its own heading.

Preventive treatment of surgical shock is of importance, and in prolonged operations Ether or A.C.E. mixture should be preferred to chloroform, and Nitrous Oxide used for shorter operations; warmth to the extremities should be maintained, and in abdominal operations the shortest exposure and handling of the peritoneum and especially douching with cold liquids must be guarded against. A hypodermic of Morphia combined with Strychnine or a small dose of Atropine should always be administered previous to operation. Crile injects Cocaine or Eucaine into the proximal end of the nerves about to be divided. Barker's method of artificial feeding by the preliminary hypodermic administration of sterile 5 per cent. solution of Glucose is a valuable addition to the surgeon's armoury when prolonged operation is to be undertaken. Sterile glucose tubes are procurable, the contents of which, when added to 1 pint of boiled water, make an isotonic solution.

In severe traumatic shock, operations, except in the case of uncontrollable hæmorrhage or sepsis, should, when possible, be postponed till the symptoms have been relieved by the above-mentioned treatment—*i.e.*, rest in bed, saline by the veins with adrenalin, and morphia with either strychnine or atropine.

COMA.

The cause of the coma must be determined before any form of rational treatment can be decided on. A head injury, meningeal inflammation, apoplexy, sunstroke, opium or alcohol-poisoning, uræmia or hyperpyrexia may be the cause, and should be promptly met by the treatment as detailed under the heading of the individual primary affection. The large dose of Calomel suitable to an apoplectic patient may cause the death of a patient seized with coma from diseased kidney. To treat the coma of opium as one would treat the profound unconsciousness caused by hyperpyrexia would be to allow the patient to speedily pass beyond the reach of remedies.

If no previous history can be obtained of the cause of the coma, say in a subject picked up in the streets, Sinapisms may be applied to the back of the neck, spine, abdomen or back of the legs. A smart purgative (one drop of Croton Oil) is safe, and can do no harm; often the Cold Douche may be used. If there be even a suspicion of poisoning, the soft tube of

the stomach pump should be passed, and the contents drawn off and examined. No harm can come from such procedure, whilst, should the patient die without this having been done, and subsequent information be forthcoming at the coroner's court, serious blame will be meted out to the attendant, even though pumping would have been useless. Valuable information may be obtained by using the catheter in such cases and examining the urine drawn off. The coma due to a general toxæmia causes symptoms which are always bilateral, both sides of the body being equally flaccid and powerless, whilst even in the severe cerebral lesions causing complete unconsciousness some variation of the motility of the limbs may be found by a careful comparison of each side of the body, and pupil changes or deviation may be detected. (See the treatment of each of the primary affections under its heading—*i.e.*, Apoplexy, Diabetes, Uræmia, Poisoning by Opium, Alcohol, &c.)

CONCUSSION AND COMPRESSION OF THE BRAIN AND SPINE.

The subject of concussion has received very close study owing to the large number of cases of injury in war caused by the detonation of high explosives where the enormous increase in atmospheric pressure is brought to bear upon the cerebro-spinal fluid. This will be referred to under Shell Shock.

The treatment of concussion of the brain differs materially from that of ordinary shock, though the two conditions are pathologically associated. Absolute rest in a darkened room, with silence and freedom from all exciting surroundings, with the patient lying flat upon a firm mattress, should be insisted upon. When the unconsciousness or dazed condition shows signs of passing off, the head should be elevated and the ice-cap used, and if the symptoms of reaction are well marked leeches should be applied to the temples. A drop of Croton Oil with 5 grs. Calomel should be administered, and no food given save a few spoonfuls of diluted milk.

The danger of hæmorrhage is increased by administering saline injections and stimulants; application of Ammonia to the nostrils, which may excite sneezing and raise the vascular tension, is also to be condemned. The period of rest and quiet must be prolonged till a considerable interval after all symptoms have passed away; at least 10 to 20 days should be spent in absolute quiet, and if the condition known as cerebral irritation should supervene, the rest and quiet must be maintained for several weeks and no animal food of any kind administered.

Concussion of the spinal cord should be treated upon the same lines and the same precautions taken to avoid hæmorrhage.

Compression of the brain is due to increase in the intracranial pressure, and may supervene upon concussion when one or more hæmorrhages follow after contusion or laceration of the brain substance, in which case trephining or lumbar puncture will be indicated. The treatment of compression of the brain will be detailed under the heading of each organic condition which causes it, as Head Injuries, Meningitis, &c.

CONDYLOMATA.

After thoroughly cleansing and drying the moist patches each should be dusted over with a powder consisting of equal parts of Calomel and Calamina, and wherever the moist surfaces come into contact they should be separated by a layer of dry gauze or lint. Ointments are less efficacious than drying powders, and one or two applications of the Acid Nitrate of Mercury solution may be lightly made by swabbing the patches with lint on the end of a probe before applying the powder. Small condylomata after being cleansed with alcohol may be lightly rubbed with a little cotton-wool wrapped on a probe dipped in concentrated Trichloracetic Acid. Iodoform is most suitable for neglected condylomata about the vulva and anus where there is much discharge. Drier condylomata may be painted over with a 1 in 10 solution of Sublimate or Salicylic Acid in Flexible Collodion.

Chromic Acid (1 to 5 of water) speedily destroys mucous patches in the mouth and on the tonsils; it must, however, be used sparingly, as its poisonous effects, when absorbed, are well known. A 1 in 50 solution may be repeatedly applied with a brush after drying, but one light application of the stronger solution is safer. Corrosive Sublimate (1 in 250) is quite as efficacious, but the writer does not hesitate to dry the patch carefully with blotting-paper and apply a light swab of Pernitrate of Mercury solution even to the tonsils when the patches are spreading, taking great care that the liquid cannot possibly flow over the surface.

Carbolic and Nitric Acids may be used as caustics, whilst the strongest Zinc Chloride Solution will rapidly destroy external patches, and a weak lotion of the same (10 grs. to 1 oz.) makes a good astringent dressing for after-treatment.

Mercurial treatment should be pushed till long after the disappearance of all local signs of the disease, and the highly infective nature of the discharge must be always remembered by the dresser or nurse. Patches of long standing may be freely cut off with a knife or scissors after the application of Cocaine, and a subsequent application of any strong caustic will stop all hæmorrhage and destroy anything left by the cutting instrument.

CONJUNCTIVITIS.

Except the mild form of conjunctival inflammation caused by the irritation of foreign bodies or of eye-strain, all other types of conjunctivitis must be regarded as microbic and infectious. Hence *preventive* treatment is of primary importance, the chief element in which is scrupulous cleanliness and in the case of school-children isolation. All towels, sponges, basins, handkerchiefs, brushes, eye-droppers and douches, &c., should be repeatedly cleansed, and each child must have its own supply.

Catarrhal conjunctivitis yields as a rule readily to any mild antiseptic or astringent lotion, as Zinc Sulphate 1 to 2 grs., Boric Acid 4 to 8 grs., Alum 3 grs., Acetate of Lead 1 gr., Tannic Acid 1 gr., Zinc Chloride $\frac{1}{2}$ gr., Perchloride of Mercury $\frac{1}{10}$ gr., to each oz. of distilled water.

In using eye lotions the best results are obtainable by adding some

inert substance to make them of isotonic strength—*i.e.*, of the same osmotic pressure as the blood, which should be, as in the case of normal saline solution, 0·9 per cent. or slightly less; by this means smarting may be obviated. Maddox explains the soothing action of boric acid on this hypothesis; 4 grs. to the oz. of this antiseptic makes a practically isotonic solution, and when a strong substance like perchloride of mercury is employed for washing out the conjunctival sac 3 or 4 grs. of sodium chloride per oz. of lotion should be added to it. Bandaging of the eyes is never necessary, and the patient should spend as much time as possible in the open air, wearing darkened glasses if necessary.

The local analgesic action of opium is doubtful, but Swanzy recommends 1 dr. of the tincture to be added to each oz. of the boric or zinc collyrium. The following is a good routine application:

℞ *Zinci Sulphatis* *gr.* x.
Acid. Borici *gr.* xxxij.
Tinct. Opii ℥iv.
Aquæ Rosæ *ad* ℥viij. *Misce.*

Any of the above lotions may be used every 2 to 4 hours by partially filling a small douche-glass with it and applying it closely to the opened eye, when by a nodding movement of the head the entire conjunctival sac can be thoroughly sluiced.

If the catarrh does not readily yield to the above treatment, a silver salt should be applied to the lids. 1 in 4 Argyrol is a favourite application; a 10 gr. to 1 oz. of the Nitrate solution may be freely applied to the lid conjunctiva with a brush or on wool, and after a few seconds a strong solution of chloride of sodium should be instilled to precipitate the nitrate and the eye irrigated freely with water or normal saline solution, the operation being repeated daily. If a 1 or 2 per cent. solution is used, salt need not be applied after it. The lids should be smeared with Lanoline or Boric Ointment every night to prevent the secretion being glued in.

Phlyctenular conjunctivitis, also known as strumous ophthalmia, yields usually to Boric Acid or Zinc Sulphate lotions; there is often much photophobia present, as corneal ulcers are liable to form, in which case Atropine must be instilled and the remedies indicated in corneal ulceration employed.

As the disease usually appears in ill-fed and badly cared for children, strict attention should be paid to regular feeding with nutritious food and a free open-air life. When out of doors the child may be permitted to wear a broad shade over both eyes; this should not be closely fitting, but should project like the peak of a cap, so that the eyes may be exposed to the air whilst shaded from sunlight, or dark glasses may be worn. These cases often do well under Pagenstecher's Ointment made of the strength of 5 grs. to 1 oz., smeared over the lid margin, or dry Calomel may be applied on a fine camel's-hair brush. The blepharospasm often present constitutes a difficulty in the application of remedies; it can be overcome

by holding the child's face under water in a wash-hand basin for a few moments, after which an examination of the eye and the application of astringent remedies can be readily carried out.

Follicular conjunctivitis is often associated with enlarged tonsils, adenoids and other forms of lymphatic overgrowth, and open-air life, with judicious feeding and Cod-Liver Oil combined with Syrup of Iodide of Iron, should be prescribed. An astringent lotion, Zinc Sulphate 2 grs. to 1 oz., or 1 gr. per oz. of Zinc Chloride, or an ointment of Copper Sulphate 10 grs. to 1 oz. Vaseline should be applied. When much catarrhal conjunctivitis is associated with the presence of the follicles which are often confined to the lower fornix of the conjunctiva, 10 grs. Nitrate of Silver solution may be applied to the lids and Chloride of Sodium swabbed on.

Membranous, croupous or *diphtheritic* conjunctivitis must be treated by the injection of the antitoxic serum at the earliest possible stage, even when the case is of the mildest type and no other manifestation of diphtheria is present. Some authorities instil the serum into the conjunctival sac, but it is better never to trust entirely to its local action. The mildest type of membranous conjunctivitis, known as the "croupous," is recognised by the ease with which the superficial exudation is detachable; the treatment of this affection is that of the simple catarrhal variety, the conjunctival sac being frequently flushed with warm 4 per cent. Boric solution; many ophthalmic surgeons use a 1 per cent. Quinine solution for this purpose. Though it is not probably due to the diphtheritic bacillus, it is a wise routine to inject serum. Silver Nitrate should never be used in the membranous varieties whilst exudation is present.

In the severer or truly diphtheritic type the same local treatment is to be at first employed, the Boric or Quinine irrigation being used freely and often, and iced compresses or Leiter's tubes applied to the eyelids, unless when warm or hot compresses afford most relief. After the detachment of the membrane Silver Nitrate may be applied to the velvety pus-secreting lids, but it must be used with extreme caution owing to corneal trouble, and if possible should be avoided. Underlying ulceration must be treated by Atropine or Eserine, as described under Cornea, and the greatest care taken to prevent adhesion of the lids to the globe.

Purulent conjunctivitis, purulent ophthalmia or acute blenorrhœal conjunctivitis is usually in the adult due to inoculation of gonorrhœal matter into the adult eye, and the less frequent cases where infection is conveyed to the eyes of an adult from those of an infant affected with ophthalmia neonatorum. The treatment during the early stages should consist of iced compresses frequently applied and thorough irrigation of the conjunctival sac with $\frac{1}{4}$ gr. to 1 oz. Perchloride solution or the same strength of Permanganate of Potash till the swelling and induration of the membrane and lids are reduced. If great chemosis of the conjunctiva occurs—a dangerous symptom—it should be freely incised, and bleeding encouraged by hot applications and by application of leeches to the outer angle of the lids or to the temples; it may be necessary to incise the external canthus. The other eye, if sound, should be most carefully guarded

against the possibility of inoculation by bandaging over a pad of cotton-wool, or in the case of infants by sealing the lids with collodion or by using a Buller's shield.

When the swelling is reduced and the suppurative stage established Nitrate of Silver 10 to 20 grs. to 1 oz. should be applied on cotton-wool to the everted lids, which should then be swabbed with solution of Chloride of Sodium, the operation being repeated at the end of twenty-four hours. In the interval the sac should be *frequently* flushed out with $\frac{1}{4}$ gr. to 1 oz. Perchloride of Mercury solution or Boric Acid, 4 per cent. solution, and the lids kept from sticking to each other by applications of Boric Ointment. Many surgeons prefer the Mitigated Caustic Stick to the nitrate solution. After the acute purulent stage has been subdued, a weak astringent lotion, Copper Sulphate, Zinc Sulphate or Chloride, should be employed. Corneal ulceration must be treated by Atropine or Eserine and astringents avoided.

Ophthalmia neonatorum is identical with the above condition, being nearly always caused by gonorrhœal infection during the progress of the infant's head through the vagina or immediately afterwards. *Preventive treatment* is of vital importance, and has become a routine in most lying-in hospitals. The vagina should be washed out during labour with a strong Permanganate or weak Perchloride solution, and the child's eyes should be carefully washed and a few drops of a 2 per cent. Nitrate of Silver solution instilled into the conjunctival sac immediately after birth (Crédé's method), or the eyes may be irrigated with a 1 in 5,000 Perchloride of Mercury solution.

When the infant comes under the physician's care when the purulent conjunctivitis has already appeared, the case must be energetically treated as in the adult, the best routine being irrigation every hour or two with a 1 in 10,000 Perchloride or Permanganate solution, followed later by the application of Nitrate of Silver in strong solution (10 to 20 grs. per oz.) or the Mitigated Stick, after which Chloride of Sodium is to be swabbed on the everted lids. A 25 per cent. Argyrol solution is preferred by some surgeons both in the infantile and adult forms of gonorrhœal ophthalmia.

Granular Conjunctivitis, Granular Ophthalmia, or Trachoma.—This being a highly contagious disease, liable to cause serious visual defects, its *preventive treatment* in schools, asylums and barracks is of great importance. Isolation is therefore necessary, and towels, sponges, handkerchiefs, brushes, &c., must be carefully disinfected, and when belonging to infected subjects must never be used by the healthy. Those affected in schools should be kept by themselves and should spend most of their time in the open air, with the best food, ventilation and hygienic surroundings possible, overcrowding and uncleanliness being powerful factors in the spread of the disease.

The acute form of the disease is rare; its treatment is identical in its early stage with that of acute catarrhal conjunctivitis. The eyes should be irrigated every two or three hours with 4 per cent. Boric Acid solution, and after the subsidence of the conjunctival inflammation the remedies indicated in the chronic affection should be employed. The writer has

successfully treated all mild chronic cases of the affection in a large charity school, when these were detected early, by frequent irrigation with a 1 in 5,000 douche of Perchloride of Mercury solution and by an occasional brushing of the inner surface of the lids with a 1 per cent. solution. Some authorities recommend the application of a 2 per cent. solution in glycerin rubbed into the lids.

If no granulations are visible the best routine is the application, after Cocaine, of solid Sulphate of Copper to the velvety conjunctiva every second day, the eyes being irrigated three or four times a day with a 1 in 10,000 Perchloride solution. Should there be much swelling or any corneal ulcers, this copper treatment is contra-indicated, the brushing over of the lids with a 2 per cent. solution of Silver Nitrate or the Mitigated Stick, followed by Sodium Chloride, being the best procedure.

When the trachoma bodies or granulations are exuberant and project much beyond the surface they may be excised or destroyed by the electro-cautery when only a few are present, but the best routine treatment of the granulations is that known as "expression." Grady's trachoma forceps being employed after thoroughly cocainising the conjunctival sac, each portion of granulation tissue is separately seized and broken down, so that the trachomatous matter is squeezed out, after which the caustic solution 2 grs. to 1 oz., the solid Mitigated Caustic or Copper Sulphate is applied and the resulting inflammation treated by Boric Acid irrigation and cold compresses. When pannus occurs (a fleshy growth over the cornea), should there be no ulceration of the cornea, and the trachomatous growths be dry, the best treatment is the employment of Merck's Jequiritol, which is to be instilled with the view of setting up an acute inflammatory action. The degree of inflammation may be easily controlled by the use of jequiritol serum and iced compresses. After the subsidence of all inflammatory reaction the pannus is usually found to have disappeared, though Copper Sulphate treatment may be required to remove any conjunctival granulations which remain.

The X rays have been successfully employed for the treatment of pannus.

Carbonic Snow has been extensively tried by Harston at Hong Kong, and the results are most successful. There is little pain, the disease rapidly yields, and a splendid cicatrix results. When pannus exists he uses the X rays.

In all cases the most persevering treatment for a long period must be kept up, and it is most desirable that in very chronic examples of the disease a method should be placed in the hands of a skilled nurse when such can be safely done, in order to insure that between the intervals of the more active treatment by the ophthalmic surgeon the disease be not permitted to relapse. The use of the solid Copper Sulphate for this purpose is a valuable routine, and if a drop of Cocaine be instilled a few minutes before the application the remedy need cause little pain, but it must not be employed when corneal ulcers are present. Corneal ulceration will require Atropine or Eserine, and as some ointment is necessary

to prevent sticking together of the lids 4 grs. of the Yellow Oxide of Mercury to 1 oz. Vaseline or Boric Ointment may be used throughout the treatment.

In most serious cases operative treatment has been advocated. Thus Darier advocates the following under Chloroform anæsthesia: Enlargement of the palpebral fissure; exposure of the entire sac by everting the lids; scarification of the conjunctiva by deep incisions parallel to the margin of the lids; scraping with a Volkmann's spoon, and brushing in with a hard brush a solution of Corrosive Sublimate, 1 gr. to 1 oz. Schneller excises the fornix of the conjunctiva with the view of preventing extensive cicatricial contraction.

CONSTIPATION.

The most potent cause is the habit of disregarding the call of nature to evacuate the contents of the bowel or postponing the response till a more convenient season.

A correct knowledge of the normal function of the bowel is essential before any progress can be made as regards either prevention or cure. In the great majority of healthy subjects the fæcal matter collects and remains about the sigmoid flexure of the colon, and does not descend into the rectum till just before the act of defecation (see the author's "Practice of Medicine," vol. i., p. 236). Its descent in health occurs usually once a day and generally after the morning meal, probably synchronising with the commencement of breakfast digestion after the stomach's long night rest. As soon as the rectum receives the contents of the colon its sensitive walls become stimulated, and the resulting reflex is the call of nature above referred to. If attention to this be postponed the delicate nerve mechanism becomes deranged and the natural sensitiveness of the rectum blunted, because instead of being empty at all times save during the few moments before defecation it remains constantly full of fæcal matter whose tendency is to become drier and harder. After a time the natural alarum-clock action of the rectum ceases, evacuation then being only accomplished by the contraction of the colon driving the hardened contents of the toneless rectum in front of the more recent feculent contents accumulated about the sigmoid, this action being assisted by the voluntary expulsive efforts of the abdominal and other muscles. The main object of treatment should never in chronic cases be to effect purgation, but to restore the normal daily rhythm of the lower end of the colon and rectum. There is little, however, to be gained by the oft-given advice that the patient should go to the water-closet and strain or bear down from day to day till his efforts are rewarded by a painless operation; the result too often is the formation of piles, fissures or prolapse.

The ordinary water-closet seat is ill constructed; each attempt at bearing down drives the pelvis tighter into the circular aperture of the seat, the bevelled sides of the opening also acting as an inclined plane, and the result is that the skin and mucous membrane around the anus become stretched to such an extent that cracks and fissures are formed, and the

writer has satisfied himself that the brittle and unhealthy state of the integument observed in this region is owing to this stretching, which is often the starting-point of prurigo and eczematous distress. The modern fashion, originating in the sense of comfort and ease, should be corrected by the substitution of an aperture of different shape, and very much larger.

Until the bowel begins to show signs of responding at the fixed hour enemata may be tried. A cold-water enema of about a tumblerful, injected whilst in the standing posture, so as only to reach the lower part of the rectum, is the best method of starting the intestinal tube to contract. Glycerin, in doses of a teaspoonful or less, injected with a syringe made for the purpose, acts powerfully by stimulating the membrane, but its popular professional reputation as a remedy for constipation rests altogether upon a misconception of its advantages. By its powerful stimulation of the coats of the rectum (partly through its hygroscopic property), it ultimately blunts the sensibility of the rectal nerve filaments to smaller stimuli, and if solely relied upon the end will be worse than the beginning. Its value seems to be clearly like that of most purgative remedies; it is of use in tiding over constipation till other means have time to act.

In the form of a suppository Glycerin affords a convenient method of overcoming *temporary* constipation. Often within five minutes a copious and painless motion may be experienced after its introduction, and in constipation arising during fevers and long illnesses its action is very satisfactory. In hæmorrhoidal conditions and in cases of anal fissure, however, its use sometimes may bring on a very acute attack of pain and tenesmus. The writer prefers the use of a piece of common brown Soap shaped roughly into a cone with a penknife and inserted within the internal sphincter.

Suppositories are valuable for administration when through any change of diet or other cause the curative drug fails to produce a motion at the hour after breakfast. They then can be employed to cause prompt action of the bowel so that the rhythm of the colon and rectum may be kept up without a break.

If there be accumulations of fæces in the rectum and colon for some time they must be removed, and for this purpose ordinary purgation by the mouth is not to be thought of. A tepid-water enema should be given when the patient is lying upon the left side, with the view of getting the fluid beyond the accumulation; 3 or 4 pints may be thrown up with safety.

Olive or Castor Oil may be administered along with the water with great advantage. It is useless to pour the oil into the water, where it floats, and is not injected into the bowel till the very last. The nurse should lift the end of the enema pipe (lying in the water) and put it into a cupful of the oil, and continue the operation as before without removal of the other end from the rectum. After pumping up 3 or 4 oz. or more in this way the end of the pipe is taken out of the oil and dropped into the warm water again, and the pumping gently continued till the

patient cannot tolerate the introduction of any more fluid, when the motion will occur. To remove lodgments from the colon several enemata may be required, and should the mass be above the reach of the finger, weeks may be spent in pumping it out, though this is decidedly exceptional. Should the mass be low down it may be broken up with the handle of a spoon or scoop, and removed piecemeal. Injections of Oils, Gruel, White of Eggs, Linseed Infusion, and various other emollients are used. Brewer's Yeast, when injected, breaks up and causes the rapid disintegration of the impaction, and it is harmless.

When the intestinal tract has been cleared in a case of chronic constipation, the physician's next attempt is to assist the patient in having a daily evacuation of the bowels, or if an evacuation every second day has been the patient's life-long habit when in health, the effort should be to restore this habit, and not to attempt to improve upon nature.

Good can be done, as already suggested, by urging the patient to take a brisk morning open-air walk or ride if his habits have been sedentary. Unfortunately, in many instances, the class of patients to whom this would be valuable have little opportunity for walking, and the haste to reach their offices in the city only permits them to indulge in their usual omnibus or railway trip. To such, a half-hours' cycle ride will be followed by splendid results.

Diet is of vital importance; it is generally the small eater who is the victim of chronic constipation, or the individual who takes his food in a concentrated soluble form, and often if such a one, from any cause, begins to eat almost any sort of food in larger quantity than is necessary for the maintenance of health, the constipation disappears. In prescribing a dietary, foods which leave a bulky residue should have the preference. Brown bread, whole-meal bread, or any bran breadstuffs are of great use. White bread made with fine flour and hard-boiled eggs should be entirely given up till the constipation has been conquered. Oaten meal made into porridge, and taken at bed-time or before the ordinary breakfast, is the remedy which keeps many folk in health for years.

Vegetables and fruit should be taken freely, and an orange or apple eaten early in the morning or orange marmalade at breakfast answers well in some cases. There is nothing better than a good supper of boiled Spanish Onion, and the writer has treated obstinate cases of constipation by this means alone with very satisfactory results. Agar-agar in coarse powder in teaspoonful doses used with stewed fruit makes a valuable laxative addition to the ordinary food.

Salad or Olive Oil every morning after breakfast is a valuable laxative and food, and when freely partaken of with salad at the evening meal it is a very efficient laxative. The writer has noticed that it is not well borne by the plethoric, or by lean folk with dark skins. The pale, washy-looking, blue-eyed, sedentary, thin subject gets much benefit from it or from Cod-Liver Oil when taken once a day in one large dose. Pure Paraffin often acts well, as none of it is absorbed; in passing down the bowel it acts as a lubricant and corrects dryness in the fæces.

Prunes and Figs are serviceable, but even children grow weary of their lusciousness. Stewed prunes do well for a short time. It is often a good thing to advise the patient to become a vegetarian or fruitarian for a time, and if he takes to the practice and makes a fad of it, his constipation, as a rule, disappears.

Massage or deep kneading of the abdominal muscles over the entire course of the large intestine may be tried in very sluggish subjects, or even a smart friction over the abdominal walls with a coarse, warm towel for five minutes on rising, or a cold-water compress, followed by a large drink of cold water and a smart cold shower or plunge bath, may do more good than medicines. Brunton recommended rolling a cannon-ball (7 lbs.) over the abdominal walls, following the direction of the colon.

Electricity—a weak continuous current, with one pole on the spine and a large wash-leather or sponge electrode moved about over the lumbar and hypochondriac regions or a smart interrupted current—may be used with advantage in the same way.

The physician will thus find that most of the cases of chronic constipation may be successfully combated without having to resort to the long list of purgatives in daily use. As a rule, active purgation should not be permitted, and, in many of the cases seeking relief, continual purgation indulged in for fancied ills will be found to be the cause of the constipation.

The physician should aim at increasing the muscular and nervous tone of the bowel, and, at the same time, increasing the intestinal secretion so as to bring the motions to a healthy state of consistence.

Though the number of purgative drugs is almost endless, those useful in chronic constipation should be only such as in regulated doses will produce a *laxative* effect, and hence the selection is practically confined to Cascara and Aloes.

Cascara comes first in value, and when all the dietetic and previously mentioned plans have failed, the patient should be placed upon small doses of the liquid extract. It may be given in various ways. One moderate dose in the evening or before bed-time, the treatment not to be commenced till the existing constipation is for the moment corrected by some brisk purgative, is the most successful plan. Beginning with an evening dose of 30 mins., in a few days knowledge of the dose suitable to the individual case will be obtained, and the initial quantity is increased or diminished accordingly. The object to be clearly aimed at is to avoid purgation, and to give the remedy in such a dose as will secure one soft, natural motion every morning. The *amount* and the *interval* necessary to produce this result varies widely in different individuals, and in the same individual under the use of various dietaries. If the moderate dose necessary to produce a laxative effect takes a long time to act the patient must shift the time from bed hour till immediately after or before the evening meal, so as to produce evacuation after breakfast hour.

There is difficulty in getting patients to graduate the dose themselves, and after a few weeks they stop the cascara altogether, through careless-

ness, or a belief that they are cured of the constipation, and when the bowels return to their old habit, a large dose of cascara is taken as a purge. This is certain to be followed by more obstinate constipation, and thus the remedy is set down as useless. The physician should insist upon a two months' course at the very beginning of the treatment. Capsules containing any requisite amount may be had readily from chemists, but, though elegant and effective, the dose cannot be easily regulated when the capsular form is used. The pilular extract may be given, but the fluid is more certain and uniform in its action.

Some give the cascara three times a day, after or before meals, in a dose equivalent to about one-third of the nightly dose. Thus, 10 mins. may be given immediately after breakfast, luncheon and dinner, but the evening dose is more rational and effective.

Whatever plan be adopted, after a few weeks the dose should be gradually diminished, still, however, taking enough to produce the healthy, natural morning motion, as if no purgative had been administered. At the end of a period, varying much in different cases, the remedy may be occasionally suspended for one day, and finally, in a few months in some cases, it may be permanently stopped.

The drug may be given alone, or combined with some of the remedies about to be mentioned.

℞ *Extracti Cascaræ Sagradæ Liquidi* ℥ij.
Tincturæ Nucis Vomicæ ℥v.
Tincturæ Belladonnæ ℥iij.
Glycerini q.s. ad ℥iv. *Misce.*

Fiat mistura, cujus capiat cochlearium minimum omni vespere et mane ad quatuor vicem, deinde omni vespere.

Cascara jelly made with agar agar is a favourite form for administration; the agar adds to the bulk of the fæces by absorbing water. Regulin—a patented combination of cascara and agar in the dried form—is also a valuable laxative. Both may be given in doses of 1 to 4 drs. with stewed fruit.

Aloes comes next to cascara in value in the treatment of chronic constipation, and often both laxatives may be combined with advantage. If judiciously administered, the dose of aloes need not be increased, whilst, in many cases, it may be diminished, and finally withdrawn as the constipated habit becomes cured. It is best given in combination with other laxatives or cathartics, as it is slow in its action, and, when given in small doses, does not soften the motions much, but stimulates the peristaltic movement. Like cascara, it is a tonic, and markedly increases the quantity of the biliary secretion. It must never be forgotten that a moderate dose of aloes requires for its action 12 to 15 hours or more, and hence the importance of administering it at a time when the normal morning hour for evacuation should not be interfered with; it should usually be given before the evening meal, and not at bed-time.

Its action in chronic constipation is very materially increased by combining with it Sulphate of Iron, as in Spender's pill.

℞. *Extracti Aloes gr.* j.
Ferri Sulphatis gr. ij. *Misce.*
Fiat pilula. Mitte tales xxiv.

Signa.—"Take one 3 times a day for 7 days, then one twice a day for a fortnight, then one every night."

When amenorrhœa accompanies the constipation the combination of aloes with iron is the best possible treatment.

Aloes in hæmorrhoidal cases requires caution, since large purgative doses often seriously aggravate hæmorrhoids when present, but small laxative doses generally relieve and produce decided curative effects; and good results have been obtained by treating hæmorrhoids exclusively by small doses (1 gr.) of the extract of aloes given night and morning.

The Compound Decoction is a most unsatisfactory laxative in chronic constipation, and though of the greatest value in other intestinal disorders, it is not to be depended upon, as it is almost impossible to regulate the dose so as to produce uniform results, and frequently it actually constipates.

A dinner pill, in which a small dose of aloes combined with Iron, Ipecacuanha, Capsicum, Nux Vomica, Myrrh, and Belladonna or Hyoscyamus, given immediately before or after dinner, is a most suitable method of treatment. The following is one of the best:

℞. *Extracti Aloes gr.* j.
Extracti Nucis Vomicæ gr. ss.
Pulveris Ipecacuanhæ gr. j.
Pulveris Capsici gr. j. *Misce.*

Fiat pilula. Mitte tales xxiv. *Sumat unam omni die ante prandium.*

Brunton recommended Pil. Rhei Co. and Pil. Colocynth. Co. āā gr. i.; Ext. Hyoscy., gr. ss.

Sir A. Clarke used this formula:—Ext. Nuc. Vom., Ferri Sulph., Pulv. Myrrhæ, Pulv. Saponis, Aloin ana, ½ gr. The quantity of aloin is to be increased or diminished according to the effect produced upon the bowel.

Belladonna was used by Trousseau. The extract in doses of ¼ to ½ gr. given at bed-time, alone or with as much Extract of Nux Vomica, may be tried, or may be given with any laxative in a dinner pill, when it will not only strengthen the muscular contractions of the bowel, but to some extent prevent griping. The tincture, in small doses, is a very excellent treatment for the constipation of infants and children. Belladonna is also the best remedy for the spastic form of constipation sometimes met with

in neurotic subjects, and usually associated with much spasm and pain. Alvarez combines atropine $\frac{1}{150}$ gr. with $\frac{1}{12}$ gr. Apocodein.

Strychnine or Nux Vomica is of the greatest value as an adjunct to other drugs, and occasionally alone it meets every requirement. The following formula combines the most valuable of agents, and by modifying the dose of the different ingredients nearly every case of chronic constipation can be treated with success:

℞ *Aloin* *gr.* j.
Ext. Cascaræ *gr.* j.
Ext. Nucis V. *gr.* ss.
Ext. Bellad. *gr.* ss.
Ferri Sulph. Ex. *gr.* j. *Misce.*

Gregory's Powder or Rhubarb, though much used for many years by chronically constipated patients, is not a good remedy. In the writer's experience its tendency in chronic constipation is not curative; aged patients employ it continually because they cannot do without it.

Colocynth is more active, but it is most difficult to graduate the dose so as to get a laxative effect. It may, however, be combined with rhubarb as in Brunton's Pill.

Podophyllin is much more valuable in the treatment of acute constipation where a satisfactory brisk purge is required, nevertheless it is useful in the chronic form in bilious subjects. It may be given in combination with Belladonna.

℞ *Tincturæ Podophylli* ℥j.
Tincturæ Belladonnæ ℥iv.
Tincturæ Zingiberis Fort. ℥iv. *Misce.*

Sumat guttas xx. *omni nocte ex paululo sacchari.*

Nothnagel recommended Podophylli Resinæ, gr. ivss.; Ext. Aloes, gr. xlv.; Ext. Rhei, gr. xlv.; Ext. Taraxaci, q.s.; misce. Divide in pilulas xl. Signa.—"One, two, or three at bed-time." Euonymin in pilular form acts much in the same way, but it is feebler.

Castor Oil in small doses has been given for long periods with advantage. Thus in the chronic constipation of pregnancy it is the best remedy in morning doses not exceeding 1 dr., and may be taken with impunity all through.

Senna in the form of Tamar Indien is an excellent remedy, and when administered with care to regulate the dose, is a very successful method of treating chronic constipation in indoor patients. It produces very large, almost solid motions, and its action is not followed by any tendency to constipation; the dose can be easily diminished by the patient. Some patients can manage to keep their bowels regular with small doses of Senna Pods made into an infusion.

Purgatin (anthrapurpurin diacetate) and Purgen (phenolphthalein) are valuable aids in the treatment of constipation, but they cannot be employed for long periods with safety. Purgatin in 15 gr. doses produces one semisolid motion after about 10 hours, but it colours the urine red. Purgen in 1 to 5 gr. doses acts in half this time.

Sulphur is of much value, and may be given in the morning before breakfast mixed with a spoonful of Orange Marmalade, and the Compound Powder of Liquorice is a palatable laxative and one of the best routine drugs for occasional constipation in childhood. Two or three Compound Sulphur Lozenges may be given at bed-time.

Rubinat, Friedrichshall, Carlsbad, Hunyadi Janos, Pullna and other natural purgative waters are useful as occasional adjuncts to the aloes or cascara treatment, and they are invaluable in the management of occasional constipation, but it will be found impossible to obtain a laxative effect by their administration. Hence upon the whole they are not to be depended upon as curative agents, and the same remark applies to the treatment at spas like Harrogate, Cheltenham and other places where saline aperients are freely administered. Often the good effects are but temporary, and the habit afterwards is aggravated.

Jalap, Scammony, Croton Oil, Epsom Salt, and Mercurials are not available for the treatment of chronic, though valuable for the relief of acute or occasional constipation.

There is little to be said for surgical interference (*Ileo-sigmoidostomy*), which can only be justifiable under very exceptional circumstances.

Constipation in Children.—In infants, the cause of constipation is usually a deficiency in sugar or fats. The former may be remedied by the administration of a teaspoonful of brown or Demerara sugar, and the latter by a similar dose of cream. When the constipation is due to scarcity of water, as in cases where artificial food is administered of the consistency of a thick cream or paste, water should be freely supplied. The constipation caused by the presence of firm curds, if not relieved, is liable to end in acute diarrhœa. The dilution of the cow's milk with barley water, or beef tea, or peptonisation should be resorted to. Manna is a safe laxative, though now seldom employed; it may be given for long periods to infants and young children till the constipated habit disappears.

For infants and young children Castor Oil is the best drug, and a daily very small dose—half a teaspoonful—generally removes the condition. A glycerin or preferably a soap suppository may be used. This remedy is not objectionable in the case of very young children, as the writer thinks that the act of evacuation in them is more dependent upon the state of the great intestine higher up than the rectum, and the fact of accustoming the rectum to a smart stimulus from day to day does not appear to blunt its sensibility so as to interfere with the act of defecation after the suppositories are stopped, as appears to be the result in adults.

Gentle massage of the abdomen is very serviceable in the constipation of infants and young children, but as a rule injections of watery fluids are to be avoided unless fæcal accumulations are present.

owing to the ease with which the colon can be dilated and its tonicity injured.

The constipation of older children will seldom require drug treatment, the condition usually speedily yielding when errors in diet are corrected and when the hour of defecation is punctually adhered to and active exercises prescribed.

Compound Liquorice Powder, or 2 to 5 gr. doses of Sulphur, may be given for considerable periods with advantage.

To *acute* attacks of constipation occurring in a person otherwise healthy, and where there is no abdominal obstruction, it will be seen that the foregoing remarks do not apply, and the treatment for such attacks is a smart purge. Any of the remedies already mentioned may be given in large doses. The old-fashioned method is the best, of giving at night a combination of cathartics, whose slow action upon different parts of the intestinal tube is "overtaken" by a smart dose of a Saline early in the morning. Thus, 5 grs. Pil. Hydrg. and 5 grs. Pil. Col. Co. taken at bed-hour, and 2 oz. Black Draught early in the morning, are a very efficient purge for robust men.

In elderly people, diarrhœa is sometimes caused by a mass of scybalæ lodged in the colon, and the proper treatment in such a case is to commence with large enemata of tepid water, given whilst the patient is placed upon his left side. Should the mass be high up in the colon, the patient should be placed upon his knees and elbows, and afterwards turned over upon his right side, so as to assist the water to gravitate towards the ileo-cæcal valve. A large dose of Castor Oil or other purgative should be given after the obstruction has been removed.

CONVULSIONS.

The cause must be sought for before active treatment can be commenced; thus the presence of a mass of round-worms in the intestinal canal of a child will call for Santonin and a purgative. The convulsions arising in a patient suffering from advanced renal affection will demand the active treatment necessary for uræmic poisoning. Epileptic convulsions will be best prevented by Bromides, &c. In the same way the reader will find, under Hysteria, Tetanus, Poisoning by Strychnine, Teething, Apoplexy, Alcoholism, Puerperal Convulsions, &c., the appropriate remedies mentioned by which the convulsions may be prevented or modified or rendered less frequent.

When called to see a patient labouring under an attack of convulsions without any apparent cause, the physician will have considerable difficulty in preventing himself from acting under the impulse that he must do something. The position of "masterly inactivity" is the safest as regards drugs in a situation of this sort, where at the moment little can be determined about the causation or pathology of the symptoms. The patient should be placed in bed upon his back with his head and shoulders slightly raised and all constrictions about the neck, thorax, or abdomen removed. If the tongue be protruded, and in danger of being wounded by the closure

of the teeth, a lemonade cork may be inserted between the upper and lower molar teeth on one side. Unless the convulsive movements be severe and liable to cause contusions of the limbs or scalp, restraint should not be resorted to. In a series of rapidly succeeding attacks the vapour of Nitrite of Amyl may be judiciously employed. Chloroform or Ether may be administered upon a sponge, or Chloral Hydrate may be given by the rectum. Heroic measures, like blood-letting, are unjustifiable, except in puerperal cases.

Infantile Convulsions.—As a proportion of the cases of convulsions arising in infancy from delayed dentition, bowel or other passing troubles, tends to end in epilepsy in the children of neurotic parents, it is most desirable that careful attention should be given to the prevention of further attacks after the immediate attack has been treated.

During the seizure a *warm* but not hot bath should be immediately resorted to; if there be hyperpyrexia the water should be tepid. Ice may be applied to the head or a cold stream of water directed against the fontanelle, and a whiff of the vapour of Chloroform or of Amyl Nitrite may be given. The practice of injecting Hyoscine or Morphia hypodermically has been advocated, but the physician will be wise who contents himself with the rectal administration of Chloral Hydrate and Bromides or with the use of these agents by the mouth as soon as the power of swallowing returns. 3 grs. chloral and 10 grs. bromide of soda may be injected into the rectum of a child six months old. The following may be given in teaspoonful doses by the mouth every 2 hours for 4 doses:

℞. *Chloral Hydrat.* *gr.* xx.
Sodii Brom. *gr.* xl.
Phenazoni *gr.* x.
Syrupi et Aquæ *ad* ℥ij. *Misce.*

The bowel in every case should be cleared out by a small dose of Calomel or Castor Oil.

A little blood may be let out from a vein in the arm where cyanosis is marked and persistent, but leeching is useless. In the asphyxial convulsions occurring at birth, bleeding from the cord may be permitted or a vein opened. When there are marked and persistent focal symptoms arising after a difficult delivery meningeal hæmorrhage is probably present, and trephining may be justified in order to prevent permanent brain injury.

In all cases of infantile convulsions the bromide treatment should be continued long after the cessation of symptoms, and such children should subsequently be carefully examined for adenoids, eye troubles, rickets, or other possible sources of reflex irritation which may tend to establish the epileptic condition.

The routine plan of scarifying the gums in every case of convulsions occurring in young children is a practice of the past. The tough cicatrix forming over the incisions afterwards, is generally the source of serious

future trouble. The writer has seen the leathery gums of infants who had been subjected to wholesale scarifications months previously for supposed delayed dentition, when the cause of the convulsions was probably a mass of curd in the intestines, the result of indigestible cow's milk. When the tooth should be above the gum, these old, dense cicatrices so hold it down that the only course is to snip a piece out of the cicatricial tissue with scissors or a knife.

If the sterilised index-finger be cautiously introduced into the mouth of the infant any tooth near eruption may have the thinned gum tissue scraped by the finger-nail.

CORNEA, Inflammation of.

Where corneal ulceration follows phlyctenular keratitis and injuries the first indication is to afford as complete rest as possible to the eye. Atropine should be instilled, but if the corneal ulcer is marginal Eserine is preferable. Both eyes should be carefully bandaged over a padding of lint. When much pain is present hot Boric Acid compresses should be kept over the eyelid after the temporary removal of the bandage, and Belladonna with Glycerin may be smeared over the brow.

Where corneal ulceration is the sequel or concomitant of severe conjunctivitis, bandages must not be employed; the eye should be freely irrigated by a warm 4 per cent. Boric solution or by a 1 in 10,000 Perchloride of Mercury solution after the lids have been treated by Nitrate of Silver solution (2 per cent.).

Where the photophobia is intense a free division of the outer canthus may be made, and counter-irritation or leeches to the brow often afford considerable relief.

Calomel, dusted inside the lids once daily, often acts with great rapidity, and causes superficial ulcers to take up new action and induces rapid granulation. Seldom will Nitrate of Silver be required. In large pustules or sluggish ulcers, a mixture of Cocaine (8 per cent.) with Atropine solution relieves pain and tension, and Mitigated Caustic may be lightly applied to the ulcerated spot with very marked benefit. Better still, after the instillation of Cocaine or the use of a Cocaine disc and staining by fluorescin, a little pure Carbolic Acid may be applied with a fine camel's-hair brush, confining the application strictly to the dried ulcerated spot. This method may even be employed for deep ulcerations of the cornea if perforation do not threaten, and if there be no iritis. *Routine* use of cocaine for the relief of pain in corneal trouble is dangerous owing to its desiccating action. Absolute alcohol is sometimes used in a similar way to disinfect the floor of the ulcer. When the ulcer shows any signs of spreading it should be cauterised with the platinum loop of the electro-cautery.

When the acute stage is over, much benefit will be obtained by stimulating treatment. This may be carried out before pain subsides if Atropine be constantly used. The best application is the yellow Oxide of Mercury Ointment, but it is too often used of a strength that aggravates the affec-

tion. 8 grs. to 1 oz. Vaseline is generally strong enough for all purposes, and sometimes half this strength will be found to answer better. A minute portion of the ointment may be inserted inside the lids twice a day, but the effect must be watched carefully, and it should be stopped at once if signs of irritation reappear.

A seton *above* the temple or behind the ear, or blisters in the same locality, prove useful in very chronic cases. When the ulceration is caused by the presence of granular lids, this condition must be met by proper treatment. (See Conjunctivitis.)

In ulcerative, strumous, or suppurative keratitis, Ford resorts to peritomy, on the principle that as the cornea receives its blood-supply from the conjunctiva, the local depletion, consequent upon a division of its vessels and of the loops which surround its circumference, tends to promote a healthy reaction and an absorption of stagnant cellular elements. Walker performs perikerotomy, or cutting round the cornea in these cases; he makes a series of short incisions at the base of the cornea.

Where the ulcer is threatening, Shaw points out the necessity of anticipating perforation as the best means of preventing the aqueous humour escaping with a gush and carrying the iris with it. He perforates the floor of the ulcer with a fine knife.

Internal treatment is of the greatest value, and constitutional measures must be employed from the beginning. Thus, in the phlyctenular form, as in strumous ophthalmia, the treatment directed under Conjunctivitis must be carried out, and an early change of air and scene is often followed by marked benefit. Special attention should be paid to the feeding of the patient, meals at regular hours being insisted on even for the youngest, and all forms of light refreshment between them absolutely prohibited.

When Cocaine, Atropine, and Eserine fail to give satisfactory relief to pain, the remedies found useful in neuralgia of the affected nerve may be employed. 5 gr. doses of Butyl Chloral every two hours for 4 doses may be given; 30 grs. of Chloride of Ammonium, or 5 mins. of the Gelsemium Tincture every two hours, may be administered. In severe cases, especially in elderly patients with serpiginous ulceration, the free administration of stimulants with Sal Volatile in Decoction of Cinchona (40 mins. in 1 oz.) must be resorted to. Atropine must be replaced by Eserine where any increase of tension or glaucomatous signs show themselves.

When hypopion forms—*i.e.*, pus appearing in the lowest part of the anterior chamber—if its absorption does not follow upon the continuance of the above treatment, a free incision or an iridectomy must be made under chloroform anæsthesia; if only paracentesis of the anterior chamber be performed the operation will probably require repetition. Subconjunctival injections of Chloride of Sodium (2 to 4 per cent.) and of Cyanide of Mercury, 1 in 5,000, 1 c.c. daily, have been extolled, especially in hypopion cases. Swanzy recommends the application of Dionin and

praises the action of finely powdered Xeroform on sloughing ulcers.

Zeigler has drawn attention to the frequency with which corneal ulcer is caused by nasal disease, and the importance of treating this before any permanent improvement in the eye can be expected. The nasal chambers should be thoroughly cleansed, and a swab of lint soaked with Friar's Balsam should be applied to the nasal membrane far back and over the inferior turbinated bone. If the patient is a child, and nasal obstruction exists, adenoids will probably be found, and, if found, they should be removed.

Interstitial Keratitis almost always depends upon inherited syphilis, and in addition to the remedies for the relief of pain and photophobia as mentioned above, with subconjunctival injections of Cyanide of Mercury, the internal administration of Mercury must be pushed *short* of producing salivation. After acute symptoms subside, the Yellow Oxide of Mercury Ointment (1 gr. to 1 dr.) should be daily applied.

CORNS AND CALLOSITIES.

Preventive treatment is important and consists in attention directed to footwear. The epithelial hypertrophy will disappear as soon as the cause is removed—*i.e.*, the intermittent pressure of a tight boot; sometimes, however, owing to the boots being too large, the friction caused by the skin of the foot rubbing against the leather in walking is enough to produce painful corns. Children frequently have their boots made too long, in order to allow for the growth of the foot during the wear of the boot. The result is that they get into the habit of strongly flexing their toes in walking, to prevent the slipping up and down of the foot inside the boot. The result is, corns appear on the upper surface of the phalangeal joints, and deformities of various kinds result which last during life. The first indication in the treatment of these conditions is to obtain properly fitting boots. (See Bunion.) When corns continually grow again in spite of bootwear of faultless make, they will be found to originate in the pressure caused by the weight of the foot resting on a hard mattress during sleep, which can be obviated by wearing a large bunion plaster at night.

The corn should be pared with a sharp knife, and, if skilfully done, it can be entirely removed at one operation, but this requires skill and much practice. Sometimes previous soaking of the foot facilitates the operation, but many chiropodists prefer to have the corn in its natural hard state before paring.

When it cannot be cut entirely out, a little Glacial Acetic Acid may be applied with a bit of wood (the end of a match), and, after the superficial film peels off, the application can be renewed till the diseased cuticle disappears.

Salicylic Acid is the basis of nearly all corn cures. It appears to possess the strange property of only dissolving or acting upon the diseased epithelium, having no effect upon healthy tissue.

The usual formula is—

℞. *Aciai Salicylici* ʒj.
Extracti Cannabis Ind. *gr.* x.
Collodii Flexilis ʒvj.
Ætheris Sulphurici ʒij. *Misce.*

Fiat solutio. Signa.—To be daily painted over the corn.

Soft corns may be best treated by the separation of the opposing surfaces with felt or Amadou Plaster, with a circular hole cut in the centre. This hole may be filled with dry Salicylic Acid, and afterwards the above solvent may be applied to seal up the powder.

Chase dissects out the little lymph sac in the areolar tissue which is connected with the apex of the corn, and, failing its complete excision, he swabs it with Phenol and inserts a small drain for two days, keeping the toes strapped for immobility.

Callosities as well as corns and warts can be removed by Rosen's plan: The growth or patch having been well moistened with an antiseptic solution, is thickly covered with Salicylic Acid. Upon the top of this are placed several layers of moistened Boracic lint, and over all a piece of gutta-percha tissue and a bandage. At the end of five days, when the dressing is removed, the thickened epidermis easily peels from the subjacent structures.

Unna treats plantar corns by painting a broad ring of Glycerin Jelly round them with a stiff brush. When the jelly has firmly set, the interior of the ring is filled with a circular piece of strongest Salicylic Plaster (Salicylic Acid, 40; Creosote, 40), and the whole covered up with two layers of glycerin jelly, and when dry a small pad of cotton-wool. This dressing will last for a week, and may be renewed till the horny layer of the epidermis is entirely removed.

Lewis Jones considers that corns are caused, like warts, by an infective process, and should be best treated by direct ionisation with a zinc salt.

CORYZA—see Catarrh and Bronchitis.

COUGH.

Cough should be treated as a symptom and not as a disease, and the cause should always be carefully sought for first. Even when chest signs and expectoration are absent the diagnosis may usually be easily made. Thus the hacking, short, dry cough of early phthisis may be traced to its cause, should there be a subfebrile temperature, marked loss in body weight, and a bad family history with unfavourable surroundings. In dry catarrh of the bronchial tubes of *large* size, though the writer has seen many such cases where no real or physical sign existed, nevertheless the presence of some small quantity of tenacious or inspissated mucus or muco-purulent secretion at some time or other will be found to clear up the diagnosis. The treatment in such a case must include more than mere

sedatives or palliatives. The dry bronchial surface must be stimulated so as to cause the pouring out of a secretion of liquid consistence, after which often the cough practically ceases, as detailed under Bronchitis.

The routine administration of narcotics in bronchitis is to be condemned, but the physician must not err in the other extreme, especially as incessant, violent, or spasmodic attacks of cough without any expectoration may in time lead to serious pulmonary trouble.

When bronchial and laryngeal causes are excluded it may be found that the throat is the seat of the irritation. Acute or chronic granular conditions of the pharyngeal mucous membrane may produce incessant coughing. Elongated uvula, enlarged tonsils, polypi, and other growths at the back of the posterior nares may call for appropriate local treatment.

Reflex cough accompanying catarrhal sore throat is best treated by the following spray, which may also be used as a gargle:

℞. *Acidi Carbolici* ʒj.
Glycerini Acidi Borici ʒss.
Aquæ Rosæ ad ʒxij. *Misce.*

Chlorate of Potash, Nitrate of Silver, Alum, or Tannin may be applied, or local sedatives as inhalations of Conium, Friar's Balsam, or Menthol spray may be employed. Cocaine should be avoided.

Ear cough occurs, and unless the diagnosis be correctly made there is little probability of the cough being relieved by drugs. A careful examination will reveal some irritation or foreign body in the meatus. In the case of children, peas, beads, &c., may be found; and in adults, plugs of dried wax. The wax is more likely to give rise to cough if partially loose in the passage, and sometimes the movements of the jaw in eating or speaking may so disturb the mass that cough results at these times. The removal of the foreign body by syringing is generally followed by instant relief.

The eruption of a tooth in infants is sometimes heralded by a smart spasmodic cough, which stops when the crown is through the gum, and in older patients the removal of a painful or carious stump has been sometimes followed by the cessation of a cough that has been a source of anxiety for a long time before.

Liver inflammation and biliary calculi have been the cause of cough, and in one case known to the writer a bilious attack, resulting from indiscretion in eating, always brought on a severe, spasmodic, barking cough, relieved or removed by a smart purge.

Stomach cough has been long recognised, and yields to remedies which cause evacuation of the gastric contents, or to sedatives like Bismuth, Codeine, or Hydrocyanic Acid.

Severe coughing may usher in an attack of gout, which is relieved when the paroxysm localises itself, and the presence of foreign irritants in the intestinal canal—as round-worms, fruit seeds, &c.—may cause cough in children, which yields to a smart purge.

Hysterical cough should be treated by antispasmodics like Asafetida and Valerian.

Reflex or spasmodic cough, arising from almost any cause, is always benefited by large doses of the Bromides, especially by the Bromide of Ammonium. Chloroform, in moderate doses (5 mins.), is a powerful sedative in most cases, and Chloral Hydrate, in small oft-repeated doses, will allay cough when the cause cannot be removed. Gelsemium, Grindelia, Conium, and Sanguinaria may be used, like Morphia and Codeine, to lessen the sensibility of the respiratory centre. Guaiacol in full doses—5 mins. has been much used in spasmodic cough even not depending upon pulmonary phthisis—and Hydrastis has been advocated by several. Phenacetin and the new analgesics are valuable where morphia is contra-indicated, and they can be combined with Bromides. Heroin ($\frac{1}{24}$ gr.) and Dionin ($\frac{1}{8}$ gr.), being less likely to dry up the expectoration, are preferred to morphia and opium. The painful cough of pleural inflammation may be relieved by strapping the chest and administering sedatives like the above.

The barking cough of puberty occurs in over-fed or too-often-fed children, and Sir A. Clarke insisted upon a simple but liberal dietary of three or at most four meals a day, active outdoor exercise, and early hours. Locally, he used Glycerin of Borax with Oxychloride of Bismuth and Morphia brushed over the whole interior of the throat after each meal and at bedtime. Internally, he used the Syrup of Bromide of Iron and Quinine, with small doses of Arsenic. When this failed he gave a pill containing Reduced Iron, Valerianate of Zinc, Belladonna, and Nux Vomica, pushed till the physiological effects of the Belladonna became evident.

COXA VARA.

This affection, due to the yielding or partial separation of the upper femoral epiphysis, is not to be confounded with hip-joint disease, which is nearly always tuberculous. It is best treated by Ridlon's method of making strong traction on the abducted limb, whilst a plaster splint is applied from the ankle to the level of the nipples. After this, the patient may be permitted to move about, the splint not being dispensed with till three or four months' freedom from all tenderness or pain is obtained.

CRAMP.

This term is usually applied to the intensely painful tonic spasm which affects the leg or thigh muscles. Smart friction may be employed over the contracted muscle, and, by a voluntary effort, the opposing muscles may be thrown into firm and prolonged action, which soon relieves the spasm. By tying an elastic band, like Esmarch's, tightly round the thigh sometimes the cramp yields at once. If it occurs when in the recumbent position, immediate relief may often be obtained by assuming the upright posture, or by firmly pressing the foot against the bottom rail of the bed-post. Often the condition is the result of over-fatigue of the affected muscles, which must be met by rest, and where toxæmia, owing to deficient

elimination of effete products, is the cause, agents like Salicylates and Massage are beneficial.

For the craft-spasms, see under Writer's Cramp, &c. See also Intermittent Claudication and Tetany.

Cramp often affects the muscles of the swimmer in the water, but, contrary to the universally accepted opinion, it is seldom if ever serious. The writer in his "Practice of Medicine" (vol. i., p. 250) has shown that the so-called cramp which often terminates the swimmer's existence has nothing in common with this condition; it is of the opposite nature, being due to a general paralysis showing itself suddenly in the total inhibition of all voluntary motion akin to that which sometimes seizes public speakers, and it is identical with "stage fright." The reason why this affection has hitherto been believed to be the result of a tonic muscular contraction is probably due to the fact that few who have been seized with it have survived to tell their tale or explain their sensations. The writer speaks from positive personal experience. It is beyond the reach of any treatment, though the condition will rapidly pass off once the swimmer has been rescued from his perilous helplessness.

CRAW-CRAW.

The treatment of this troublesome African disease of the skin which causes extreme itching is so easily effected by the application of Sulphur Ointment that its pathology has been accepted by many as identical with scabies, though Manson believes it to be the result of a species of filaria. The utmost cleanliness and the use of the agents suitable in ordinary itch will usually, as in Uganda, be found successful in removing the disease.

CRETINISM.

The indications for treatment are identical with those of myxœdema, and the sooner thyroid feeding is commenced the better as regards both the mental and physical development of the child. There is some difficulty in determining the correct dose, but any case may be commenced in the infant with a dose daily of 1 min. of the liquor or $\frac{1}{4}$ gr. of the dry gland; if much increase of pulse-rate, or if the loss of weight becomes very marked, the dose may be lessened. The thyroid may be increased in any case till the low temperature comes up to the normal and keeps there, and till the body weight comes to and remains normal; generally speaking, 5 mins. daily or 1 gr. of the extract need not be exceeded.

Improvement may be effected even in cretins of twenty years of age; growth to the extent of 6 inches in height in a year has been observed. The dry skin desquamates, and the new skin retains its moistness, and in a few months the features become altered; their thick, coarse texture changes, and they become sharp, and the expression lively and pleasant. The improvement in the mental condition is equally surprising as the cretin gradually rises to a higher moral, intellectual, and physical level, but it is too much to expect that the mental development will proceed equally with the physical when the remedy has not been commenced till the child

has already reached the age of puberty. The thyroid feeding must be continued all through life, and Murray calculates that 1 dr. of the old B.P. liquor or 10 grs. of the dry powder are sufficient for the weekly intake of thyroid in adult individuals to supply the absence of the normal gland; these doses should be evenly spread over the days of the week.

CROUP.

Laryngismus Stridulus (a true spasm of the glottis usually occurring in rickety children) has its treatment detailed under its own heading. *Membranous Croup* or *M. Laryngitis*, formerly known as True Croup, is now universally regarded as of diphtheritic nature, and its treatment will be discussed under Diphtheria. The present article deals solely with the treatment of *spasmodic croup*—an affection whose pathology is that of a slight catarrhal inflammation of the larynx, which induces spasm of the laryngeal muscles in young children, coming on suddenly, generally during the night, and manifesting itself in lividity and dyspnœa with hoarse cough and crowing.

The affection, though more sudden and alarming than true diphtheritic laryngitis, yields speedily to simple treatment. A smart emetic, 5 grs. of the powder or 1 teaspoonful of the wine of Ipecacuanha, should be given every 15 or 20 minutes till free vomiting is produced. Some physicians prefer Tartar Emetic ($\frac{1}{6}$ gr.) or the old-fashioned Mercuric Sulphate or Persulphate in 1-gr. doses.

The purely local emetics, as Zinc Sulphate, Alum, Copper Sulphate, or Mustard, are contra-indicated, as they possess no after nauseating expectorant action.

The following mixture is more valuable than either of its active ingredients when given alone. It is suitable for a child one year old.

℞. *Vini Antimonialis* ʒiij.
Vini Ipecacuanhæ ʒiv.
Syrupi Scillæ ʒiv.
Aquæ Destillatæ ad ʒij. *Misce.*

Fiat mistura. Signa.—"*A teaspoonful every* 15 *minutes till vomiting occurs, then half a teaspoonful every* 2 *or* 3 *hours whilst the cough lasts.*"

Though the laryngeal spasm rapidly subsides after the establishment of free emesis, it will be found wise to continue the use of expectorants for a few days, to keep the child well clad and confined to the sick room, the atmosphere of which should be warm and moist, and due precautions should be taken against future attacks, which are apt to be easily induced by even mild attacks of catarrh from exposure to cold and damp.

Whilst awaiting the action of the emetic, the child may be plunged into a warm bath containing a spoonful of mustard, and after being rubbed dry and placed between blankets a hot poultice may be applied round the

throat, or Graves's method may be tried of applying a sponge squeezed out of very hot water, and kept in close contact with the laryngeal and tracheal region, and renewed every few minutes till thorough reddening of the skin be produced.

Nitrite of Amyl may be inhaled in urgent cases where swallowing is difficult.

When the laryngeal cough and hoarseness do not pass rapidly off there is sure to be a catarrhal condition of the membrane, and steam inhalations or the bronchitis kettle should be used, and it is needless to say that the serum treatment should be undertaken without delay if there be even a suspicion of diphtheria. The nares should be examined for adenoids when the attacks recur in older children; exposure to cold and damp must be avoided. Hutchinson recommends a small dose of Antipyrine or Chloral at bed-time for a few nights after the seizure as a preventive of future attacks.

CYANOSIS.

The treatment will vary with the nature and site of the obstruction which is preventing the oxygenation of the blood. Thus the profuse secretion of bronchitis must be expelled by emetics, and œdema of the lung substance relieved by blood-letting and purging, after which Oxygen inhalations should be resorted to. In the cyanosis of heart disease, in addition to Strychnine and Digitalis, the right heart may require relief by opening a vein. Tumours pressing upon the larynx when these cannot be removed will require the operation of tracheotomy to permit access of air to the lung.

The enterogenous forms of cyanosis are believed to be the result of the production of sulphuretted hydrogen in the intestine, causing sulphæmoglobinæmia, or of diarrhœic conditions in which the blood becomes charged with nitrites manufactured in the intestine, and after absorption causing methæmoglobinæmia. These states are allied to the microbic cyanosis in which an organism resembling the *Bacillus coli* is found in the blood. The treatment of these forms of cyanosis resolves itself into the administration of intestinal antiseptics and purgatives and the use of a milk diet, which speedily stops methæmoglobinæmia.

Mackenzie Wallis has isolated a nitrite-producing bacillus in the saliva, which he believes is the origin of the sulphæmoglobinæmia; whether this bacillus in the salivary glands be a part of the general infection or a primary condition, oral sepsis should be attended to.

DANDRIFF (Seborrhœa Capitis).

The scalp must be thoroughly cleansed and all scales removed before any treatment is started. The best cleansing agent is Borax, which should be applied as a soap is used and rubbed into the skin with water, raising a lather. A solution of green soap in alcohol is also used, but whatever cleanser is employed it should be thoroughly washed off the scalp and from the hair by changing the water two or three times. The washing

operation should be repeated every fourth or sixth day according to the severity of the case; between the washings the scalp may be cleaned by the application of Benzine, which effectually removes all crusts.

Dandriff is of a parasitic origin, and hence the basis of all modern treatment consists in the application of germ-destroying agents, though in mild cases the old method of applying any bland oil to the scalp was also beneficial, probably by inhibiting the growth of the morococcus organism in the very dry form of the disease.

Sulphur is the most reliable routine antiparasitic agent, since it can be fearlessly used owing to its freedom from danger. Vidal recommended the following pomade:

R.	*Sulphur. Præcip.*	ʒiij.
	Olei Theobromatis	ʒv.
	Olei Ricini ʒix.	*Misce.*

Acid. Salicylic. is less unsightly and more cleanly. At least 20 grs. to 1 oz. vaseline should be used, and this may with advantage be combined with an equal amount of sulphur, the ointment being well rubbed with a piece of flannel into the scalp. It is a good plan to occasionally use a spirituous solution of the acid (4 per cent.) for cleansing purposes when the ointment cakes upon the skin, and Walker adds 4-12 per cent. of castor oil and uses the solution as a spray.

The disease often ends in alopecia, and during the later stages of the seborrhœa treatment the remedies for alopecia may be combined with the antiparasitic agents. (See under Baldness.)

For seborrhœa attacking other parts of the body the Sulphur and Salicylic Acid ointment should be applied in about 2 per cent. strength or preferably used as a lotion.

Vaccine treatment should be resorted to in inveterate cases, and Towle's local method of using a fluid ointment containing 400 million staphylococcic and 100 million acne vaccine in 100 c.c. cold cream promises to be an advance.

DELIRIUM.

The treatment of this *symptom* is referred to when considering the treatment of the different fevers and diseases upon whose presence the delirium depends. (See particularly under Typhoid Fever and Mania, Acute.)

Acute Delirium or Acute Delirious Mania with feverish symptoms is generally fatal. Its treatment, like that of acute mania, can only be attempted in an institution fully equipped for the treatment of insane patients. Before the removal to the asylum the utmost care should be bestowed upon the feeding, which in most cases must be forced by the use of the rubber stomach-tube. (See under Mania.)

DELIRIUM TREMENS.

The patient must be removed to a partially darkened, noiseless room, with good window fastenings and as little furniture as possible in it. For

male patients the female nurse should always have the aid of a reliable male to assist her, and where trained male nurses are procurable their services should always be preferred to females. Often the patient's surroundings are such that removal to a properly regulated hospital, where suitable provision for such cases is provided, is the only course open to the physician to recommend in violent cases. Though the great majority of the subjects of an attack of delirium tremens betray no evidence of suicidal or homicidal tendencies, the writer has encountered many instances of the contrary during a prolonged residence in hospital, where such cases were common. He has witnessed and experienced several hair-breadth escapes from their violence, whilst they were labouring under the delusion that the nurse or attendants were the hated objects which the hallucination of their disordered vision had conjured up. When the very first symptoms of the disease shows itself the patient must be regarded as insane, and should never for one moment be left alone. Much will depend upon the tact of the nurse, who may be able by humouring the patient to keep him quiet and at rest in bed. Violent and repeated struggles may be caused by an indiscreet and quick-tempered nurse, and may have a serious influence upon the patient's chances of recovery in bad cases.

Forcible restraint will not be often called for, and the nurse should be made to understand that it is much easier to keep a patient upon his back in bed by gentle persuasion and mild restraint than to allow him to once get up and initiate a struggle, when considerable force will be necessary to get him again into bed. Where this method fails with a restless patient a sheet may be so tied across the bed or tucked in that his movements will be considerably hampered. The straight-jacket—rightly regarded by every physician with disfavour—must in rare cases be employed; and the writer has seen it induce rest and calm, without which the patient's struggles could not have been subdued, and death from exhaustion would inevitably have supervened. Such cases are, however, rare, and are no justification for the coarse or cruel abuse which sometimes may be noticed at the hands of untrained nurses or attendants. Visitors should be excluded, only one relative being allowed to have access to the sick room.

Food should be administered with regularity, and it should be of the most sustaining and stimulating kind. Solid food, owing to the state of the digestive organs, cannot be taken. Strong soups, beef tea, beef essences, and beef jellies, with an unlimited supply of milk, should form the diet of a patient during the acute stage of the disease. Feeding by the nasal tube and *per rectum* may be demanded in rare instances.

Such nursing arrangements will safely carry a large majority of patients through their attack, without any narcotics or hypnotics; upon the third night or fourth morning the patient, exhausted and wearied by his restless movements, falls into a natural slumber of variable duration, from which he generally awakes comparatively well and free from all hallucinations.

Many cases, nevertheless, will demand some further therapeutic measures, and few instances will occur in which some of the distressing

symptoms may not be removed or modified by judicious administration of medicine.

Alcohol.—The first question which the physician must decide is the one of alcoholic stimulants, and, as mentioned under Alcoholism, the popular prejudice is strongly against the withdrawal of the patient's favourite beverage. In many instances it will be found that he has already ceased drinking just before or soon after the first symptoms of the affection have declared themselves. The distaste for alcohol is often the first symptom of the disease. The physician may be certain that in the great bulk of cases alcohol will do no good, and in very many, especially in young subjects in their first attack, its administration will do harm.

The case is different with older patients, especially those who have taken alcohol for long periods, and in whom symptoms of pneumonia or of cardiac failure manifest themselves. Here alcohol cannot be withheld unless at great risk; but such cases are comparatively rare, and even in them the alcohol should not be started at the very beginning of the attack. When there is dyspnœa, pallor of the face, or lividity, or any approach to symptoms of syncope, with failure of pulse, alcohol must be given freely, in conjunction with large diluted doses (1 dr.) of Spirit. Ammon. Aromat., and Strychnine hypodermically.

Hypnotics.—The use of these drugs in delirium tremens is the next serious question. There cannot be a doubt but that some cases would be better without them all through the attack, and it is equally certain that they should not be given in any case at the beginning. It appears probable that a patient who would not fall into natural sleep till about the fourth night if left alone, will not be sent to sleep by narcotics *much sooner*. It is also highly probable, where sleep has followed the use of a narcotic in the early stage, that the case has chanced to be one of those mild forms of the affection which would have terminated in sleep if left to itself. Should hypnotics then be administered at all in delirium tremens? The answer to this question must be in the affirmative.

A very short curtailment of the period of excitement in bad cases may save life, and one cannot help reflecting, after witnessing the death of a patient, say upon the fourth day of a restless and exhausting delirium, that had sleep been induced by any means, even by chloroform, a short time before the fatal termination was due, a different result might have been obtained. This seems so highly probable that one must be undertaking a very serious responsibility who would withhold all narcotics or hypnotics from a patient sinking from the exhaustion caused by a restless delirium and want of sleep. It must also be remembered that drugs like the Bromides and Hyoscine, even if they fail to induce sleep, may nevertheless quiet nervous excitement, and husband the strength of the patient.

It must be remembered that many deaths have been attributed to the free use of narcotics, and that Wilks stated he had seen many cases of delirium tremens sent to their last sleep by opium. With this statement all observers would agree had Wilks spoken of chloral instead of

opium; but the physician may find himself placed in a grave difficulty when dose after dose of narcotic fails to induce sleep in a patient apparently sinking from the exhaustion which sleep would soon banish. Owing to the state of the digestion and absorptive powers these doses may lie in the stomach or intestines unabsorbed for a time, and then may all rapidly enter the circulation at once; hence solid opium should never be administered in this condition, and hypodermics of morphia are certainly preferable even to liquid preparations given by the mouth. It seems highly probable that an hypnotic, even when given before natural sleep is about to occur, renders this more prolonged and refreshing and tends to hasten recovery, but when the judgment of the physician leads him to believe that a moderate hypnotic will be beneficial in a given case, he should not, however, think of giving it sooner than 24 or 30 hours after the onset of the symptoms.

Early restlessness and activity may be to some extent benefited by full doses of Bromides, though they fail to induce sleep, and there can be little objection in carrying this routine out by administering the following mixture:

℞ *Sodii Bromidi* ʒiv.
Tr. Nuc. Vomicæ ʒij.
Tr. Capsici ʒij.
Liq. Ammon. Acet. ʒiij.
Aquæ Camphoræ ad ʒviij. *Misce.*

Fiat mistura. Cpt. ʒss. *tertiis horis.*

Caution is needed in the use of Chloral, though many physicians still press it freely in this disease. The writer has long since abandoned it, having seen fatal cardiac failure caused by it. Chloralamide and other Chloral compounds are not so treacherous, but they must also be given with caution.

Narcotics, as 45 mins. Liq. Morphiæ or 30 mins. Tr. Opii, may be given about the ordinary sleeping hour of the patient upon the second night of his attack, and if sleep does not follow it should not be repeated till the early hours of the morning, and not again till bed-time the following night. Should the state of affairs be the same upon this night as upon the second, the dose may be repeated early upon the fourth morning. If sleep does not supervene by the fourth night (say 72 hours after the onset of the disease), the situation will become serious, and the dose may be again repeated, to be followed by 20-30 mins. every four hours till sleep comes on. Should excitement follow each repetition of the opiate, its administration should be suspended, and it has been long observed that rapid improvement often follows one or two doses of Tartarised Antimony ($\frac{1}{8}$-$\frac{1}{4}$ gr.), or the Hot Pack may be tried. This latter agent often helps the patient to fall asleep in mild cases without resorting to hypnotic drugs; the hot or warm bath is, however,

contraindicated in the disease. Cold affusion may be employed when all hypnotics fail, but it should only be resorted to in robust subjects, and is especially valuable where there is any rise of temperature.

A smart purge should be given before beginning the opiate treatment, and if the physician suspects that the remedy is not being absorbed, he may give a corresponding amount by the hypodermic needle when the next dose falls due in 4 hours.

Wood states that the combination of chloral and morphia far exceeds in efficiency and general applicability all other hypnotics, though some physicians believe that this combination is more dangerous than full doses of either drug.

A 90-min. dose of Paraldehyde is the safest of all hypnotics; Sulphonal and trional, in 30-gr. doses, have been used to great advantage, and many physicians are content to treat all cases with one or other of these drugs; they are, moreover, perfectly safe in the above-mentioned doses. When the delirium has been fierce and exhaustive, Hyoscine hypodermically ($\frac{1}{100}$ gr.) has been tried as a hypnotic, and has given splendid results.

After an investigation of over 1,000 cases, Ranson and Scott state that Veronal (Barbitone) was the only hypnotic drug which did not increase the mortality of the disease. They found that in the early restless stage it often cut short the attack, and that in the delirious stage it alone of all hypnotics should be selected. In the early stage the veronal was given with ergot and whiskey at regular intervals. 10 grs. may be accepted as a full dose, but owing to its insolubility there should be long intervals between the doses.

Digitalis has been advocated in very large doses, and it is rather surprising to find that a heavier mortality has not been reported after 240 mins. of the tincture every 4 hours. These heroic doses have unfortunately been followed however in some cases by dangerous symptoms.

Strychnine acts much more quickly than digitalis when symptoms of cardiac failure show themselves, and it has an antagonistic action to alcohol. (See under Alcoholism.) The Tincture of Nux Vomica may be given in doses of 20 mins. every 4 hours with 10 mins. of Tincture of Digitalis, and, where cardiac failure threatens seriously to cut off the patient, in addition to the free use of whiskey with Ammonia, as already mentioned, it is a good practice to give a *large* hypodermic dose of Strychnine ($\frac{1}{12}$ gr.), which may be repeated in 3 hours. Hot Mustard poultices to the cardiac region and spine should be used at the same time.

Leonard treats serious cases by Spinal Puncture and injecting a Pravaz syringeful of a 25 per cent. Magnesium Sulphate solution into the spinal canal.

The following is a good formula for use when the restless delirium is severe and the heart is showing signs of failure:

℞. *Hyoscinæ Hydrobrom.* gr. $\frac{1}{150}$.
Liquor. Strychninæ Hyd. ℥j.
Tinct. Digitalis ℥iss.
Tinct. Card. Co. ℥iss.
Aquæ ad ℥vj. *Misce.*

Ft. must. *St.* ℥ss. *tertiis horis.*

Capsicum, in 20-gr. doses, has been advocated as a hypnotic; it is unreliable and may produce gastritis, though some authorities employ it in the presence of acute gastric disturbance.

Convulsions may occur from renal disease; they should not be mistaken for epileptic seizures, which also often occur. A convulsion coming on, accompanied by a large amount of albumin in the urine, should be promptly treated by Saline purgatives and a Hot Mustard pack, Morphia being only used with great circumspection.

Where symptoms of Acidosis supervene, the intravenous injection of Sodium Bicarbonate with normal Saline should be resorted to.

Pneumonia is especially serious, and complications, as they arise, must be treated upon the general principles mentioned under the head of each. As a rule, they are an indication for stimulants.

Delirium Tremens following an injury or accident in intemperate and irregularly living subjects generally turns out a grave affection. It may come on with alarming rapidity, and it is the writer's experience that the delirium in these cases is often of a more active and dangerous kind, and free stimulation is much more frequently indicated in this group of case, than in the ordinary medical varieties of the disorder; this is especially true when erysipelas or other septic condition complicates the accident.

DEMENTIA.

For dementia secondary to severe mania, melancholia and other forms of insanity, treatment is practically useless. Though a cure is not to be expected, much can be done by education of the patient in some simple employment which tends to prevent further mental deterioration, and the routine of a carefully conducted asylum affords the best means of carrying this out.

If the primary attack of mental disease has been mild or of short duration and the symptoms of dementia are in their early stage, much may be done by a complete change of environment and a generous dieting.

Food should be given in the liquid form, and, practically, in unlimited amount. By the India-rubber tube of the stomach pump, 6 to 8 pints of peptonised milk may be put into the stomach daily when there is difficulty in getting the patient to eat, and rectal feeding may be resorted to.

Massage is of much value, but this should only be attempted when the forced feeding is being freely carried out. Thyroid feeding has occasionally proved successful by making a profound impression upon the

general metabolism, and where the disease arises in the progress of myxœdema this remedy will often give surprising results.

Cod-Liver Oil, Malt Extracts, Iron, Quinine or Bark, with Dilute Nitro-Hydrochloric Acid, or other tonics may be given with advantage. Stimulants may be freely administered at first till the activity of the alimentary canal and the nervous system be roused from its torpor by the increased nutrition. The patient's body should be enveloped in thick flannels, and artificial warmth is almost always required. The constant current, 20 Leclanché cells, may be applied to different parts of the body for a period of 15 minutes twice daily, and Static Electricity has a powerful influence over the general nutrition.

In the premature type of the primary disease (Dementia Præcox), supposed to be the result of some unknown toxins or of thymic or thyroid deficiency, total change of environment, with complete rest of body and mind and open-air treatment such as the phthisical patient improves under in a sanatorium, will often restore the mental powers speedily. With the feeding, which may have to be forced, massage should be combined and the patient kept in bed. Saline purgatives should be judiciously administered, and the intestinal tract kept in the healthiest possible condition by the use of intestinal antiseptics or lavage of the colon to minimise the formation of any toxins, and normal Saline freely administered hypodermically or intravenously and Thyroid or Thymus feeding tried with caution. Nucleinate of Soda has been injected in many cases, but not with convincing result.

DENGUE.

The treatment of this tropical disease remains entirely symptomatic. The patient should be sent to bed and fed on liquid diet, and as in ordinary short febrile affections he may have a simple diaphoretic mixture preceded by one smart purge.

Aspirin, Quinine, and Antipyrine have been tried, but possess no specific influence over the disease; the high temperature should be met by sponging, or cold packs. Severe excruciating pain can only be effectually relieved by Morphia hypodermically, and this should be combined with Atropine ($\frac{1}{200}$ gr.).

Iodides are valuable after the subsidence of the acute symptoms, though generally antirheumatic remedies afford little relief to the arthritic complications, but joint stiffness and tenderness may be relieved by Chloroform and Belladonna Liniments.

DENTAL CARIES.

Preventive treatment will consist in thorough cleansing of the mouth at least twice a day and the use of a local antiseptic, as the condition is due to microbic action. Odolol in alcohol makes the most reliable of washes; it splits into salicylic acid and phenol in contact with the alkaline saliva and renders the mouth aseptic, a few drops being used on the wetted tooth-brush. Oil of Cloves inserted by pushing a thin wooden tooth-pick moist-

ened with it between the teeth and Formamint tablets slowly dissolved in the mouth are also highly efficient. Dental caries is greatly facilitated by the free use of sugar and starch, and many cases are evidently caused in children by the habit of constant indulgence in sweetmeats. Baker's fine white bread is answerable for the increase in decay of the teeth, being directly proportional to the perfection of the process in milling wheat into flour.

Pain may be relieved, whether due to disease of the dentine or exposure of the pulp, by gently removing the softened dentine, and after drying the cavity with cotton-wool a small pledget of wool soaked in Carbolic Acid, Chloroform, 5 per cent. Cocaine, Creosote or Oil of Cloves should be loosely packed without pressure into the cavity and renewed every six or twelve hours. When the pain has been relieved and the cavity thoroughly disinfected an attempt should be made to save the tooth by stopping with metallic filling. When the above measures fail extraction must be resorted to, but even in cases where the infection has extended through the apical canal of the tooth, producing alveolar abscess and periodontitis, the tooth may often be saved by a skilled dentist.

DENTITION, Disorders of.

Formerly nearly every symptom of illness occurring during late infancy was put down to teething; at present the opposite view is so strongly maintained that many regard the subject as practically outside the sphere of etiology, pathology, or treatment. Owing to the activity of the developmental changes occurring in the nervous system of the infant from the middle of its first year of life till the end of the second year, the nerve centres are in a state of more or less unstable equilibrium, and it is a well-recognised fact that comparatively trivial causes may excite a general convulsion or determine severe febrile, sensory or peripheral disturbances. The close anatomical connections existing between the nerve supply of the gums and the aural circulation render it probable that when the gum tissue becomes swollen, inflamed and tender, severe reflected aural pain and general distress may arise. In most instances the indications for incising the gum may be met with by scraping the swollen tissue with the scrupulously sterilised finger-nail till the crown of the tooth is reached, a practice which effectually prevents the formation of tough cicatrices.

The abnormal sensitiveness of the nerves of the mouth and of the ear, as well as the instability of the motor and other centres, may be controlled or lessened by the judicious administration of harmless drugs, but Opium should never be employed for this purpose. Before the employment of sedatives a smart purge should be given, the best being ½ gr. of Calomel or 1 gr. Grey Powder administered in half a teaspoonful of Syr. Senna, or a teaspoonful of Castor Oil may be given. (Doubtless the vast bulk of cases regarded as due to dentition are examples of errors in feeding.)

Bromide of Sodium is the best routine drug; it may be combined, when the motor irritability is marked, with minute doses of Chloral

Hydrate. Antipyrine is often used, especially when marked febrile disturbances are present, but it is not so safe as the next-mentioned agent.

Spirit of Nitrous Ether has a decidedly beneficial effect; its soothing influence depends upon its power of causing dilatation of the small vessels and making the skin to act.

Restlessness, wakefulness, muscular twitchings, night terrors, vomiting, auditory hyperacusis and other characteristic series of teething troubles often rapidly yield in an infant of about 12 months old to the following simple combination:

℞. *Sodii Bromidi* *gr.* xl.
Chloral Hydratis *gr.* iv.
Liquor. Ammon. Acet. ʒiv.
Syrupi Simplicis ʒiv.
Aquæ Chloroformi *ad* ʒij. *Misce.*

Fiat mistura. *Sumat* ʒj. *omni secunda hora.*

DERMATITIS.

The cause must be searched for, and when this is removed the condition rapidly subsides under local treatment such as is indicated in the management of a case of simple eczema or intertrigo in its early stages—viz., a bland Ointment like Zinc Oxide or an unirritating drying powder such as Starch, Zinc Oleate, Fuller's Earth, &c.

Many of the cases described as dermatitis are examples of drug eruptions, and this class is known by dermatologists as Dermatitis Medicamentosa. It includes not only the inflammations of the skin resulting from internal remedies like bromides, iodides, arsenic, copaiba, different sera, belladonna, the synthetic coal-tar preparations, &c., but the eruptions which follow the local application of irritants as the primula plant (obconica), poisonous rhus, X rays, certain aniline dyes, hair dyes, and explosive substances, as well as the entire group of rubefacient remedies.

Treatment consists in the instant removal of the local irritant or the suspension of the drug which has caused it, and the skin lesion itself should be treated upon the general principles which are indicated in dealing with each type of eruption. Thus for erythematous rashes a dry dusting powder should be used; urticarial eruptions are best treated by weak alkaline lotions, pustular or vesicular ones by antiseptic ointments, or by astringent lotions containing lead when there is much discharge.

Geyser's preventive treatment of X-ray dermatitis consists in the use of a special form of tube made of lead glass with a flat flint glass window which can be placed in contact with the skin which is to be influenced by the rays. Pads of lint soaked in solution of tungstate of soda and dried have proved useful. Operators should protect their hands by the use of

thick leather gloves upon which oxychloride of bismuth has been precipitated. When the dermatitis has already appeared it should be treated on general principles by soothing applications. An ointment containing Menthol and Cocaine relieves the severe pain and smarting. The resulting warts should be excised or rubbed flat with sand-paper; chronic cases have been treated by Fibrolysin.

Dermatitis Exfoliativa.—The treatment of this cutaneous affection, better known under its first name of Pityriasis Rubra, will be described under Pityriasis.

The treatment of *Dermatitis Herpetiformis,* or *Hydroa,* is very unsatisfactory. The best routine is Sulphur Ointment (1 in 4), which relieves the itching when freely rubbed in so as to break up the vesicles and bullæ. Ichthyol may be applied when the bullæ are numerous and there is much pustulation. Warm baths are always useful, and the discharge may be controlled by Lead Acetate combined with a weak Tar ointment.

Constitutional treatment is of more value than local applications. Rest in bed and if possible a total change of environment are necessary. The food should be such as will not likely tend to the formation of toxic products in the intestines; and some recommend a vegetarian diet. Upon this theory of autogenous toxæmia saline purgatives and diuretics are vaunted, and the use of an autogenous vaccine has been tried, but without avail.

Arsenic exercises a marked influence over the disease, as it does in pemphigus, and should be always administered as a routine in gradually increasing doses till the limit of toleration is reached, and Antimony has been also recommended. Crocker recommends Belladonna in full doses, and Pringle advocates Ichthyol in large amounts.

Intense itching will often demand hypnotics for the control of insomnia, and a combination of Chloral Hydrate with small doses of Antipyrine and Atropine is to be preferred to morphia; bromides are contra-indicated.

Hydroa Gestationis, the form which appears in the late months of pregnancy, may be treated on similar lines.

Dermatitis Factitia, produced by hysterical subjects to gain sympathy or by malingerers to escape some undesired service, can be detected sometimes only after careful scrutiny; the treatment is obviously moral after the management of the lesions, which may have become accidentally infected by various microbic agents.

DIABETES INSIPIDUS.

The treatment of this affection is entirely empiric, since its pathology is still a mystery. Electricity in every form has been tried, without marked benefit.

Extract of Valerian in large doses was employed by Trousseau. He administered a drachm three times a day, and in one case he gave 1 oz. daily. The nausea which follows is the great drawback. Ralfe

administers 10 mins. Tincture of Cannab. Ind. with 6 drs. Tr. Valerian and 30 grs. Bromide at bed-time. Valerianate of Zinc in 10 gr. doses may be given in capsules, but it is doubtful if it has any valerian-like action.

Antipyrine has been reported as markedly successful in several cases. It should always have an early trial. The daily dose should begin with 30 grs., steadily increased till 60 grs. are reached.

Ergot is used by many as a routine treatment in full doses, and Nitroglycerin has been favourably reported upon. Suprarenal Extract has disappointed expectations. Amylene Hydrate in doses of about 1 dr. at night and Paraldehyde have their advocates.

Roberts, noticing how often the disease was relieved by the presence of some intercurrent inflammatory affection, was led to apply a large blister to the pit of the stomach with some benefit.

Morphia, Opium and Codeine generally do harm, but in a few cases they have proved useful. Iron, Strychnine, Gallic Acid, Creosote, Alum, Belladonna, Muscarine, Pilocarpine, Cream of Tartar, Nitre, Salts of Silver, Mercury, Arsenic, Zinc and Gold, Bromides, Iodides, Permanganate of Potash, and many other drugs have been at times found useful in diminishing the amount of the urine. Some cases are upon record where, after failure of all drugs tried, rapid improvement has followed a change of air to the seaside. Warm clothing should be insisted upon, and the general health carefully looked after, signs of emaciation being treated by Cod-Liver Oil, and the usual remedies applicable in the treatment of wasting diseases.

Dietary should be generous, with few restrictions; any attempt to reduce materially the intake of liquids causes rapid diminution in the amount of water passed, but produces such intense discomfort and depression that, as a method of treatment, it has to be soon abandoned in each case. Often, however, good is obtainable by a very gradual diminution of liquids till the point is reached at which the bulk of the urine is greater than the intake of fluid, after which the quantity of fluid food is slightly increased. Where phosphaturia exists, Opium and Codeia may be tried for a short period, and then food rich in phosphates may be given, and wholemeal flour is indicated.

DIABETES MELLITUS.

Dietetic treatment still remains the great resource in the routine of diabetes, drugs being of little avail save for correcting complications. The chief object should be to furnish for the patient a dietary containing the least amount of sugar or starch, or substances easily convertible into sugar. But no two cases of the disease will thrive best upon an exactly similar diet table, and in this lies the secret of treating the affection successfully. By daily estimation of the amount of sugar voided in the urine, and by weighing the patient at short intervals, the diet may be adjusted from time to time, so as to make life comfortable, and in many cases lead to a complete and permanent cure. The amount of sugar ex-

creted will often convince the physician that some articles can be taken with safety and benefit by one patient which may seriously increase the disease in another; hence each case must be scientifically treated upon its own merits and a routine cut-and-dry dietary is inadmissible.

Roberts's method of daily estimating the amount of sugar excreted can be entrusted to any patient of average intelligence. About 4 oz. of the saccharine urine are put into a 12 oz. bottle, and the bulk of a small walnut of German Yeast is added to it. The bottle is then covered with a nicked cork (which permits the escape of carbonic acid), and set aside on the mantelpiece or other warm place to ferment. Beside it is placed a closed 4 oz. phial filled with the same urine without any yeast. In about 24 hours the fermentation will have ceased, and the scum cleared off or subsided. The fermented urine is then decanted into a urine glass and its specific gravity taken. At the same time the density of the unfermented urine in the companion phial is observed, and the "density lost" ascertained. Fermentation is generally complete in about 18 hours, if the locality be sufficiently warm; and it is desirable to remove the two phials into a cool place two or three hours before the densities are taken.

The difference between the S.G. *before* and *after* fermentation will give approximately the number of grains of sugar in each fluid ounce of the urine. Thus, suppose that the unfermented sample by the urinometer registers S.G. 1040, and that the fermented sample registers S.G. 1010, the urine for practical purposes may be regarded as containing 30 grs. of sugar per fluid ounce. By multiplying the total number of ounces passed during the twenty-four hours by 30, the total amount of sugar in grains will be easily obtained.

It is advisable, before any serious reduction is attempted in the intake of carbohydrates, to examine the urine, testing with perchloride of iron in order to insure that no diacetic acid is present; should this or acetone or hydroxybutyric acid be present the dietetic change should, owing to the danger of coma, be limited to the exclusion of sugar till the acid disappears. The fall in the pressure of CO_2 in the lung alveoli should be determined by Fredericia's tensimeter when acidosis is suspected, where the urinary examination is not conclusive.

The total urine should be collected for 1 or 2 days before dietetic treatment is commenced in order to demonstrate the degree of severity of the affection. Sugar is then prohibited and carbohydrates restricted, and in a few days entirely stopped. If the sugar disappears altogether from the urine, after a week or two of this treatment, a little starchy food may be permitted in gradually increasing quantity till sugar returns in order to test the patient's power of assimilating carbohydrates. These should then be systematically administered in amount short of producing glycosuria. Mild cases require no further treatment, and the disease may entirely pass away under a properly restricted diet.

If, however, the sugar persists in the urine in spite of the absence of all starch and sugar in the food, the case is a severe one, and will tax the

resources of the physician to the utmost. The prohibition of both starchy food and sugar must be still enforced, and proteids may also require diminution. Even in this serious type of the disease if the patient continues to lose weight and if diacetic acid appears in the urine a small quantity of bread must be allowed.

In selecting a diet, the following must be avoided: Vegetables which do not contain chlorophyl in quantity, as Potatoes, Turnips, Cauliflower, Carrots, Parnsips, Sea Kale, as well as Peas, Beans and Lentils.

Fruits—especially all sweet fruits—Grapes, Oranges, Apples, Pears, Gooseberries, Currants, Plums and Peaches, must be forbidden. Lépine thinks Apricots are admissible in most cases, as their sugar is chiefly lævulose.

Farinaceous food must be avoided—thus Corn Flour, Baker's White Bread, Biscuits, Rice, Sago, Macaroni and Vermicelli, Tapioca, Sweets, Pastry, Puddings, &c.

Of the articles allowable, nearly every animal substance may be freely partaken of—any kind of Meat, Ham, Bacon, Tongue, Game, Fish, or Poultry; indeed, the only animal products which are injurious and must be avoided are Liver, Honey, and Molluscs, especially oysters, though the flesh of the lobster may be safely permitted. In the cooking of animal substances, strict attention must be paid to the avoidance of adding any starchy or saccharine flavouring ingredients to the meat.

Cabbage (when quite green), Lettuce, Cress, Spinach, Watercress, Celery tops, Endive, young Brussels Sprouts, Spring Onions, Rhubarb, Cucumbers, and French Beans (when *quite* young), and *green* Artichokes may be allowed in moderate quantities. Almonds and all nuts save Chestnuts may be freely used, and Mushrooms are permissible.

Suet, Fat and Oils, Cheese, Cream Cheese, Cream, Butter and Eggs may be used in quantity. The question of Milk will be considered afterwards. If cream be mixed with a large quantity of water and the mixture allowed to stand, the perfectly pure cream devoid of all lactose can be skimmed off; this added to water, with which the white of an egg has been blended, will form a mixture almost identical with good cow's milk.

The exclusion of baker's bread is the great dietetic problem, as most patients find it impossible to use a meat diet without its assistance. It is therefore necessary to provide a substitute which will contain neither starch nor sugar, and which will at the same time be palatable.

Bran cakes made by Camplin's method, with eggs, butter, and a little milk, are used, and may be obtained from various makers. 6 oz. finely ground bran, ½ doz. eggs, 3 oz. butter and a teaspoonful of baking powder make a good batter, which should be baked in an oven for 30 minutes.

Bread, made from thoroughly washed Gluten, in which as little starch as possible is left, is, if made carefully, a tolerable substitute, but its toughness and absence of taste are disgusting to most patients. The writer has had several poor diabetics kept alive upon home-made bread, prepared by themselves from the crude gluten obtained from the starch

works. This compound is far from being a proper diabetic food, but, amongst the poor diabetics discharged from hospital as incurables, it is the best that can be done for them. He directs them to take 4 breakfast-cupfuls of the finest bran, and a small teacupful of the best white Indian flour or meal, and rub these up with 6 oz. butter and a teaspoonful of bicarbonate of soda. This mass is then made into dough with the thick part of the washed gluten, which has been left to settle in a pail of water over night. This mass is to be rolled into cakes, and baked in a slow oven for two hours. Gluten flour, as sold, often contains large amounts of starch. Dr. V. Fielden has found as much as 68 per cent. in samples obtained from manufacturers. Many of the samples of gluten bread contain as much starch or more than ordinary wheaten or brown bread, and the latter, when cut in thin slices and thoroughly toasted through and through, is undoubtedly much less objectionable than many of the gluten breads, buns, and cakes freely advertised as safe diabetic food.

Bread made with Almonds offers upon the whole the most palatable substitute for white bread, and almond flour is procurable which, when freshly prepared and rubbed up with beaten eggs, and a little baking powder added, may be baked in small tins in any good oven without difficulty. Saundby recommends for almond cakes—1 lb. ground almonds, 4 eggs, and two tablespoonfuls of milk, and a pinch of salt (or saccharin); the eggs to be beaten up, and the almond flour stirred in, divided into cakes, and baked in a moderate oven for 45 minutes.

Soya bread always contains a considerable amount of starch.

Bread made with flour obtained from the embryo of wheat, after the separation of its starchy endosperm, is recommended by Danype, and is used in France for diabetics, and is said to be very poor in starch.

Cocoa Nut, Aleuronat, and Roborat breads are also procurable, and are valuable changes from the gluten and almond feeding-stuffs.

Casein bread is relished by many diabetics who cannot use gluten and almond preparations. Williamson recommends Casein made into a custard by adding to a tablespoonful of the powder one egg, a little salt, and a teaspoonful of baking powder, and baking it for thirty minutes. It is a good practice to order through the patient's chemist a tin of assorted breadstuffs (biscuits, cakes, rolls, &c.) from a reliable London firm like Bonthron, Callard, or the Protene Co., who also supply non-saccharin jams and jellies, so that the diabetic can not only have a large variety, but may find a food which will constantly meet his individual tastes.

Lævulose and Inulin are recommended; Hale White suggests the use of dahlia tubers boiled as a vegetable, on account of their starch being in the form of inulin.

Tea, Coffee, and Cocoa made from nibs, may be freely partaken of, sweetened with Saccharin or Glycerin, and containing good Cream. There is little use in trying to diminish the amount of fluid consumed; thirst may be assuaged by acidulated drinks made with Cream of Tartar, Phosphoric Acid, Lactic Acid, or fresh Lemons. A very palatable

liquid is made by dissolving a dessert-spoonful of pure Citric Acid in a quart of water, and adding Glycerin to sweeten it according to taste. Sour Buttermilk may be permitted when the amount of sugar is small in the urine. Water charged with Oxygen has been extolled as a beverage, and sometimes seems to diminish glycosuria. Alcoholic stimulants should be sparingly used, and, when given, should consist of whiskey, brandy, or Hollands, or light bitter ale like Pilsener. Sweet wines are decidedly injurious.

Donkin's method of treating diabetes consists in an exclusive diet of skimmed milk. About one gallon or more is the daily allowance. This treatment has met with general condemnation. The writer has seen, however, excellent results in obese patients from an exclusive milk diet, and it is invaluable in albuminuric cases. Lépine advises that the milk be fermented, and Hutchinson's sterilised non-saccharin milk can be obtained.

Poor hospital patients who gain admission for a few weeks or even months, and are compelled to leave and return to their homes, find that milk is their only available diet. Severe cases of diabetes will, unfortunately, be often found where milk acts most injuriously. In agricultural districts, good buttermilk turned acid is a very valuable diet for the poor diabetic.

Van Noorden's Oatmeal treatment need only be mentioned to be condemned. Janeway found that when oatmeal was given beyond the assimilating power of the patient the whole of the carbohydrate was eliminated in the urine, and the same is true of potatoes. The so-called "potato cure" has been vaunted by many; as a routine it must be condemned. Many diabetics undoubtedly do well on potatoes given up to the limit of their assimilative power, but the range of their usefulness is limited, and like most of the crazes which appear in connection with the therapeutics of this disease it is the evidence of a revolt against a too rigid dietary. The physician, as stated before, should aim at supplying carbohydrates in every case short of the degree in which these can be thoroughly assimilated, and there is no doubt that often harm is done by a too strict enforcement of a rigorous dietary, and the excessive use of animal food and fats adds to the danger of acetonæmia.

Fasting or starvation diet has been successfully employed by Allen for clearing all sugar from the urine. For several days no food is given except small quantities of diluted alcohol, and as soon as the sugar disappears the diabetic dieting is commenced in which green vegetables and meat are administered in gradually increasing amounts. The hours of work, sleep and excercise should be carefully regulated, and the patient should as far as possible be saved from bodily fatigue, worry, or heavy brain work. Against changes of temperature he should be provided by being well clad in flannel, and should wear thick-soled boots. Gymnastic exercises may be advised, when weather and other contra-indications forbid exposure. Most authorities lay stress upon the necessity of constant open-air exercise, and many recommend

cycling and riding, but rest should be strictly enforced in all acute or grave cases. All cases of glycosuria should be treated by a restricted diet as if they were examples of mild diabetes.

Treatment by Drugs.—Though no substance has yet been discovered which exercises a specific action upon diabetes, many drugs are at the physician's disposal which exert some influence over the glycosuric process.

Opium and its alkaloids are the most reliable of these. Crude opium can be tolerated in very large doses. The extract, in doses of ½ gr. three times a day, may be started with, and the dose need not generally be pushed beyond 3 or 4 grs. Morphine and Heroin may be employed in proportionately smaller doses. Codeine is less likely to cause disturbance from its narcotic action, being weaker than morphine; the good which opiates unquestionably accomplish in diabetes is altogether independent of their anodyne properties. Codeine may simply be regarded as weak morphine. Fraser found that the therapeutic value of 1 gr. morphine daily in diabetes exceeded that of 15 grs. codeine. The dose of codeine may commence with ½ gr., increased to 2 or 3 grs., three or four times a day. It will be found not to interfere with digestion, and is always well borne. Under its influence the amount of sugar generally markedly falls in a few days.

Where the codeine treatment with strict diet fails, any of the following drugs may be tried. The list might be much further lengthened out, as nearly every known drug has been experimented with in the management of this serious ailment.

Antipyrine is next in value to opium and its alkaloids, and some observers state that it possesses more influence over the diabetic process than these agents. It must be given in full doses—*i.e.*, 5 to 10 grs. 4 or 5 times a day, to be suspended as soon as any albuminuria appears.

Aspirin, Salol, Salicylates, Phenacetin, Antifebrin, Exalgine, and the other members of the same class, appear to have a similar but less certain effect. Belladonna or Atropine in full doses has been highly praised.

Carlsbad Waters drunk freely at Carlsbad, in conjunction with strict dietetic treatment, till the urine becomes alkaline, with or without the opium or morphine treatment, have given satisfactory and lasting benefits in many cases, but the bread substitutes procurable at Carlsbad are very unsatisfactory as a rule.

Vichy, Neuenahr, Fels, Contrexéville, and Vals are favourite resorts for treatment; and it is insisted by those at the spas that the drinking of the waters at their source is much more efficacious than undergoing the treatment at home.

Alkalies have been much used, and the good effect of the Vichy, Vals and Carlsbad waters is doubtless owing to their presence. The alkaline carbonates and ammonia phosphate, the citrates of soda and potash and free ammonia, or its carbonate or acetate, have been pushed, but apparently with very little influence upon the amount of sugar.

Saccharin and Glycerin are only of use as substitutes for sugar. Large

quantities are liable to upset the stomach, and by leaving a permanent sweet taste in the mouth may destroy the appetite.

Uranium Nitrate, Strontium, Ozonic Ether, Permanganate of Potassium and Peroxide of Hydrogen have failed signally in the hands of most physicians. Bromides, Cocaine, Arsenic, Picric Acid, Calcium Sulphide, Lactic Acid, large doses of Quinine, Ergot, Benzosol, Camphor, Magnesium Salts, Lithia Salts, Creosote and Jambul have been reported to have effected cures, but in other hands have almost always proved useless.

Papain, Pepsin and Rennet have been used and found wanting, and the same may be said of the plan of giving large doses of Yeast.

The existence of pancreatic diabetes has directed attention to the use of Pancreatic Extracts, and occasionally good results have been reported. Trypsin should always have a trial; it must be given in Keratin coated capsules or pills in order that it may pass unaltered through the stomach. Amylopsin, Pancreatin, and other preparations of the gland may be given in a similar manner. Secretin prepared from the duodenal mucosa is being tried with the view of stimulating the action of the pancreas, but the reports are unsatisfactory.

Massage and Electricity, Cod-Liver Oil, Iron, and Laxatives of the Castor Oil or Cascara type, are generally useful in combating symptoms or complications arising during the disease.

It would appear from a study of the long list of vaunted drugs that many observers, when getting a case of diabetes, place it at once upon a diet devoid of sugar and starch, and any drug which their fancy induces them to try they prescribe, and often fall into the error of ascribing all the good effects to it alone.

Complications arising during the disease are to be treated upon general principles.

Coma (due to acidosis) should be promptly met by large doses of Alkalies, or the intravenous injection of Bicarbonate of Soda Solution (2 per cent.), or, better still, by *large* hypodermic doses of saline solution, as mentioned under Anæmia and Acidosis.

In the threatening stage when the patient is still quite conscious he should drink as large a quantity of water as he possibly can swallow, 1 dr. of Citrate of Soda or Potash being dissolved in ½ pint, and many cases are recorded where the stupor has disappeared under this treatment.

Carbuncle, Boils, Pruritus, Gangrene, Constipation, and other complications are to be treated by the remedies mentioned under their appropriate headings. Often neuritis is very severe, and it is best met by Antipyrine or Heroin.

The numerous dietaries designed by various authorities are all founded upon the principles already detailed. The physician should guard against prescribing a printed "diet roll" for his diabetic patient, as the sameness of the routine, unless greatly varied from day to day, is sure to become irksome. Better supply him with a more or less complete list of the forbidden and of the allowable articles of diet; from the latter list he can formulate a dish according to his individual tastes under the guidance of

the physician. For this purpose Pavy's list is sufficiently comprehensive.

The following articles are allowed:

PAVY'S DIETARY.—Butcher's meat in every form except liver; bacon and ham; game, poultry; all kinds of fish, both fresh and cured, including the crustacea; animal soups (without thickening), including beef tea and broth.

Eggs, cheese, cream cheese, cream, and butter.

Almond, bran, or gluten substitutes for ordinary bread.

Greens, spinach, turnip-tops, watercress, mushrooms, mustard-and-cress, cucumber, lettuce, endive, radishes, and celery.

In moderate quantity, after boiling in much water, are allowed:—Turnips, French beans, Brussels sprouts, cabbage, cauliflower, broccoli, sea-kale, asparagus, vegetable-marrow; also pickles, olives, vinegar, and oil.

Jelly, flavoured but unsweetened; savoury jelly blanc-mange made with cream and not milk; custard, made without sugar.

Nuts of all kinds except chestnuts.

Tea, coffee, cocoa from nibs.

Dry sherry, claret, hock, dry Sauterne, Chablis, Burgundy.

Brandy and spirits, unsweetened; soda water, Burton bitter ale in moderate quantity.

The following are forbidden:

Sugar in any form, wheaten bread and ordinary biscuits of all kinds.

Rice, arrowroot, sago, tapioca, macaroni, and vermicelli.

Potatoes, carrots, parsnips, beetroot, peas, and Spanish onions.

All kinds of pastry and puddings, and fresh or preserved fruits of all kinds.

Milk is forbidden, except in very small quantity, and also port wine.

Sweet ales, mild and old porter and stout, cider, liqueurs, and all sweet and sparkling wines.

DIARRHŒA.

The treatment of this *symptom* can only be rationally carried out after its cause has been discovered. Unfortunately the general acceptance of the theory which has bracketed diarrhœa and enteritis as synonymous terms has plunged the subject into hopeless confusion. In the great majority of cases of diarrhœa the frequent loose motions are the result of some purgative substance introduced into the intestinal tract from without, or produced in the bowel through the action of ferments or microbes. It is therefore as irrational to regard the catharsis as a *disease* as it would be to call the pharmacological action of castor oil or senna by the same name.

A catarrhal enteritis may supervene when the action of the cathartic agent has been of long standing, and it may even remain after this has been expelled from the body, but such instances are rare except in the case of infants.

The purgative substance is often the product of fermentative or microbic action which has already been induced in some article of food as contaminated milk, or it may be a ptomaine poison originating in fish or meat, or the irritant itself may be harmless from a chemical point of view, but still be capable by its mechanical action of exciting greatly increased but ineffectual peristalsis, as is seen in indigestible masses of casein or accumulations of fæces in the colon.

The term *irritative* diarrhœa, therefore, may be applied to most of the examples of looseness of the bowel met with by the physician,

and they follow for the most part some indiscretion in diet, and, especially in adults, may be safely regarded as if the patient had taken a cathartic which was irritating the small intestine, causing sometimes intense griping and smart purging. Such cases will require little treatment, and certainly should not be checked at first. The diarrhœa is nature's method of getting rid of a poison introduced from without in the food, or generated within the bowel, and if the physician must interfere, it may be best to assist nature, and give a mild dose (1 dr.) of Castor Oil, or a teaspoonful of Gregory's Powder. The severe pain is best combated by a large dose of Whiskey or Brandy, or 5 mins. of Oil of Peppermint or other essential oil. Salines may increase the pain, and, by rendering the motions quite fluid, may sweep past and not remove the source of irritation.

Diarrhœa common in infants fed upon cow's milk is clearly of this nature. It can be recognised at once by an examination of the child's napkins. The motions consist of masses of undigested curd, closely resembling glazier's putty in appearance and consistence; these masses can be easily shaken off or detached from the napkin, which they scarcely soil. They are often green in colour and are passed solid, with a little acrid watery discharge often mistaken by the nurse for urine. Here the employment of vegetable astringents or opiates means delay, and too often death.

The preliminary colic and diarrhœa may be rapidly followed by vomiting, and if the cause be not promptly removed, a low and fatal form of enteritis sets in which is beyond the reach of drugs. The cow's milk should be instantly stopped, and a healthy wet nurse obtained. When this cannot be accomplished without delay, which is often the case, two courses are open. Raw Meat, grated or pounded to a pulp, may be given or made into strong beef tea; or a peptonised food or predigested milk should be tried. Directions must be given that cow's milk should not be administered till long after the attack is passed, and then only in very small amount, and but once a day at first, watching its effects. It is upon the whole better never to return to it if the attack has been a serious one. As soon as the child takes to the new food, a smart dose (one teaspoonful) of Castor Oil should be given to clear any indigestible curds out of the bowel. No further drugs are needed in the majority of cases.

Benger's, Nestlé's and Mellin's Foods are very suitable, and Meigs' Milk Cream—which for an infant 6 months old may be made by mixing pure fresh milk 3, cream 1½, lime water 1, sugar of milk ½, and boiled water 2 parts—is an excellent food when cow's milk must be used. The lime water may be replaced by a solution of bicarbonate of soda (3 grs. to each oz.) if constipation follows. Wright recommends the addition of 20 grs. Citrate of Soda to each pint of cow's milk, and Variot states that this drug has a specific action in the vomiting of infancy.

Summer Diarrhœa is a different form of the irritative type of diarrhœa, and to which the term " septic " has been also applied; it occurs in young children and sometimes in infants. Here also the milk—generally cow's

milk—is at fault, and there can be little doubt that the irritant is a microbe or ferment which secretes a highly poisonous principle, causing profuse and frequent liquid motions, so that severe cases sometimes are described as Cholera Infantum. The affection is rarely met with in breast-fed infants, and the contamination of the milk has been regarded as the result of infection of the liquid by the introduction of such microbes as *Bacillus coli, pyocyaneus, streptococci,* &c., which are believed to be carried readily by the house-fly.

It is unfortunate that these names are used in different senses by different writers; thus irritative diarrhœa is often called inflammatory. The irritative diarrhœa caused by curds of milk in infants is sometimes spoken of as simple or dyspeptic diarrhœa, but if it passes on into entero-colitis it becomes an inflammatory diarrhœa.

The immediate withdrawal of the milk diet and the copious administration of ice or iced water with a purgative is the first step in treatment, after which any of the previously mentioned foods, prepared fresh every time, or sterilised cow's milk may be given, provided it is clear that prior to the attack there was no evacuation of the firm, dry, putty-like masses before described. Castor Oil is the safest purgative in these cases; the following old-fashioned combination is an excellent one, and a child one year old may get a powder twice a day:

℞ *Pulv. Rhei gr.* iss.
Sodæ Bicarb. gr. iv.
Pulv. Cinnamomi gr. j. *Misce.*
Fiat Pulvis.

Sterilisation of the milk is a reliable prophylactic; the milk can be best sterilised by being heated upon a water-bath in small bottles for 15 minutes, and all tubes and bottles soaked in a strong solution of Boric Acid. There is no doubt that tuberculous disease is communicated often through the milk of cows with tubercular deposits in the mammary gland, and it is a wise measure to *always* sterilise the milk of bottle-fed children where there is any doubt about the purity of it, or of the health of the animal supplying it.

Chalk Mixture or Bismuth may be prescribed safely as a routine, and the following is suitable for a child of 1 to 2 years when the diarrhœa continues after the diet has been made right; a child 4 years old may have the amount of bismuth doubled and the tincture of camphor trebled.

℞ *Bismuthi Carbonatis gr.* xlv.
Tincturæ Camphoræ Co. ℥j.
Glycerini ʒss.
Mucilaginis Recentis ʒss.
Aquæ Chloroformi ad ʒiij. *Misce.*

Fiat mistura. Signa.—"A teaspoonful to be administered after each loose motion."

Intestinal antiseptics constitute the ideal treatment for this form of diarrhœa, but unfortunately an intestinal antiseptic in the true sense of the word is as yet unknown. Salol, Naphthaline, Beta-naphthol, Resorcin, Creosote, Iodide and Perchloride of Mercury, Salicylates, Aspirin, and perhaps one hundred more antiseptics have been lauded from time to time. but by common consent their local antiseptic action is considered to be useless as regards the lower part of the intestinal tube. The only reliable drug of this class is Calomel, which may be given even to young infants in doses of $\frac{1}{8}$ gr. every hour for 6 to 8 hours with a little sugar; it may be combined with $\frac{1}{2}$ to 1 gr. doses of Naphthol. This treatment is highly successful in checking the foul green motions of most forms of septic diarrhœa occurring in childhood. Illingworth gives small doses of the Biniodide of Mercury dissolved in Iodide of Potassium combined with Chloral.

In the more severe degree of irritative diarrhœa known as Cholera Infantum (probably identical with the Cholera Nostras of adults), the intestinal symptoms are combined with grave constitutional disturbance arising from the absorption of the toxins produced in the intestine which induce high fever, rapid shrinking of the skin and subcutaneous tissues, and the development of collapse and the hydrocephaloid state: the Calomel treatment is the best routine. Hyperpyrexia must be treated by cold sponging or the cold pack, and the tendency towards acidosis or collapse met by rectal flushing with warm saline Solution and Alcoholic stimulants. Where vomiting is continuous, a liberal supply of pure water may be permitted to wash out the stomach, or this organ may be irrigated through a rubber catheter with a weak solution of Permanganate of Potassium. Strychnine should be given hypodermically ($\frac{1}{100}$ gr.) and Saline Solution injected slowly into the subcutaneous tissue.

Robert-Simon recommends the subcutaneous injection of sea water. He states that the dying infant unable to retain food, by a single injection may be made to digest a normal amount of milk immediately afterwards. The dose of the isotonic sea-water plasma is 30 c.c. injected into the scapular region, no other treatment being usually permitted.

After the injection of salines has been tried a mustard poultice may be applied over the heart and to the extremities, and the hot bath or wet pack may be resorted to. The main principles of this treatment are applicable to the examples of septic diarrhœas occurring also in older children, and in them Eustace Smith advocates the hypodermic injection of Morphia to check purging and vomiting in the early stage, but this agent must be used with extreme caution, since its administration must tend to facilitate the absorption of the toxins whose elimination by the bowel is nature's method of effecting a cure.

When the more urgent symptoms of vomiting, fever and collapse have been met, the catarrhal diarrhœa resulting from the prolonged action of the intestinal toxins should be treated by a simple local soothing drug like Bismuth used in the form of the prescription upon p. 212. This will also be most suitable for the treatment of the diarrhœa of

infants and delicate young children who suffer from looseness of the bowel after chills or exposure of the surface of the body from injudicious cold bathing carried out under the craze of "hardening" them. This form of diarrhœa is probably of true catarrhal nature, and should be also met by a warm flannel binder and extra clothing.

The diarrhœa of disordered dentition is of reflex type, probably caused by increased peristalsis, and is best met by mild sedatives like Bromides.

Lienteric diarrhœa is a type of looseness of the bowels resembling in its pathology teething diarrhœa, the bowel being suddenly emptied when the infant, child or adult partakes of food, the contents of the stomach being swept rapidly down the canal. The best treatment for this is Arsenic, which is administered in liquid form usually with minute doses of Strychnine: in very young infants Bromides may be tried with ¼ min. of Fowler's Solution.

A word may be said about the action of Castor Oil in all forms of acute diarrhœa both in the infant and adult. It is a mistake to regard the good results obtainable by this drug as being due entirely to its eliminatory action; the pure oil is a local emollient and sedative, as proved by its popular use in eczema, conjunctival irritation caused by foreign bodies, &c., in which it is devoid of all irritant action. When swallowed it only acts as a purgative by a small percentage of its bulk being changed into ricinoleic acid in the duodenum; the unaltered remainder passes down the bowel, exercising its bland emollient action on the intestinal tract as it does when instilled into the eye. The recognition of this fact places in the hands of the physician a remedy of the greatest value in the treatment of every form of diarrhœa, reflex, catarrhal, or irritative.

Dec. Aloes Co. has a very striking effect in diarrhœa. It may, in one full dose (½ dr. to an infant, 1½ oz. to an adult), cause a firm, natural motion where watery stools have been the rule for many days, and it can be administered safely in the worst cases, as a morning dose, when the ordinary astringent remedies are being administered during the day. The writer has occasionally obtained excellent results from this drug after the very acute symptoms have subsided, but its action is very uncertain.

Chronic Diarrhœa usually depends upon a catarrhal condition of the bowel, and is often the sequel of the irritative or septic type when not depending on tuberculous ulceration. In infants and young children it may be due to feeble circulatory powers with successive attacks of chill, in which case warm clothing, the avoidance of cold bathing, and the substitution of predigested thick foods for cow's milk will usually restore the digestive power and tone of the intestinal tract.

In older subjects the relaxed mucosa will require the stimulus of astringents; popular preparations, consisting of Kino, Rhatany, Catechu, Tannin, Logwood, &c., are usually prescribed with Opiates and Chalk Mixture for this condition, but since the greater part of their astringent principles are absorbed in the stomach they frequently upset gastric digestion without influencing the flux from the bowel, and the same remark applies to the salts of Lead, Copper and Silver.

The best routine remedy for checking the watery motions is a compound of tannin, which will pass unabsorbed through the stomach and exercise its local astringent action upon the intestines. Tannalbin Tannigen, Tannoform, Tannol, Tannyl and Tanocol act in this manner. The writer prefers the first mentioned.

℞. *Tannalbin gr.* xv.
Bismuthi Carb. gr. x.
Pulv. Cretæ Ar. c. Opio gr. x. *Misce.*
Mitte tales xij. (*in cachet. serv.*) i. *ter die.*

Nitrate of Silver, Lead Acetate, Copper Sulphate, and Extract of Logwood may be given in pills coated with Keratin, and Opium can be administered along with them to restrict the exalted peristalsis always present. Tincture of Coto bark is a favourite remedy with some physicians.

The diarrhœa caused by tuberculous ulceration should be treated on similar lines, and in all chronic cases Rhubarb, Dec. Aloes Co., Castor Oil, or Calomel should be occasionally administered from time to time, the latter drug always being selected when the motions are foul. Salol, Naphthol, or Aspirin may be combined with tannalbin, and carminatives like Cinnamon, Clove and Peppermint Oils may be given for griping.

Diarrhœa due to catarrhal or other states of the colon is to be treated locally and constitutionally as Colitis (p. 164).

Chronic Nervous Diarrhœa is of the same type as the lienteric, and should be treated upon the same principles by Bromides and small doses of Arsenic.

Malarial Diarrhœa yields to Arsenic and Quinine, and diarrhœa occurring in the tropics, when not of the ordinary irritative type, is likely to be dysenteric in origin, and should be treated by Ipecacuanha. A routine for chronic tropical diarrhœa will be found in a strong decoction of Cinnamon bark administered in conjunction with a diet of well-boiled arrowroot.

Dietary in chronic diarrhœa should be such as is indicated in typhoid fever, the object being to give all foodstuffs in either the liquid form or in preparations of thicker consistency containing impalpable farinaceous materials which cannot mechanically stimulate the bowel membrane and increase peristalsis. Peptonisation of the food is necessary in all severe cases to aid its absorption, since owing to the increased peristalsis the food is only a short time in the intestinal canal.

After-treatment when the flux has been checked should consist of tonics to strengthen the relaxed tone of the intestinal tract. Iron is always valuable when the tongue is uncoated, and minute doses of Strychnine may be advantageously combined with it. A favourite tonic is Aromatic Sulphuric Acid with small doses of Quinine. Should constipation follow the cessation of the flux irritating cathartics are contra-indicated, Castor Oil or enemata being clearly the safest methods of opening the bowels.

DIPHTHERIA.

Preventive treatment in time of epidemic consists in rigid isolation as in scarlatina, &c. The diphtheritic patient cannot be regarded as innocuous until after a period of at least three weeks, or *as long as the bacilli can be found in the nasal discharge or throat.* The best prophylactic in the case of these carriers consists in the use of insufflation of the nostrils by the Pasteur Institute Powdered Antimicrobic Serum three or four times daily. The injection of a moderate dose of antitoxic serum (1,000 units) affords protection only for 3 or 4 weeks. The best results are obtainable by using 1 c.c. of a Toxin-antitoxin mixture or this plus 1,000 million sterilised bacilli. As the disease has a brief incubation period, a week's quarantine is sufficient for the isolation of suspected individuals who have been in contact with diphtheritic patients. By using the Schick test (the $\frac{1}{50}$ minimal lethal dose of toxin for a guinea-pig) the susceptibility of an individual is determined by the appearance of a local reaction within 48 hours at the seat of injection.

Treatment by Antitoxin, when once any membrane has become visible, must be instituted without a moment's unnecessary delay. Statistics demonstrate conclusively that the mortality of the disease increases with every fraction of a day's delay, and even in the mildest case the physician cannot be held as blameless who postpones injection unnecessarily once the diagnosis has been arrived at. In most cases, even with a speck of false membrane visible upon the mucous membrane of the fauces, the delay caused by waiting for an incubation of the bacillus from a swab of wool is unjustifiable.

The dose is not to be regulated by the bulk or volume of the antitoxic liquid or by the age of the patient. In early mild cases 2,000-5,000 units should be injected under the skin of the abdomen or into the substance of the vastus externus muscle, and repeated inside 24 hours if no visible change is apparent in the small patch of membrane. Cases only seen upon the third or fourth day require larger doses—viz., 10,000 to 15,000 units—which should be repeated in half this amount in 12 hours afterwards. No late case, no matter how apparently hopeless, should be deprived of the advantage of the antitoxin, even should its intravenous injection be demanded. The repetition of the injections will be required in all such cases every 12 hours. Intramuscular injection gives better results than the subcutaneous.

Should the membrane show no signs of disintegration or should it be extending it may be accepted as a limit that 25,000 units very rarely will be required, though double and even treble this amount has been given with success in grave and neglected cases. In all laryngeal or tracheal cases the first dose should never be less than 10,000 to 15,000 units.

Under this treatment all early cases may confidently be expected to clear up rapidly, as the discharge speedily lessens, and the symptoms of general toxæmia and cardiac weakness are prevented, the mortality

in uncomplicated faucial cases dealt with upon the first day of the disease being practically nil.

Rest in bed in a warm and well-ventilated room should be insisted upon from the first. In private practice the room itself must be carefully isolated from the rest of the house, and a sheet kept moist by a disinfectant should be fastened outside the door.

The patient should be kept in the horizontal position owing to the danger of cardiac weakness, and any necessary change from this posture should be effected slowly, especially in the early stages of the disease when there is much septic discharge, and in the convalescent stage when a more serious cardiac weakness is liable to follow from a paralysis of the heart.

The diet should be generous and sustaining, but must be administered in the liquid form. Peptonised milky foods of the consistence of gruel or cream are as a rule more easily swallowed than thin fluids; boiled milk with arrowroot in which an egg is well beaten up answers every purpose. Small quantities of beef juice or any good thick soup devoid of all greasiness may be also given at short intervals. Many children take greedily a pap made by soaking a Naples or Marie biscuit in warm milk flavoured with weak tea. When swallowing is difficult or impossible rectal feeding must not be relied upon; it is always unsatisfactory in children. The best plan will be to feed through the nasal tube, and this will be imperative in intubation cases, and at a later stage in all cases where, owing to paralysis, food constantly regurgitates through the nose. Obviously in the presence of continual vomiting rectal feeding must be tried; even the hypodermic use of saline solution may be indicated, and the writer has resorted to the inunction of cod-liver oil, which apparently saved life in two desperate examples of the disease in the paralytic stage, where both rectum and stomach were unavailable routes for the administration of food.

Drugs have been of late years steadily falling into disuse since the introduction of the serum treatment. Iron, however, which is usually well borne in the disease, is undoubtedly of great value, and especially in the cases complicated with streptococcal or other septic infection; where there is much offensive discharge, the drug affords an adjunct to treatment which should never be omitted. The following is a good routine formula suitable for a child of about 4 years of age:

℞. *Tinct. Ferri Perchlor.* ʒj.
Potassii Chloratis *gr.* xxxv.
Glycerini ʒvj.
Aquæ Chlorof. *ad* ʒiv. *Miscc.*

Fiat mistura. *Cpt.* ʒij. *quartis horis.*

Basham's Mixture, or 30 mins. Tr. Ferri Perchlor. with 1 dr. Liq. Ammon. Acet., may be given with water every four hours to adults.

Of the host of internal antiseptics from Euchlorine to Biniodide or Perchloride of Mercury there is little to be said; the writer has long satisfied himself that all are inferior to Iron. Strychnine, however, stands alone as an internal remedy in cardiac failure, and it should be administered hypodermically once the symptoms of heart weakness show themselves, and as a preventive of this 1 min. of the liquor may be added to each dose of the above iron mixture, and small quantities of Brandy may be added to the milk.

Gargles or sprays will probably continue to be used in all cases where the discharge is profuse and offensive, but the established rule has no exceptions—that a caustic agent should never be applied with the view of destroying the bacilli in the false membrane. Serum therapy has also done away with the application of Papain, Pepsin, Lime Water sprays and other agents formerly used to cause disintegration of the membrane. In all mild and most severe cases the use of a spray of Carbolic Acid, 1 in 100, with 4 per cent. Boric Acid, is the most harmless and efficient flushing medium for the throat and nares. Swabs, syringes and douches are a source of terror to young patients, and the excitement which their use inspires often does much more harm than their employment does of good. The spray, on the other hand, when gently brought first under the child's notice as a plaything by the nurse using it to her own open mouth, need be the cause of no alarm. With older patients the nasal douche or syringe may be used with a weak Perchloride of Mercury, 1 in 5,000, but warm saturated Boric Acid solution is safer. Swabs of the mercurial preparation may be used in 1 per cent. strength, or Peroxide of Hydrogen, 10 vols., may be employed in the same manner or as a spray. Recently swabbing with Hypochlorous Solution is highly recommended by several authorities both in the active disease and in the case of carriers. The solution is made by passing a strong electric current through a 3 per cent. solution of common salt, using graphite plates. There is scarcely an antiseptic substance from the crude Flowers of Sulphur and Garlic to the latest Iodoform substitute which has not its advocates, but the 1 per cent. Carbolic spray answers all requirements both for the mouth, throat, nostrils and nasopharynx, and it may be easily used while the patient lies upon his side with his head thrown backwards till the spray condenses in the mouth, after which it may be permitted to flow out on depressing the chin.

Laryngeal Diphtheria.—Though the author in his "Practice of Medicine" has pointed out good reasons for believing that the serious disease formerly known as "True Croup" is not always of diphtheritic nature, nevertheless from the standpoint of treatment all cases from the moment that laryngeal symptoms begin to show themselves should be dealt with as if the result of the Klebs-Loeffler bacillus, the simple spasmodic croup from its peculiar invasion being easily excepted.

In addition to the isolation, general environment and feeding arrangements necessary for ordinary diphtheria, the warm air of the sick-room should be saturated with moisture by means of the bronchitis kettle, or a

curtained cot into the canopy of which steam or the vapour of boiling water may be introduced is better. For very young children and infants, screens may be so arranged as to answer the same purpose, but which will permit the infant being kept on the lap of the nurse, as the recumbent posture is impossible when there is much dyspnœa.

A dose of 10,000 to 15,000 units of antitoxin should be administered without delay, and repeated in 12 hours should the symptoms not show signs of improvement. One of the most remarkable results of the serum treatment of diphtheria is seen in the small percentage of cases which will require operative relief when the injection has been promptly resorted to, and another result is equally striking in the almost entire absence of the supervention of laryngeal trouble in ordinary faucial diphtheria after the use of the serum has been commenced on the first day. Should, however, the breathing continue to be laboured and recession of the thoracic walls be noticeable, the trachea must be opened or the operation of intubation must be performed.

Tracheotomy may be required in the absence of a surgeon, and every physician should be familiar with the steps of the operation, since he may find himself in an emergency responsible for the life of a patient gasping from a remediable obstruction of the larynx. The operation known as "high" tracheotomy or crico-tracheotomy is always selected.

Chloroform anæsthesia of mild degree will be necessary unless the patient be asphyxiated completely; in adults local anæsthesia is often quite sufficient. The head being extended by placing a small hard pillow or bolster at the back of the neck, a median incision is made from the lower margin of the cricoid cartilage downwards for about 1½ to 2 inches, dividing the septum between the sterno-hyoid muscles, any bleeding veins being clamped, and the thyroid isthmus being drawn down or divided the trachea is exposed. By fixing a sharp hook into the tissues at the lower edge of the cricoid the larynx is steadied for the scalpel, which is thrust into the lumen of the trachea with its cutting edge upwards, and the two uppermost rings of the trachea are then divided; usually in small patients it is advisable to sever the cricoid cartilage as well.

The trachea dilator is introduced between the lips of the slit in the tube and any membrane present gently removed by forceps, after which a proper-sized tracheotomy tube is inserted, the outer sheath or canula of which is to be fixed by tapes passed round the neck, the inner tube being kept free for frequent removal and cleansing. The skin wound is to be treated on ordinary surgical principles—viz., by dusting with Iodol and covering its margins by antiseptic gauze lightly inserted under the collar of the canula.

The after-treatment will consist in the keeping of the inner tube clear and free from obstruction; the temperature of the sick-room should never be allowed to fall below 65° F. and the steam always be kept going; a further dose of antitoxin should be administered after the operation unless one had been administered a short time before, and all feeding should be by the spoon.

Intubation requires no anæsthesia and can be rapidly performed. O'Dwyer's or preferably the shorter Bayeux's instrument should be used. The operation may be performed most readily when the patient is placed upon his back; the tube with its obturator or pilot on the end of the introducer is passed into the orifice of the larynx guided by the left forefinger of the surgeon introduced through the gagged mouth beyond the base of the tongue, and the finger must be kept in this position to steady the tube before the pilot and introducer are withdrawn.

After either operation the tubes should be removed as soon as the symptoms abate to the extent of restoring the free passage of air through the normal channel; if the O'Dwyer's tube be kept in beyond a few days there is danger of a permanent stenosis of the larynx following. After intubation the child should be fed by the nasal tube to prevent the food entering the lungs through the patent larynx. O'Dwyer's tube can be removed by pressure over the trachea and sudden flexure of the extended head with the mouth wide open, but when this fails it must be removed by the introducer.

In great emergency where the necessary instruments are not at hand an attempt may be made to prevent suffocation by passing into the trachea a large-eyed, gum elastic catheter or a small stomach-pump tube of the same material having a terminal aperture.

Tracheal or **Tracheobronchial Diphtheria** is a grave affection, owing to the almost certainty of pulmonary obstruction and collapse. Lynah effects mechanical removal of the membrane by the use of a suction tube introduced through the larynx and connected with a vacuum and spraying pump. After sucking up the obstructive membranes the interior of the trachea and bronchi are sprayed freely with Antitoxin and a long tube is left *in situ* for 3 days.

Nasal Diphtheria is rarely an isolated condition, and is easily treated on the same lines as the faucial, by antitoxin injections and the free use of the carbolic spray.

The treatment of *Diphtheria of the Conjunctiva* is described under Conjunctivitis.

In the convalescent stage, even in mild cases of diphtheria, rest in the horizontal position must be maintained as long as there is any symptom of cardiac weakness; the pulse should be frequently investigated, and the temperature of the extremities watched carefully in infants; the patient's clothing must be warm, and generous feeding at short intervals should be strictly enforced even by the nasal tube should paralysis of the throat prevent swallowing. Iron tonics with Quinine or Strychnine should be administered as a routine till perfect health is restored.

The complications and sequelæ of diphtheria are to be treated upon general principles, always remembering that the main reliance is to be placed upon early large, and repeated smaller doses of the specific antitoxin. Broncho-pneumonia and bronchitis must be treated by appropriate remedies, but tartar emetic and nauseating expectorants must be sparingly used, if at all, in a disease characterised by debility and cardiac

weakness. Ammonia is the safest agent in such cases; stimulants—brandy or whiskey in the milk, or wine whey—will be generally freely indicated. Cardiac failure, as already stated, should be promptly met by Strychnine hypodermically and prolonged rest. Albuminuria in the early stage requires no interference, that following later must be treated upon the principles laid down for guidance in Acute Bright's Disease.

Symptoms of Acidosis must be met by the prompt use of Alkaline serum intravenously or subcutaneously.

Scarlatinal Diphtheria, contrary to what might be expected, is usually controlled by the antitoxin treatment, and as a prophylactic measure when a case of diphtheria appears amongst the inmates of the scarlatina wards an antitoxin injection of 2,000 units should be administered to each patient within the zone of infection. In the treatment of diphtheria with profuse fetid discharge from the nose and throat in scarlatinal patients the injection of the antitoxin should be accompanied by a dose of 30 c.c. of a Polyvalent Antistreptococcic Serum. The same treatment is clearly indicated in all diphtherial cases occurring independent of scarlatina when the purulent nasal or throat discharge is profuse and fetid.

For the treatment of the paralysis which follows diphtheria, see under Paralysis.

DISLOCATIONS.

The obvious procedure is to effect reduction at the earliest moment before reflex contracture sets in. If this be attempted immediately, the end of the displaced bone can usually be so manipulated as to replace it in its normal position through the rent in the capsule of the joint by which it has just escaped.

Rarely, except on the hunting-field perhaps, will the surgeon be fortunate enough to meet the injury in this early stage, more or less muscular rigidity being always present when the case presents itself for relief.

Force was formerly the remedy always used for overcoming this, but the use of the general anæsthetic—Chloroform and Ether—has almost relegated the pulley, cord, and weights to the museums of surgical antiquities. Nevertheless, judiciously applied force will always continue to be a valuable aid in some cases. The aim of the surgeon should be to replace the bone by manipulation when possible; as a rule this is easy when the patient has been thoroughly anæsthetised.

By movements of flexion, extension, adduction, abduction, or circumduction, the bone is replaced noiselessly in its capsule, the exact nature and degree of movement being determined by various factors, such as the formation of the joint, the extent of the rent in its capsule, the displacement of tendons, &c. Sometimes when complete narcosis has taken place the bone may be, as in shoulder dislocation, easily replaced in its socket by the direct pressure of the fingers upon its articular extremity.

Should an anæsthetic be not available or contra-indicated, steady traction is to be made in the direction of the new axis of the limb till the

resistance of the muscles is almost completely overcome, when the bone may be felt to slip into its place with a snap, being replaced by the action of its own muscles, as is witnessed in the reduction of dislocations of the humerus by placing the heel in the axilla, and making steady, forcible traction upon the limb. Often, patient and gentle manipulation will achieve this by tiring the muscles without any appreciable degree of force being employed, and the writer, when resident surgeon in a large hospital for two years, nearly always reduced shoulder dislocations without chloroform in this way by raising the arm upwards, the bone being manipulated into its socket at a moment when the muscles were taken unawares, or during a brief period of relaxation, exhaustion or faintness, the heel in the axilla being very rarely resorted to. Dislocation of the lower jaw is readily reduced without anæsthesia by inserting the thumbs into the mouth and steadily pressing downwards behind and outside the last molar, whilst the chin is elevated to permit the condyle to slip into its socket. Dislocations of the hip in all recent cases can be reduced by manipulation under chloroform. The surgeon uses the femur as a lever to replace the head through the torn capsule by executing the movements of flexion, rotation, abduction, or adduction, according to the position of the displaced bone.

In old-standing dislocations considerable force must be used, but even then pulleys are seldom required. It becomes a serious question to determine the limit of time since dislocation, which should prohibit some attempt being made to replace the bone. Valuable, indeed indispensable, information will be gained by X-ray examination of old dislocations. The humerus has been replaced after six months, and even after the lapse of a year. The hip has been reduced in several cases after six months, but many instances are on record where death from rupture of arteries has supervened upon attempts at reduction in long-standing dislocations. It will therefore be necessary in many old-standing dislocations (and exceptionally in recent ones also) to cut down upon the end of the displaced bone, and if this cannot be then replaced it will be found necessary to excise a portion of it. When the normal socket is found to be obliterated with new fibrous growth and a fairly useful new joint has been formed around the end of the displaced bone, matters should be allowed to remain as they are. It is not necessary to enter into a detail of the various manipulative manœuvres required for the reduction of luxations of the several joints of the body; these will in each instance be dictated by a knowledge of the anatomical peculiarities in the formation of the affected joint.

After the bone has been replaced an ice-bag or evaporating lotion should be applied to the joint. Some apparatus or bandage will be necessary for a time to prevent the bone slipping out again through the rent in the capsule, especially when the laceration has been extensive, but the mistake most generally made is to keep the joint too long at rest. Gentle movements should be commenced early, not later than one week, and the absorption of effused products promoted by massage. This is especially

necessary in the elbows of children, and excessive care has been responsible for numberless ankylosed elbows. Most surgeons now commence with massage immediately after the reduction of all dislocations and carry out passive movements daily, avoiding the movement likely to bring the end of the bone opposite to the rent in the capsule.

Dislocations complicated with fracture, especially common about the shoulder-joint, should be always reduced if possible by manipulation, after which the fracture is to be treated. When manipulation fails the operation of arthrotomy should be at once resorted to, and the head of the bone fixed to the shaft by screws or wire sutures; sometimes resection may be necessary.

Recurring dislocation of the shoulder may be prevented by the habitual use of a leather splint apparatus, but the only satisfactory treatment in chronic cases is the performance of capsulorrhaphy, and in some cases the relaxed and widened capsule may be diminished in capacity by "reefing" without opening the joint; the glenoid cavity has sometimes been deepened by the surgeon.

DROPSY.

Treatment can only be commenced after a careful examination has determined the cause of the anasarca, and the removal of the swelling will be effected by those remedies which exert a specific action upon the primary disease. Thus in cardiac dropsy the effusion into the cellular tissue being mainly the result of diminished arterial and increased venous pressure, the proper treatment will consist in raising the power of the cardiac muscle by cardiac tonics and stimulating the kidneys by diuretics, as will be described under Heart, Valvular Diseases of. The dropsy of hepatic cirrhosis and portal thrombosis is due entirely to obstruction in the portal venous system, and is to be treated by tapping the peritoneal cavity or by establishing a new route for the blood to reach the heart, as described under Ascites.

Renal dropsy, whose treatment is described under Bright's Disease, must not be regarded as merely the result of the accumulation of water in the system owing to its faulty elimination through the diseased kidney; the altered condition of the blood and of the endothelial lining of the small bloodvessels are very important factors which must receive attention, hence the necessity for the elimination of waste products and the signification of a salt-free diet which, by diminishing the amount of sodium chloride in the exuded liquid, tends to cause its absorption by the peripheral vessels.

The blood condition is the primary agent in the production of the anasarca of anæmia, chlorosis and beri-beri, and of the local swellings in erythematous or urticarial affections, and should be met by free administration of Calcium Salts.

Angio-neurotic œdema or the anasarca of Quincke is little influenced by treatment; the only danger is through obstruction of the larynx caused by anasarca about the glottis, in which case a free scarification of the

swelling or even a high tracheotomy operation may be indicated. The cause of the disease will probably be found to be a toxin like that produced in urticaria, whose selective action is upon the peripheral vaso-motor nerves; hence a large dose of a Saline Purgative in strong solution should be given. Codd has succeeded in cutting short the attack by injecting 4 mins. solution of Adrenalin, and Dryland recommends ½ gr. dry Thyroid thrice daily, which checks or prevents attacks and relieves the severe vertigo. Osler has found benefit from the administration of Nitroglycerin. Chloride of Calcium should always have a trial, and this acts beneficially in the allied œdema occurring in Henoch's purpura.

DROWNING.

As soon as the apparently drowned is removed from the water, artificial respiration should be commenced without a moment's delay, Shäfer's method being employed. The body should be placed horizontally on the bank, with the back upwards and the left side of the face resting on the ground, no attempt being made to remove the wet clothing or to cause inversion by raising the feet. The operator places himself astride the patient's body by kneeling upon the ground and applies each hand with his fingers widely apart over the lowest ribs, the thumbs being planted upon either side of the spine in a parallel direction pointing towards the patient's head. The operator's elbows being kept extended, he next steadily leans forward so as to throw through his hands the weight of his own trunk upon the lower part of the patient's chest in order to effectually compress the thorax and expel the air contained in the lungs and any water which may have been inhaled. He then rapidly swings his own body backwards without letting go his touch of the patient's chest in order to permit the ribs to resume their normal position and draw in a fresh supply of air as the pressure is suddenly removed. The alternate compression and relaxation of the thorax is continued every five seconds without pause between the movements, and the operation is persisted in till natural breathing is established or till the hopelessness of resuscitation is obviously demonstrated. The operator need give no thought to the position of the tongue; this cannot fall backwards and block the air passages, and he should lose no time by inverting the body, as the "face-down" position facilitates the expulsion of water through the mouth.

Life often has been saved after more than an hour's continuous performance of artificial respiration when no signs of vitality have been present, and the operator should not desist from his efforts till thoroughly satisfied that the task is absolutely hopeless.

Where the period of *complete* submersion has been known to extend over several minutes the operation is of no avail. Two minutes of submersion have been regarded as fatal, but the writer at a private séance timed a professional swimmer who remained under water in a large glass tank for 4 minutes 5½ seconds, his features being under observation all the time.

Whilst resuscitation is being carried out, assistants may be employed

in rubbing and applying warmth to the extremities. As soon as spontaneous breathing occurs, the patient should be turned upon his back and the wet clothing replaced by warmed blankets, friction being assiduously carried on over the extremities, always in the direction which promotes the flow of venous blood towards the heart. As soon as possible he should be removed to a warm bed and hot-water bottles applied to the surface of the body.

Any threatening of stoppage of the breathing must be met by a return to artificial respiration; Laborde's method of rhythmical traction of the tongue is very convenient at this stage should it arise. Some authorities recommend the induced current with one pole applied over the phrenic nerve in the neck and the other over the sixth interspace between the right axillary and mamillary lines so as to induce vigorous contraction of the diaphragm, the poles being applied at the moment that the artificial inspiratory act is being performed.

Hot drinks containing a moderate amount of alcohol may be administered as soon as the patient is able to swallow, but as a rule stimulants should be withheld till the patient has been enveloped in warm blankets and placed in bed. A large dose of alcohol administered when the individual's body is still chilled in transit towards the nearest house is liable to cause a further loss of natural heat; the opposite effect follows when the stimulant is given after he has been put to bed and surrounded with warm-water bottles.

Barreiro maintains that in drowning there is an intense congestion of the brain and spinal cord as well as compression of the lung by elevation of the diaphragm owing to the amount of air and water swallowed, and the heart dilates. Blood-letting is part of his routine, and he opens a leg vein so as not to interfere with artificial respiration. For the artificial respiration he places the patient in a sitting posture, with the head and shoulders well raised, so that the weighty abdominal viscera draw down the diaphragm and thus aid the artificial movements which the attendant executes whilst placed behind the patient, supporting his back with one knee. The movements consist of alternate compression and expansion of the thoracic walls by the arms of the patient as in the older methods of resuscitation, whilst an assistant performs rhythmical traction on the tongue.

For the writer's views upon the nature of so-called "swimmer's cramp," which is a common cause of drowning, see p. 190.

For the practical methods of rescuing drowning persons whilst struggling in the water the reader is recommended to study the illustrated handbook of instruction which is issued by the Royal Life Saving Society, and which should be in the possession of every physician and swimmer. (*It* can be obtained by application to the London office of the Society for 1s.)

DUODENAL ULCER—see under Gastric Ulcer.

DUPUYTREN'S CONTRACTION OF THE PALMAR FASCIA.

In very slight cases the deformity may be kept from extending and even a cure may be sometimes effected by constant passive movements

and massage with the careful application of a well-padded metal splint worn every night so as to keep the fingers fully extended by the use of elastic tractors. In the majority of cases this treatment, however, is useless, but before resorting to surgical operation the hypodermic injection of Fibrolysin or Thiosinamin should be tried and repeated for at least 20 times, 2 c.c. of Fibrolysin being injected into the palm of the hand, though any other region as the buttock may be selected. Many cases are on record where this treatment has caused entire absorption of the pathological fibrous tissue whose slow contraction produces the deformity. Massage, passive movements and splints should be used at the same time.

The operation of subcutaneous division of the fibrous bands by a number of separate punctures avoiding the transverse palmar crease gives immediate results and permits of the extension of the fingers, but relapses are the frequent outcome of this method even when a splint is assiduously applied afterwards.

The favourite procedure is to make a V-shaped incision and openly dissect back a flap of skin, removing entirely all the bands of fibrous tissue with the prolonged processes of normal fascia which go to the sides of the phalanges; when the deformity is reduced the sutured wound assumes a Y-shape.

Kocher insists upon thorough *extirpation* of the thickened and shortened palmar fascia with its extensions, after simple longitudinal incision of the skin of the palm. He holds that no operation can guarantee against relapse unless it include prophylactic excision of healthy parts of the fascia.

Hutchinson advises the shortening of the affected finger by excising the head of the proximal phalanx. This relieves the deformity by allowing the finger to straighten out without dragging on the contracted bands.

The writer would suggest that perhaps the best method of treatment will be found to be the old subcutaneous fasciotomy followed up by massage, extension and splints, combined with a prolonged course of fibrolysin injections to prevent relapse.

DYSENTERY.

The experience of the host of observers working on the various battle fronts in the great world war has cleared up many doubtful points in the prevention and treatment of this disease. Rational treatment can only be entered upon after an examination of the stools, which will demonstrate whether the attack is one of *amœbic* dysentery (*Amœbiasis*) or of ordinary *bacillary* dysentery.

Preventive or prophylactic measures are practically the same in both types, and are of vital importance in travelling in the tropics, in war and in the regulation of life in barracks, jails and asylums and in all regions in time of famines or scarcity of food supply and other depressing conditions. The destruction of the excreta by fire, disinfectants, or deep burying in the soil and the boiling and filtering of all water used for drink-

ing or washing purposes should be rigidly carried out; fruit should never be eaten till thoroughly cleansed, and the most thorough cleanliness of bed and wearing linen, &c., is important. Flies play an important part in the spread of amœbic dysentery, but the chief agent to be searched for and found out is the presence of the human carrier, whose stools may be loaded with cysts, though he appear to be in perfect health. The remedy for the carrier danger consists in a ten or twelve days' continuous treatment by ½ gr. Emetine twice daily or a course of Thymol and Calomel. The Lister Institute Serum is prophylactic against bacillary dysentery, and immunity in epidemics has been established by Shiga Vaccine.

As soon as the symptoms indicative of an acute attack of either type of dysentery are observed the patient should be ordered to remain in bed; his food should consist of small quantities frequently administered of a liquid food as barley water, albumin, peptonised milk or light soup, chicken jelly or meat essences.

Notwithstanding the presence of diarrhœa and tenesmus it is a good routine to administer a smart purgative at the beginning of the illness.

Three types of cathartics, each having their strong advocates, are in ordinary use both at home and in the tropics; these are Castor Oil, Salines and Calomel. The former is much used and never can do harm. Salines are more speedy in their action of sweeping out the contents of the intestines, and by many authorities the plan of administering Sulphate of Soda or Magnesia in drachm doses 4 or 6 times a day is kept up after the administration of the large initial dose. Calomel in one dose of 5 to 10 grs. is a favourite drug for starting the treatment.

Bacillary Dysentery.—The best routine consists in the immediate administration of 80-100 c.c. Antidysenteric Serum intravenously in all severe cases, followed next day by 40 c.c. hypodermically. Mild cases may be treated by subcutaneous injections of 30-50 c.c. The administration of mild saline purgatives may be safely continued for a few days. In collapse the intravenous injections of Normal or Hypertonic Saline solution with Adrenalin are invaluable. After suspension of saline purgation, Bismuth in full doses with moderate amounts of Opium and Salol affords the best results.

Chronic Bacillary Dysentery.—Rogers in chronic cases recommends his Vaccine, consisting of sensitised Shiga and Flexner bacilli. The after-treatment consists in the discriminating use of such agents as Bismuth Salicylate, Opiates, and vegetable astringents, alternating with short courses of minute doses of Calomel.

Ipecacuanha or Emetine is not indicated in bacillary dysentery, but as it is practically harmless it may be administered as in the amœbic type till a microscopic examination of the stools demonstrates the absence of amœba.

The plan of treating chronic forms of the disease by Appendicostomy and washing out the colon with antiseptics is apparently less effective than large rectal injections of Silver Salts, as Albargin ½ dr. in 30 oz. water, recommended by Rogers.

Amœbic Dysentery.—Treatment by Ipecacuanha is firmly established by all recent war experience. Emetine, its active alkaloid, is now the routine in every case where amœba or cysts are found in the stools; 1 gr. of Emetine should be given subcutaneously every day for 10 or 12 days. Some authorities recommend ½ gr. daily by the mouth in divided doses during the course of injections. Complete success follows in the great majority of cases before the seventh day. As regards saline purgatives, though rationally indicated, their use retards the action of the Emetine by hastening its elimination, and it is generally advisable to give small doses of Opium during the injections. Dale recommends the double Iodide of Emetine and Bismuth in 3-gr. doses by the mouth, but the drug causes vomiting. In severe collapse Saline intravenously should be resorted to, and though the injection of Antidysenteric Serum is rationally indicated only in the bacillary type of the disease, some authorities do not hesitate to inject 80-100 c.c. into a vein, and this is clearly justified in grave cases before a diagnosis can be made from the stools.

Flushing of the colon by various antiseptics, Tannin, Quinine, Permanganate, Copper, Mercury, and Silver Salts, has not found much favour. Tenesmus and pain may call for small Enemata of Laudanum or Morphia Suppositories or a large enema of Liquid Paraffin (20-40 oz.).

Emetine treatment certainly seems considerably to reduce the supervention of liver abscess.

Chronic Amœbic Dysentery is often intractable, whether following acute attacks which have been treated by Emetine and have relapsed or in those cases where treatment has been neglected from the first. Emetine should be administered as soon as a chronic case comes under observation, and here again hypodermically rather than by the mouth. Bismuth in large doses, Liquid Paraffin, Salol, the so-called intestinal antiseptics, and every drug useful in colitis, has had its advocates. Quinine is useless either by the mouth or in strong solution as an irrigator of the colon. Ulcers in the lower end of the bowel may be locally reached by caustics through the protoscope, and those higher up by large enemata of Albargin 1 in 500 or Nitrate of Silver 5 grs. to 1 pint. Short courses of minute doses of Calomel $\frac{1}{6}$ gr. thrice daily, alternating with the Bismuth or Salol treatment and followed by a few days of Saline purgation, may be tried. Appendicostomy and flushing with an antiseptic solution should be a last resort.

DYSIDROSIS, POMPHOLYX, OR CHEIROPOMPHOLYX.

In the acute itching stage the best application will be 1 dr. of Liquor Carbonis Detergens, and 15 mins. Liq. Plumbi Fort. with 1 oz. of Cold Cream or Vaseline. Unna believed the disease to be the result of a specific bacillus; hence many authorities advise frequent bathing of the affected parts with antiseptics, and since only the hands are generally involved this is easily carried out by soaking the skin in diluted Jeyes' Fluid, Lysoform, Salicylic Acid, Permanganate or weak Perchloride of Mercury solutions. When the vesicles appear the patient should be at once put upon Arsenic and a liberal diet; 5 mins. of Fowler's Solution need not be

exceeded. Tilbury Fox recommended diuretics. Iron, combined with the arsenic at a later stage, appears to prevent new crops of vesicles or bullæ making their appearance. Pringle states that alcohol, tea, and tobacco are injurious. Everything that improves the tone of the nervous system and increases the body nutrition should be persisted in.

Graham Little points out that many of the cases supposed to be dysidrosis are really examples of eczematoid ringworm; when the feet are attacked this should rouse suspicion.

DYSMENORRHŒA.

Practically every civilised woman suffers from more or less discomfort and malaise at the menstrual epoch, such manifestations as pain and weight in the back and loins, some abdominal cramp, headache, and a general sense of lassitude being very common. When these unpleasant sensations become severe enough to merit the name of dysmenorrhœa it is perhaps difficult to decide, as we have no measure for pain, but it may be taken as a rough-and-ready rule that a woman has dysmenorrhœa when the pain associated with menstruation is sufficient to disable her for a shorter or longer time from following her usual avocations.

From what has been said above it follows that there is a whole class of cases of dysmenorrhœa in which the disability has no relation to any pelvic affection, but is the direct result of a general condition which causes the normal menstrual malaise to be felt much more acutely than it is by a normally healthy woman. Such cases may be divided roughly into a *neurotic* and an *anæmic* type, and most of these cases are found in girls and young women who are still unmarried. It is in such cases wisest for the physician to ignore as far as possible the sexual organs and to avoid at first any local examination or therapy. A persevering trial should be given to measures adapted to restore the general health, chief among these being strict attention to the hygiene of diet, sleep, rest and exercise, with the administration of tonics such as Iron, Arsenic, and Strychnine, and insistence on saline aperients. (See also articles on Anæmia and on Neurasthenia.)

It is often advisable to combine with these general remedies some measures more particularly adapted to the relief of the menstrual pain. One of the most useful is *rest in bed,* which should be insisted on at first for the entire menstrual period, and afterwards for at least the first day. The drugs most likely to be useful are *aspirin* in 5-10 gr. doses repeated if necessary, *phenacetin* in 5-gr. doses repeated at intervals of 2 hours for three doses, *apiol* in 1-gr. capsules every 3 hours, *guaiacum* in 10-gr. powders three times a day for a few days before the menses are expected, *tannate of cannabin* 2 to 4 grs. three times a day for a week before the period, *bromide of soda* 40 grs. administered *per rectum* in half a pint of warm saline solution. The two things to avoid are *alcohol* and *opium,* but in the worst cases a hypodermic of morphia may be indispensable. A hot bag to the abdomen is often useful, so is a hot water and mustard footbath. Blisters to the spine have also been recommended.

When a fair trial has been given to these remedies without any relief being afforded, it is, I think, best in all cases to suggest to the patient or her friends a pelvic examination, which should be made under an anæsthetic in the case of an unmarried woman, with permission to perform any minor operative procedure indicated as advisable by the examination. In the case of a married woman, a pelvic examination should precede any efforts at treatment. The operative treatment of the case will depend, of course, on the condition found.

1. There may be no pelvic lesion or abnormality discoverable. In this case the condition is probably a *spasmodic dysmenorrhœa*, the pain being caused by cramp-like contractions of the uterine muscle, especially of that surrounding the internal os, and the appropriate treatment is to dilate the cervix up to 12 or preferably 14 Hegar, so as to overstretch the muscular fibres of the internal os and so obviate their abnormal contraction. After dilatation it is well to curette the uterus, as there may be an abnormal sensitiveness of the endometrium which will be relieved by curetting (see Endometritis). Permanent relief is more likely to be gained if the cervical canal, after dilatation and curetting, is packed for 48 hours with a strip of iodoform or bismuth gauze, which seems to produce a "vital dilatation" comparable to the effect produced on urethral stricture by tying in a bougie or catheter. This is successful in from 40 to 50 per cent. of cases; in others it gives temporary relief, and should be repeated when the dysmenorrhœa returns; and in others it is without effect. It is most likely to be successful when the dysmenorrhœa is of extreme severity, but only lasts a few hours. In the most severe and intractable type of these cases, as well as of those belonging to the next section, the question of removing the ovaries will probably arise as a last resort from the pain. The practitioner should be very chary of giving his consent to this operation. He should be perfectly convinced not only of the existence of unbearable pain, but of the fact that the pain is having an injurious effect on the patient's general health. He should remember that castration has its own evils in the shape of a premature menopause, and the nervous disturbance that accompanies it, and he should not forget that the removal of painful ovaries is not always followed by the disappearance of pain referred to them. The more experience one gains in gynecological work, the more one becomes convinced that removal of both ovaries in a young woman is seldom or never justifiable. The same objections are not present to the removal of the uterus, and although this measure necessarily condemns the patient to barrenness, that is the less to be deplored, as most subjects of intractable dysmenorrhœa are also sterile. Whether it will be as efficacious can only be proved by trial.

2. A pelvic lesion or abnormality may be present and be the cause of the dysmenorrhœa. A common form of pelvic abnormality found in cases of dysmenorrhœa is some *failure of development of the uterus*. In extreme cases the uterus may be represented by a mere knot of tissue, and these usually prove very intractable; sooner or later the question of removal of the rudimentary uterus or of the ovaries is sure to arise and must be

settled on the lines already suggested. Short of this no operative interference is likely to do good, and general measures must be relied on. In other cases the uterus is infantile in type, the cervix being fully developed, but the body undeveloped. These cases are not very amenable to treatment, but I think they benefit sometimes from curetting and packing with gauze. Again, the body of the uterus may be poorly developed and may be acutely anteflexed on the cervix, which is often narrow and conical. Many of these cases are relieved by dilatation and curettage; in some I have got good results from Dudley's operation, in which the posterior lip of the cervix is split up, and by the excision of a half-diamond-shaped piece on each side and subsequent transverse suturing the external os and cervical canal are brought into line with the axis of the uterine cavity.

In a number of cases examination reveals a condition of *endometritis*, either a true chronic inflammation as shown by the discharge of mucopus, or a hyperplasia of the endometrium, sometimes associated with dilatation of the capillaries. The endometritis may be combined with retroversion of the uterus. Such cases are usually benefited by dilatation and curetting. (See under Endometritis.)

In other cases examination shows the presence of an *erosion*, often an unsuspected cause of dysmenorrhœa as of other symptoms. In my experience the only certain cure for this condition is to slice off the affected cervical mucous membrane much as one shaves off a skin-graft. I have tried various caustics, phenol, formalin, and fuming nitric acid, but with very disappointing results. After shaving off the erosion the upper end of the vagina should be packed with iodoform gauze, and after its removal a daily douche should be given for a week.

In about half the cases of *fibroid*, dysmenorrhœa is a symptom and may be the only symptom of the presence of the tumour. The pain is, however, usually caused by the excessive loss of blood; clots are formed in the uterine cavity, and cramp-like contractions of the uterus are required to expel them. In a number of cases a very small fibroid situated at the internal os has been shown to be the cause of dysmenorrhœa. The remedy is the removal of the fibroid, with or from the uterus. (See Uterine Fibroids.)

Another type of case is that in which the dysmenorrhœa is a symptom of disease of the ovaries or tubes, usually inflammatory. The amount of pain is no criterion of the extent of the mischief. Many of these cases may be benefited by measures adapted to the relief of the tubal or ovarian congestion. (See Ovaritis, Pyosalpinx, Salpingitis.)

In still another type of case there is retroversion with endometritis. (See under Endometritis and Retroversion.)

Electrical Treatment of Dysmenorrhœa.—Electrical treatment in diseases of women has rather fallen into disrepute. Latterly, however, some records of encouraging results have appeared, and in inveterate cases it is worth trial. The galvanic current is most generally useful. The positive pole, usually a copper plate covered with flannel moistened

with saline solution, is placed over the lumbo-sacral region, and the negative pole, which takes the form of a copper sound insulated up to 2½ inches from the tip, is introduced into the uterine cavity under strict antiseptic precautions. The strength of the current should be at first 5 milliamperes, which is gradually raised to 25 milliamperes, the first complaint of pain being a signal to stop. The current is allowed to pass for 3 to 5 minutes, and the séance may be repeated twice a week during the intermenstrual period. The presence of pus tubes or ovarian abscess is a contra-indication to the treatment. The faradic current has also been used to lessen pelvic congestion, and high-frequency currents have been employed with benefit in neurotic cases. It is at least questionable whether much of the benefit supposed to be derived from electrical treatment is not due to suggestion. In exposure to the X rays we have a means of sterilising the patient without removal of the ovaries, and to my mind it is much to be preferred to that operation should the question of obtaining an artificial menopause arise.—R. J. J.

DYSPEPSIA.

In displacing the term "Dyspepsia" by that of "Gastric Neuroses" confusion has risen. Dyspepsia may in its varied phases be accepted as the predominant symptom of these affections, as it also is of many truly organic diseases of the stomach, but the treatment of functional affections of this organ has been plunged into hopeless confusion by regarding all cases where acute or chronic indigestion is the main symptom as falling under either organic disease of the organ or a gastric neurosis, or as the result of gastritis.

Similar confusion has arisen in the treatment of diarrhœa owing to the craze for classifying this symptom under the various headings of "Enteritis," and the student is advised to read the article on Diarrhœa in association with the remarks which here follow on the treatment of dyspepsia.

To simplify the subject we may define dyspepsia as purely a *symptom* of gastric indigestion or of some perverted or retarded action in the normal digestive process. Accepting this definition, we may safely affirm that numerous cases in which disordered digestion is the prominent feature are constantly presenting themselves for treatment in which there is no gross structural lesion or any active inflammatory condition present, and in which the function of the nervous mechanism is working normally. For convenience such cases may be considered as examples of *simple dyspepsia,* regarding the condition solely as a symptom-complex and not as a disease.

The first step in treatment is to determine the causal agent and effect its removal. In acute attacks this may be: (1) some irritating substance introduced into the healthy stomach generally in the form of improperly cooked food, as baked fat meat or pork, food which has already commenced to undergo putrefactive change, warm freshly baked bread or cakes, improperly made pastry, unripe fruit, acid beer, wine or cider, or even

large draughts of iced water; (2) the food may be normal in every respect, but taken in such amount as is beyond the power of the gastric juice to cope with; (3) the quantity and quality being normal, it may be bolted hastily in such unmasticated lumps as will only permit the digestive juices to operate upon the outer layer of each mass, the normal process being thus prolonged and secondary fermentative changes set up; (4) the same results will follow when the intervals between the meals are so short as to prevent the stomach being emptied before another supply of food is introduced; or (5) an acute attack of dyspepsia may result from indulgence in an ordinary meal of solid food after a very prolonged fast.

Should these errors be persisted in a true catarrhal inflammation of the mucosa will become established, but such gastritis should be regarded as the *result* and not the *cause* of the dyspepsia, a condition of affairs exactly corresponding to the diarrhœa which results from the irritation of the intestines by cathartics, which is usually described wrongly as being of inflammatory origin.

An attack of *Simple Acute Dyspepsia* is best treated, if severe, by the administration of an emetic if nature does not effect relief by vomiting, after which all symptoms of pain, nausea, and distension rapidly disappear. The best emetic in these cases is a copious draught of lukewarm water or a pint of warm infusion of Chamomile Flowers, assisted if necessary by tickling the fauces; the large quantity of water will also often afford considerable relief by diluting the irritating contents of the stomach. Where intense acidity is the predominating feature of the distress a large dose (1 to 2 drs.) of Soda Bicarb. in a tumblerful of cold water will often give immediate relief by neutralising the organic acids produced by fermentation. The after-treatment will consist in a short period of judicious starvation and the administration of a purgative if diarrhœa has not already followed.

Simple Chronic Dyspepsia may be the result of similar errors in feeding, and the correction of these will effectually cure the condition and prevent recurrences. In many instances the physician by careful and conscientious investigation may find that the error in diet arises from a too restricted dietary, the patient having eliminated one article of food after another under some fanciful theory that each is injurious, whilst the cause of the condition may be due to irregularity in the meal hours or other unsuspected error. Of all the articles of diet, perhaps no single one is so frequently responsible for simple indigestion as the pernicious custom chiefly prevailing amongst women of indulging in tea between meals and sometimes at all hours of the day. This is seen constantly amongst the female operatives in mills and factories, whose chief meals consist largely of tea often infused or even boiled for long periods. Though this type of chronic indigestion is classified amongst the gastric neuroses or as a form of gastritis, it nevertheless usually disappears promptly and permanently when the cause is removed if no inflammatory or nerve disturbance has been set up.

A common cause is that of bolting the food hurriedly. This, contrary

to what is usually stated, is more frequently found amongst those who have good teeth than those who have imperfect or absent molars, because though in the latter mastication must be imperfect, the individual is usually conscious of his defect and takes his food more slowly. This form of dyspepsia can be at once recognised by a peculiar sparse furring of the tongue with prominence and redness of the papillæ, and one often meets with such patients who have gone the rounds of various physicians and used numerous drugs and elaborate diet lists without relief for months or even years; the correction of the bolting rapidly removes all dyspeptic distress.

Wind-sucking is sometimes the sole cause of an inveterate dyspepsia. After some temporary interference with the digestive process, as rapid eating or badly cooked food, the patient tries to belch up flatus in order to obtain relief; with each *voluntary* belching effort a larger amount of air is always swallowed or drawn into the stomach each time than the volume of expelled flatus, and the result is that a chronic habit is induced which is too often labelled as a form of gastric neurosis, especially as the flatulent distension may remain from the exercise of the habit long after the original cause of the dyspepsia has disappeared. Once the physician can convince an intelligent patient that he swallows more air than he expels, this symptom of chronic dyspepsia speedily disappears upon the discontinuance of the habit.

Another cause of simple chronic dyspepsia must be mentioned, as its correction is the main or only treatment necessary for the cure of the resulting failure in digestion. This is caries of the teeth, which, however, is a totally different question from imperfect mastication, though much misconception exists on this apparently trivial distinction. The hollow cavities of the necrosing molars harbour myriads of micro-organisms, which flourish in this rich culture-ground and are swallowed with each meal along with their soluble toxins. These undoubtedly interfere with the digestive process in the stomach, leading to a retardation of the normal time, and probably also by inhibiting the pepsin secretion fermentative changes are started. That the dyspepsia under these conditions is the direct result of microbic action, and not of imperfect mastication, is easily proven by placing the patient upon a purely liquid dietary, when no improvement will follow. The treatment is obvious: the patient's symptoms should not be prescribed for; he should be handed over to a dentist, who is to make a complete and clean sweep out of every diseased tooth, and it is astonishing to witness the change which often follows; the dyspeptic symptoms speedily disappear, appetite returns, and the weight increases.

It is obvious from the above examples of simple dyspepsia which do not fall under the modern classification of stomach ailments, but which perhaps are more common than the whole of the gastric neuroses group, how important it is to investigate every case when disturbed digestion is the prominent feature so as to find out the cause in each, instead of prescribing fancy diets and feeding the patient on drugs. A remark may be made about the most common of all varieties of dyspepsia, though it

seldom comes under the physician's care. This shows itself in perfectly healthy individuals with an apparently normal condition of stomach, but where an attack of acute dyspepsia always follows the ingestion of a particular article of diet which other healthy and even dyspeptic patients may eat with impunity—the condition is akin to the idiosyncrasy which the physician meets with occasionally in prescribing certain drugs. As the patient of average intelligence discovers his peculiarity for himself he soon learns to avoid the disturbing element in his dietary.

Though the removal of the cause will speedily effect a cure in the great majority of cases of simple dyspepsia, nevertheless a few remarks may be made about the general regulation of the dietary and the use of routine medicinal aids which tend to expedite recovery.

The fashion of giving the patient a printed or written cut-and-dry list of the different meals of the day should be avoided when possible. Flint's statement may be accepted as a truism applicable in most instances: "I have never known a dyspeptic recover vigorous health who undertook to live after a strictly regulated diet, and I have never known of an instance of a healthy person living according to a strict dietetic system who did not become a dyspeptic, and that in a great number of cases in which persons have been sufferers for years on a regulated diet, health has been speedily regained by simply eating in accordance with appetite." The explanation of this lies probably in the fact that the original error having been long since corrected, the stomach is weakened by the prolonged restriction imposed by the artificially framed diet, just as a joint becomes useless by the long-continued rest which is insisted upon by the timid surgeon who refrains from prescribing exercise. One rule should never be departed from in any case: the patient should be prohibited from taking *baked* animal food in every form and from eating meats which have been *re-cooked*. The meal hours and the intervals between these must be well regulated and never departed from unless the causes are quite unavoidable; an average of 4 or 5 hours between each is desirable, and in subjects liable to attacks of acute dyspepsia from whatever cause the late dinner hour with its necessary heavy meal had better be avoided. The masticatory apparatus must be put into proper order, bolting in haste must be warned against, tea and coffee between meals, and large quantities especially of cold fluids at meal-times must be forbidden. Rest of mind and body for a short time after food is essential, and breakfast should not be swallowed immediately after getting out of bed. Predigested or peptonised foods are as a rule not indicated in simple dyspepsia, and no case can be considered as cured till a fair amount of fresh vegetables can be introduced into the dietary.

Measures which improve the tone and vigour of the general system are indicated, as suitable clothing (Brunton recommended an abdominal flannel binder); a healthy residence upon an elevated, dry situation; open-air exercise; sea bathing; change of scene and, if convenient, of employment, with early hours; and freedom from occupations causing high pressure or mental worry. Agreeable society, especially at meal-times,

is of much use, and it is a good rule which prevents the dyspeptic from dining alone or reading while he sits at meals.

Drugs are not to be prescribed till the cause of the indigestion has been discovered and removed. After a long-continued abuse of the organ following any of the causes already mentioned the condition of gastric catarrh or a genuine gastric neurosis may have become established which will not yield immediately upon the withdrawal of the exciting cause, in which case the condition will require the exhibition of the remedies mentioned under Gastric Neuroses and long and patient administration of gastric sedatives, digestive agents and probably lavage.

Valuable indications will be obtained on recognising two types of stomach condition following prolonged errors in dietary, irregularity in meals, improper methods of eating, dental caries, wind-sucking, &c. These are the conditions which were formerly described as *atonic* and *irritative* dyspepsia when dyspepsia was erroneously regarded as a disease and not as a symptom of many diseased processes in the stomach. Thus in the atonic state of the stomach before dilatation has set in much benefit will be obtainable by the administration of Vegetable Bitters before meals and the use of Pepsin after food, as in the following combinations:

℞ *Tr. Nucis Vomicæ* ℥iij.
Ac. Nitro-hydrochlor. Dil. ℥iij.
Tinct. Aurantii ℨss.
Infus. Calumbæ ad ℨviij. *Misce.*

Ft. mistura. Capt. ℨss. *ex* ℥j. *aquæ ante cibum.*

When symptoms of gastric acidity predominate the above sometimes checks the trouble, but should they continue the acid must be omitted.

℞ *Glycerini Pepsinæ* ℨiiiss.
Acid. Hydrochlor. Dil. ℥j.
Tr. Chiratæ ℨss. *Misce.*

Ft. mistura. Capt. ℥j. *ex paululo aquæ hora post cib.*

When, however, the feebleness of the gastric function permits the food to remain so long in the stomach that secondary fermentative changes occur with the production of large quantities of lactic, butyric and other organic acids, the administration of hydrochloric acid is a mistake. This drug can never exert any real local antiseptic action on the ferments in the diluted strength in which it is only permissible to prescribe it. Creosote or Carbolic Acid may be substituted for it in 2 min. doses, or one large dose of Sodium Bicarbonate may be administered.

Papain is clearly indicated in such cases, as it will act as a digestive in the presence of a marked alkaline reaction; this enables the physician to correct the organic acidity and at the same time to hasten the retarded digestive process. The following combination is the most valuable

routine remedy under such circumstances, and indeed under most of the conditions met with in chronic gastric ailments even when organic lesions are present:

℞. *Papain. Purif.* *gr.* iij.
Sodii Bicarb. *gr.* xxx.
Mag. Carb. Pond. *gr.* xx. *Misce.*

Ft. pulvis. *Mitte tales* xxiv. *St.* i. *ex paul. lactis ter die p. cib.*

A more convenient plan is to prescribe the papain and alkali in bulk—Papain ʒij., Mag. Carb. Pond. ℈iss., Sodii Bicarb. ℈iij. Menthol ʒss., of which a level teaspoonful may be given in a wineglassful or more of milk.

As soon as the atonic state of the stomach has yielded to dilatation the question of lavage, massage, &c., must be considered; the condition then may be regarded as having passed out of the category of a simple dyspepsia or chronic gastritis into that of a gastric neurosis (which see).

In the irritative type of dyspepsia as shown by the small, red, clean tongue, with a tendency to nausea and loss of appetite, vegetable bitters do more harm than good, probably because more or less catarrhal inflammation is present. The treatment should consist in the employment of gastric sedatives, amongst which Bismuth stands high, though its virtues are greatly overrated. Other gastric sedatives should always be combined with it, as in the following:

℞. *Bismuthi Carb.* ʒiv.
Acid. Hydrocyan. Dil. ʒss.
Liq. Morphiæ Hyd. ʒiss.
Mucilaginis Recentis ℈ij.
Aquæ Chloroformi *ad* ℥viij. *Misce.*

Fiat mistura. *Cpt. cochleare mag. p.p.a. ter die ante cib.*

Bismuth may also be given with advantage as a cachet in 30-gr. doses, with $\frac{1}{18}$ gr. Morphia, or the above papain powders may be prescribed, with the addition of the same quantity of morphia to be taken within an hour after meals.

In either variety of simple dyspepsia the tendency towards acidity should be checked by diminished supply of carbohydrates and by giving freely undercooked red minced meat. C. McNeill treats successfully the *Dyspepsia of Children* (due to various causes) by 30 min. doses of Liquid Paraffin or 15 min. doses of Castor Oil thrice daily.

Constipation will usually require treatment, as the sparely fed dyspeptic patient is nearly always constipated; Aloes or Cascara, as described in the article on Constipation, will afford the best results. The occasional use of a natural purgative mineral water is also beneficial. Anæmia should be corrected by Iron, but this drug must be cautiously used in the irritative type of the condition, as it is liable to increase gastric distress, in which case it may be prescribed as Reduced Iron in a keratin-coated pill.

The dyspepsia caused by chronic valvular lesions and cirrhosis of the liver, which lead to passive congestion of the gastric mucosa, must be met by remedies directed against the primary disease combined judiciously with the administration of gastric sedatives and digestive ferments. The same remark applies to the dyspeptic condition so often caused by chronic renal affections and other toxæmic states, which must be relieved by eliminatory treatment.

See also under Gastric Inflammation, Gastric Neuroses, Acidity and Gastric Dilatation.

EAR, DISEASES OF.

Only an outline of the treatment of the various conditions can be given.

EXTERNAL EAR, Diseases of.

Eczema of the auricle and meatus often exist together, and may be acute or chronic. Its treatment differs in no way from that of eczema in other regions. When the auricle alone is affected, in the acute stage, Zinc Ointment to which 30 mins. Liq. Plumbi F. to each ounce are added should be freely smeared over the affected skin, and lint also coated with the ointment should be applied. When the acute stage has passed, 1 dr. per oz. of Liq. Carbonis Deterg. with 20 grs. White Precipitate should be added to the unguent.

In acute eczema of the meatus the best treatment will consist in filling the canal with Almond Oil or Liquid Paraffin, mopping this out afterwards with wool, and instilling a few drops of 1 in 40 Liq. Plumbi F. In the chronic stage the meatus should be daily cleansed with warm Boric Acid solution, and after drying with wool a solution of 10 grs. Argent. Nit. in 1 oz. Spt. Ether. Nit. should be freely applied on wool twisted round a probe, after which a piece of lint or wool smeared with the ointment may be loosely packed into the external meatus.

Hæmatoma of the auricle, when small in extent, may be relieved by the local application of ice; when it is extensive it is best treated by a free incision, and dressing with a weak Spirit Lotion (1 to 5) to which Perchloride of Mercury ($\frac{1}{2}$ gr. to 1 oz.) is added.

Perichondritis should be relieved in the same manner, and after free incision under antiseptic precautions a warm Boric Acid poultice should be applied till pain disappears.

Exostoses, when blocking up the meatus, are best removed by gouging, by grinding down with a dentist's drill, by sawing with the ecraseur, or by inducing caries through the use of the trephine.

Diphtheria, Erysipelas, and Herpetic Eruptions are treated upon the general principles indicated when these conditions affect other parts of the cutaneous covering; as erysipelas of the auricle and of the meatus is a common result of eczema and otorrhœa, the primary condition must be carefully attended to; a 1 in 5 Ichthyol solution is a good routine application.

Furunculosis.—The presence of small boils in the cartilaginous meatus causes intense pulsating pain and often an acute general inflammation of

all the tissues entering into the external ear with mastoid swelling. When the patient consents the speediest method of treating them is to administer a general anæsthetic, and with a sharp knife to make a deep incision into the inflamed spot without waiting for pointing of the abscess. The bleeding should be encouraged by warm Boric fomentations and the meatus flushed with a 1 in 1,500 Perchloride of Mercury solution.

Leeches to the auricle, followed by hot fomentations, may be tried before incising, and Cocaine—the pure alkaloid *dissolved* in warm oil (4 per cent.)—affords some ease when dropped into the meatus; but to relieve acute pain in the ear, whether from the meatus or the tympanic membrane, the best application is a solution of 10 per cent. each Cocaine and Carbolic Acid in water. A very few drops poured into the ear out of an eggspoon (previously warmed) seldom fail to give relief, but as the pain in furunculosis is due to greatly increased tension in the unyielding structures constituting the meatus, relief of pain by any means short of incision is very disappointing. Stein uses 5 grs. of Resorcin and 25 grs. Cocaine in 1 oz. water, and drops a little into the ear, where it is allowed to remain for a short time before being soaked out on wool. MacCuen Smith cleanses the canal with alcohol, and applies tampons of Camphor-Phenol (carbolic acid 45, camphor 55 parts). A 1 in 10 solution of Menthol in liquid paraffin is also often serviceable.

The liability to recurrences is great, and by far the best local after-treatment is the use of a Corrosive Sublimate solution to destroy the staphylococci which produce the furuncles. In the writer's opinion this solution is employed in too great dilution for this purpose. The following may be dropped into the ear once a day and the orifice plugged with cotton-wool moistened by the solution:

℞. *Hydrargyri Perchloridi* *gr.* ij.
Spirit. Vini Rectif. ʒvj.
Aquæ Destillatæ *ad* ʒiij. *Misce.*

Fiat solutio. Signa.—"*To be applied to the inside of the ear on cotton-wool.*"

Vaccine treatment is of great value in rebellious cases; the organisms may be cultivated after isolation from the discharge, and a subcutaneous dose of 100 to 500 million of the killed staphylococci should be injected. Rarely, however, will vaccines be needed if the above solution be conscientiously employed. Furunculosis of the meatus has become more common since the introduction of the telephone, and the use of the antiseptic lotion may be employed as a preventive.

Inflammation of the meatus caused by otorrhœal discharges, and not depending upon furuncles, may be speedily relieved by leeches, fomentations, and weak astringent injections, followed by dry Boracic Acid insufflations.

Fungi—Aspergillus fumigatus—are sometimes found infesting the

meatus. They may be easily destroyed by the above liquid instilled into the meatus so as to fill the canal for some minutes, after which a plug of cotton-wool moistened by the solution may be inserted. Each alternate day dry Boric Acid may be insufflated.

Cerumen, Epithelial débris and *Foreign bodies* in the meatus are best removed by syringing with warm water. A new or sterilised India-rubber enema apparatus answers very well, and it is hardly necessary to say that the nozzle should not be introduced *within the meatus*, but should be held within a few lines of its orifice. The auricle when pulled upwards and backwards permits the free flow of water in and out of the meatus, and by persevering for some time the stream, getting behind the cerumen or foreign body, forces it out. If this fails, variously shaped instruments devised for the purpose may be used; about the best is a loop of wire gently coaxed past the obstruction and drawn forwards. Sometimes when the plug has been rotated or tilted forward its edge may be grasped by a fine forceps and the mass delivered, but much harm may be done to the canal or tympanum by unskilful poking, and the novice should content himself with syringing alone.

When there is much difficulty in removing the wax, it will be well to adjourn operation for a time, as prolonged syringing sometimes causes faintness, tinnitus, and deafness owing to congestion or extravasation in the labyrinth. The introduction of a little solution of Bicarbonate of Soda (1½ grs. to each drachm) for a few days greatly assists in the removal of the wax. Papain, Glycerin and Peroxide of Hydrogen also assist the disintegration of wax and other concretions.

MIDDLE EAR, Diseases of.

Acute Catarrh of the Middle Ear, if severe, will be best relieved by a smart purge and the application of 2 or 3 or 4 leeches to the auricle or over the mastoid, and hot fomentations will encourage the bleeding from the bites, and give further relief. The Cocaine and Carbolic solution mentioned on a previous page may be instilled, but if the pain be severe and the tympanum found bulging, an incision with a fine, sharp, double-edged knife or needle should be promptly made, but this will be seldom needed.

When the symptoms are not very acute, the case often yields to a few inflations of the tympanum by Politzer's bag. By inserting the nozzle of the apparatus well up into the nostril of the affected side, and forcibly injecting air at the instant when the patient is in the act of swallowing a little water, the air is driven through the Eustachian tube, and obstructions caused by accumulations of mucus may be easily overcome, but in acute severe attacks inflation should be postponed till the exclusion of pyogenic infection is decided.

As the disease originates in catarrh of the naso-pharynx creeping up the Eustachian tube, the naso-pharynx should be douched with weak saline solutions—Boracic Acid, Chloride of Sodium, Borax, or Bicarbonate of Soda (100 grs. to ½ pint tepid water). It is a good practice to paint the naso-pharynx with a 25 per cent. Argyrol solution daily after flushing with

the alkaline solution, and the Chloride of Ammonium inhaler is a valuable adjunct to treatment. Dry Boracic Acid in fine powder may be blown up the nostril by means of an insufflator.

Should the catarrh resist the above treatment, and show signs of passing into the chronic form, the Eustachian catheter may be passed, and a weak astringent solution, if there be evidence of much mucous secretion, should be injected. The strength of the solution varies, but generally speaking about the strength of an eye lotion suffices—viz., 4 per cent. Boric Acid in warm water. If the tympanic cavity contain thickened mucus—the remnants of an acute attack—some experts make a linear incision in the tympanic membrane, and, through the Eustachian tube by means of the catheter, wash out the cavity by a stream of weak alkaline solution injected into the external meatus. Effused products in the middle ear may sometimes be removed by blistering over the mastoid.

Chronic Catarrh of the Middle Ear is to be dealt with on the lines laid down for the acute catarrhal affection; the Eustachian tube being generally blocked, constant inflation of the tympanum by Politzer's method, or the Eustachian catheter, must be frequently resorted to. The condition of the naso-pharynx will also require constant attention, local antiseptic and astringent applications being employed after flushing with saline or alkaline solutions. The Chloride of Ammonium Inhaler may be used several times a day with advantage. In very bad cases the incision of the membrane and the injection of alkaline solutions, as just mentioned, may be tried, or Leil's operation for division of the tensor tympani muscle may be suggested. Bronner advocates intratympanic injections of 20 or 30 mins. of a 3 per cent. solution of Bicarbonate of Soda, with equal quantities of glycerin and water or paroleine, injected by a Pravaz syringe through the Eustachian catheter, air being blown in afterwards. Another form of treatment is the injection through the Eustachian catheter of a few drops of a solution of Menthol 20 grs., and Thymol 5 grs., in 1 oz. Liquid Paraffin.

The presence of adenoids tends to keep up this condition, and their removal is essential to prevent recurrences.

The hygienic surroundings of the patient should be carefully examined and rendered as ideally perfect as possible. The use of alcohol and tobacco in every form is objectionable in both acute and chronic ear catarrh.

Eustachian Catarrh and *Obstruction* must be treated in the same manner by continual inflation and by the use of the Chloride of Ammonium Inhaler; this condition is responsible for many of the cases of dry deafness. The deafness following chronic catarrh causing fixation of the malleus should be treated by Oto-Massage and the hypodermic administration of Fibrolysin.

Acute Purulent Otitis Media is the result of the admission of pyogenic organisms more dangerous than those causing simple catarrh, and should at first be treated as if a case of acute simple catarrh of the middle ear, from which at first it cannot be distinguished. If perforation of the

membrane has already occurred, there may be afterwards difficulty in getting the opening to close. It is better for this reason to incise the membrane early if the case comes under notice before perforation has occurred. Müller strongly advises early paracentesis; he succeeded in 23 out of 24 cases, and no after-treatment was required. Constant syringing with warm weak antiseptic solutions (20 grs. Boracic Acid to 1 oz. water) must be carefully done at least twice daily, and oftener when possible, after inflation by Politzer's method, but early inflation before perforation of the tympanum should be avoided.

The naso-pharynx will require antiseptic treatment; a gargle of 1 in 80 Carbolic Acid, Chlorate of Potash (1 in 40), or a swab of Carbolic Acid and Glycerin (1 in 10), Tincture of Iron and Glycerin (1 in 2) or Argyrol solution (1 in 4) may be employed.

Mastoid swelling and tenderness may occasionally be relieved by one deep incision, but when pus is found the more radical operation mentioned later on must be carried out.

Chronic Purulent Otitis Media with its suppurative discharge is nearly always a sequel to an attack of the acute disease with perforation of the tympanum. The majority of cases follow scarlatina and measles. The treatment is tedious and often unsatisfactory, especially as regards the degree of the power of hearing which may remain, but the chief object to be attained is the prevention of the grave conditions which are liable to supervene, such as cerebral abscess, sinus infection, mastoid and meningeal troubles. These can only be avoided by the most scrupulous and persevering attempts at disinfection.

The Eustachian tube must be kept open by Politzer's inflation daily practised, and the patient may supplement this by Valsalva's method of closing the nostrils with the fingers, shutting the mouth and puffing out the cheeks while he swallows air.

Antiseptics should be employed to disinfect the naso-pharynx as a gargle of 1 in 80 Carbolic lotion, or a swab of 1 in 10 Carbolic Acid and Glycerin, 1 in 2 Tincture of Iron and Glycerin, or 25 per cent. Argyrol.

The ear should be syringed out repeatedly with warm saturated Boric solution, 1 in 5,000 Perchloride of Mercury, ½ per cent. Lysol or 5 per cent. Carbolic Acid. Peroxide of Hydrogen is the most effectual disintegrator and cleanser, the 10 vol. solution being instilled when there is cholesteatomatous tendency or solid débris in the middle ear, and the warm lotion used to flush out afterwards. The meatus may then be lightly packed with cyanide gauze after drying, or dry boric acid may be insufflated.

When the discharge is not very profuse an instillation of 1 part of Boric Acid in 30 of strong Rectified Spirit is very efficacious, and this may be employed in most cases after the profuse discharge has been checked by syringing and when the aperture in the drum is extensive.

An artificial tympanum may be extemporised by inserting during the daytime a small tampon of cotton-wool moistened with boric solution or liquid paraffin, which should be inserted as far as the tympanum by

forceps, an operation which the patient soon learns to perform himself.

Granulations or small polypoid growths springing from the margins of the tympanic aperture should be cauterised by a fine probe with a little cotton-wool twisted round its extremity, which is then moistened with saturated solution of Chromic Acid or the solid stick of Nitrate of Silver may be applied. Large polypi springing from the inner surface of the tympanum must be dealt with by the snare or curette when these project into the meatus.

Mastoiditis.—When in spite of the above routine suppurative mastoiditis occurs, the surgeon should not wait for subperiosteal pointing of the abscess, but proceed at once with the performance of *Schwartz's* operation in order to prevent sinus and intracranial complications. This consists in cutting down on the mastoid through a curved incision behind the ear, and by means of the gouge and chisel the cells of the antrum are freely opened up and all diseased tissue removed, after which the bony cavity, being thoroughly flushed and dried, is to be packed with gauze or drained on ordinary surgical principles.

In many cases the more radical *Stacche-Schwartz* operation will be found necessary, and this is also indicated for the removal of the condition known as *Cholesteatoma*. It consists in opening the mastoid, and by chiselling and gouging the mastoid antrum, middle ear and attic are converted into one large cavity, out of which all diseased tissue with the remains of the tympanum and the ossicles are completely cleared, after which efficient drainage is to be established, or the cavity being lined with Thiersch's grafts as practised by Ballance, it may be gently packed with gauze.

Necrosis of the Temporal Bone, Extradural Abscess, Sinus Thrombosis and *Cerebral Abscess* are to be treated by the evacuation of pus through an extension of the last-mentioned operation, according to the anatomical conditions of each case.

For the deafness remaining after middle-ear suppuration causing fixation of the malleus or oto-sclerosis the chief measures are oto-massage (20,000 vibrations per minute) and injections of Fibrolysin subcutaneously. This treatment should only be commenced after the discharge has been stopped by antiseptic measures.

INTERNAL EAR DISEASE.

Inflammation of the labyrinth may be the result of pyogenic infection from middle ear disease, in which case a radical operation upon the lines before mentioned must be promptly undertaken and the labyrinth drained through the vestibule after all necrosed tissue has been removed. Where the disease follows meningitis, simple or cerebro-spinal, there is little hope of recovery from the deafness, the only treatment available being large doses of Iodides, with constant blistering over the mastoid.

Deafness which arises in syphilis is usually due to implication of the auditory nerve, and may be of the congenital or acquired kind. The only hope of restoring function lies in the active treatment of the primary

disease by Mercury, and in those cases where the affection shows itself in the late secondary stage inunctions should be prescribed and pushed till the system has become saturated by the drug. Large doses of Iodides should then be pushed to the limits of toleration; these alone or combined with Bromides will usually relieve the vertigo and tinnitus which are commonly present. Blistering over both mastoid regions alternately should be persevered with, and Cheatle recommends fortnightly courses of Pilocarpine injected daily.

Disease of the internal ear may manifest itself by symptoms which are also sometimes entirely due to trouble in the outer or middle ear; hence treatment cannot be undertaken with any hope of success until the site of the mischief has been determined. This is obvious when we consider the treatment of the most common symptoms—viz.:

Tinnitus Aurium.—When this is produced by a plug of cerumen in contact with the tympanum the removal of the wax will afford speedy relief. When the result of pressure in the middle ear it may be due to cholesteatomata or cicatrices causing deformities of the drum or adhesion of the stapes, &c. When due to internal ear disease the mischief may be caused by inflammatory conditions in the labyrinth or in the terminations of the auditory nerve, or it may be due to centric causes disturbing the function or affecting organic changes in the nucleus of the nerve or its tracts within the brain. In the majority of these cases all that can be accomplished by treatment is to palliate the distress by large doses of Bromides, which fortunately in most instances afford marked relief when the cause of the tinnitus is beyond the possibility of removal. The tinnitus associated with cicatricial changes in the tympanum, adhesions or otosclerosis following chronic dry catarrh or suppurative affections of the middle ear may be greatly relieved and in some cases permanently cured by injections of Fibrolysin combined with the use of oto-massage. French injects 30 mins. subcutaneously and 5 mins. are introduced into the middle ear through the Eustachian catheter twice a week for twelve times. The accompanying deafness is also improved proportionately, but the tinnitus may disappear under this treatment even when the deafness remains as before and *vice versa*. The tinnitus produced by quinine, aspirin and salicylates does not always disappear upon withdrawal of the drug; this is especially true when deafness remains, as in those who take large doses of quinine for malaria.

The tinnitus of arterio-sclerosis, valvular lesions, anæmia, plethora and other circulatory disturbances should be met by agents directed against the primary cause. The toxic tinnitus of chronic Bright's disease yields to purgatives and other eliminatory measures, and as already stated the symptom usually accompanies syphilitic disease of the internal ear, and yields to Iodides and Hg.

Auditory Vertigo.—The same remarks in the main apply to the treatment of this common symptom, which is also frequently due to the above causes acting in such a way as to produce increased tension in the labyrinthine fluid. The resulting giddiness is often associated with tinnitus and

followed by vomiting. The best routine treatment when the primary cause cannot be removed is to purge freely and put the patient upon full doses of Bromides.

Ménière's Vertigo is the name given to the symptom-complex in which paroxysmal attacks of vertigo, tinnitus and more or less persistent deafness are always present. The causes are various and practically identical with those already mentioned as factors in producing tinnitus and vertigo, and hence it is often described simply as aural vertigo. The name was originally applied by Ménière to the vertigo, deafness and tinnitus caused by labyrinthine hæmorrhage, and the term is usually restricted to those cases of internal ear trouble when the triple symptoms are unassociated with otorrhœal discharge. As the most potent factor in the majority of cases is probably an irritative lesion involving the terminations of the vestibular branch of the auditory nerve in the ampullæ, the indications for treatment are to reduce the hyperexcitability of these and at the same time to render more stable the equilibrium of the co-ordinating centre in the cerebellum. Both these indications are fulfilled by bringing the patient under the influence of full doses of Bromide of Sodium. In hæmorrhagic cases Pilocarpine hypodermically with blistering over the mastoid may be tried. As the deafness progresses and becomes complete the vertigo tends to lessen and disappear, though the tinnitus may remain.

The treatment of *Nervous Deafness*—viz., deafness arising from disease of the auditory nerve or its centre apart from ear disease—is practically beyond the reach of medicine, except in the syphilitic cases as already mentioned. Hyperæsthesia of the auditory nerve or Hyperacusis is the opposite condition, and may be functional as in hysteria, when it will yield to Weir Mitchell and other recognised measures; if organic as in cerebral tumour and meningeal affections, when large doses of Iodides fail to give relief, Bromides combined with Antipyrine may be tried advantageously.

ECLAMPSIA—see **Puerperal Convulsions.**

ECTHYMA—see **Impetigo.**

ECTROPION.

The treatment of this condition, which is also known as Eversion of the eyelids, may be conveniently considered along with that of the opposite state—Entropion, or Inversion.

Ectropion of muscular or spastic origin is often met with in the lower eyelids of patients who suffer from chronic swelling of the conjunctiva. The affection in its early stage usually yields to the free use of astringent eye lotions as Sulphate of Zinc (1 gr. per oz.) or Boric Acid (8 grs. per oz.). As seen in the lower lids of senile patients it is due to a displaced position of the lachrymal punctum caused by loss of tone in the skin of the cheeks and in the orbicularis muscle. When treated early these cases usually yield to conjunctival astringents and slitting of the canaliculus.

More radical operative procedures must be undertaken in very chronic cases; thus where there is much thickening of the conjunctiva a long narrow slip of the marginal portion is to be dissected from the lower lid, and the remaining healthy conjunctiva, after freeing it from underlying tissues, is to be attached by sutures to the lid at its margin as in the Freeland-Fergus operation, or an attempt may be made in less chronic cases to procure the same result by application of the solid stick of Nitrate of Silver or by the galvano-cautery. In the absence of hypertrophied or inflamed tissue the lid may sometimes be restored to its normal position by Snellen's sutures without a cutting operation.

Kuhnt's operation is the best for senile ectropion; this consists in shortening the lower lid by splitting it in its central portion into two layers; out of the posterior one, which contains the tarsus and conjunctiva, a triangular piece with its base along the free margin is then excised, and the lips brought together by sutures.

The ectropion which follows burns and ulcers of the face can only be remedied by a careful dissection of the cicatrised tissue, which enables the displaced lid to be restored to its normal position, in which it is maintained by sutures, whilst one graft of skin or a number of Thiersch grafts are attached to the raw surface exposed by the dissection.

ENTROPION, or inversion, when spastic, sometimes, but very seldom, may in slight cases be remedied by a temporary fastening of the lower lid in its normal position by strapping. When due to senile changes a long strip of skin, including the fibres of the orbicularis muscle along the margin of the lid, should be excised and the margin of the lid loosely sutured to the skin wound so as to draw the lid outwards as the cicatrix shortens. The marginal fibres of the orbicularis should be at the same time divided at the external canthus. A better result is obtained in severe cases by avoiding sutures altogether. Holtz's operation is more reliable when the upper lid is affected; it consists in making a longitudinal incision at some distance from the margin of the lid for its entire length, and after removal of muscular fibres the margins of the skin wound are attached by sutures to the tarsal cartilage.

In entropion caused by thickening of the conjunctiva and deformity of the tarsus following granular ophthalmia, a wedge-shaped portion of the cartilage will require excision by Snellen's operation. An incision is made for the entire length of the lid and a strip of orbicularis muscle is removed and a long triangular or wedge-shaped piece of the tarsus cut out by a sharp knife, after which, by careful suturing, a complete eversion of the margin of the lid is effected.

In Berlin's operation an incision is made at a short distance along the margin of the lid dividing skin and conjunctiva, after which an oval strip of the tarsal cartilage with its conjunctival covering is excised and the wound sutured.

In less severe cases the operations suitable for *Trichiasis* or *Distichiasis* are indicated.

Arlt's operation consists in splitting the lid into two layers for its entire

length, after which an oval flap of skin is dissected out at a short distance from the margin of the lid without removing the fibres of the orbicularis and bringing the edges of the skin wound together. The margin of the lid with its inturned hairs is everted or tilted forwards.

In Von Milligen's operation the lid is split into two layers, as in Arlt's method, and into the entire length of the upper part of the resulting hiatus, which is kept open by sutures, a thin strip of mucous membrane dissected from the inner aspect of the patient's lip is adjusted with a probe or held in position by a few sutures when necessary. This forms a new edge to the lid between the globe and the line of the inverted eyelashes.

ECZEMA.

The bewildering catalogue of remedies employed by specialists is a trial to the young physician who approaches the treatment of a case of eczema for the first time, and his confusion is not lessened by a perusal of the pathological literature of the disease, some authorities persisting in the view that the main factor in the disease is a constitutional cause, whilst others regard it as a purely local phenomenon. The truth lies in neither of these views; a state of the blood, like gout, for example, undoubtedly causes a condition of the skin in which trivial local irritation may bring on an attack of eczema which cannot be removed by purely constitutional agents, but which may speedily yield to local remedies. Though local applications must be considered as more effective than constitutional remedies, every departure from the normal standard of health must be closely investigated and rectified.

Unna's microbic theory is true as regards the pustular type of eczema in which secondary pyogenic organisms are grafted on the original skin inflammation, but the acceptance of a microbic cause of the disease in its ordinary forms only leads to failure in the treatment of these.

If the principle enunciated in the articles on dyspepsia and diarrhœa be applied to eczema its treatment becomes simplified. Many cases are nothing else than the local manifestations of irritating stimuli applied to the skin from accidental contact with unsuspected vegetable, animal or chemical substances, or from the exposure of the part to changes of temperature, mechanical irritants, &c. It would be quite as rational to regard the effects of such irritations as examples of true eczema as it would be to label the results of a rubefacient liniment by the same title, and the teaching of Walker may be accepted when he states regarding these forms of dermatitis " that the more one knows about skin diseases the fewer cases he finds it necessary to label eczema." More recently Heimann strikes the same note by insisting that the term Eczema should be discarded for Dermatitis.

Constitutional Treatment.—The diet of the eczematous subject should be carefully attended to; as a rule it should be generous and varied, and made to embrace a good supply of fresh properly cooked vegetables and not an over-abundance of animal food. Certain articles of diet have been so commonly found to increase the irritability of the diseased skin that

they should be rigidly proscribed; amongst such are salted meats, spices, shellfish, fresh pork, pickles, cheese, raw sweet fruits, sugar and coffee. As the effect of other articles in some patients is so easily demonstrated by experience the individual peculiarities should serve as a guide. Thus, some subjects feel that the smallest sip of wine, in a very short time after being swallowed, produces tingling and itching in the seat of the eczema, and this is especially true if the head, face, or neck is affected. Upon the whole, stimulants must be allowed in very sparing quantity, and, where indicated, whiskey is the best. Acid wines are especially hurtful, and beer, as a rule, should be forbidden. In the presence of dyspepsia or other gastric trouble, the dietary suitable to the patient's needs must be prescribed. C. J. White's plan of detecting the patient's sensitisation to various articles of dietary consists in applying the suspected item as egg albumin, milk, butter, &c., to minute incisions in the skin, when the offending ingredient will be detected by its local reaction.

The periods of labour, rest, exercise and sleep, the clothing, sunshine, cookery, etc., must be seen to when found to be faulty, and the general hygienic surroundings improved when possible; thus change of air, scene and occupation affords marked benefit in some cases, but a bracing sea air is not to be recommended.

Dyspepsia, or acidity, should be counteracted by appropriate remedies, and constipation by laxatives or purgatives. The use of these latter in chronic eczema is universally acknowledged. Salines are valuable, especially in the form of a natural purgative water like Rubinat or White Mixture, containing 2 drs. Epsom Salt with 30 grs. Carbonate of Magnesia in each wineglassful, given early in the morning whilst fasting, so as to produce one or two copious motions of watery consistence; or the following may be prescribed: Magnesii Sulphatis, ℥ijss.; Ferri Sulphatis, ℥ss.; Acid. Sulphurici Dil., ℥ij.; Aquæ Destillatæ, ad ℥xvj.; misce. Signa.—"A large wineglassful to be taken in half a tumblerful of water every second morning, and to be repeated in three hours if the bowels be not well moved." The saline should be occasionally preceded by a good dose of Blue Pill, given at bed-time.

Anæmia should be remedied by small doses of Iron, and in chronic cases associated with enlarged veins and a weak heart or diseased mitral valve, the eczema of the lower extremities is much improved by a combination of Iron and Digitalis.

Sedatives may be called for to allay itching and sleeplessness, but opium, morphia, or chloral should be used for this purpose with the greatest caution. (Chloral may be more safely administered to children when the itching is very severe.) Trional, in 20-gr. doses, may be tried, but large doses of the Bromide of Sodium (30 grs.) allay restlessness without producing any untoward results; it may well be combined with Hyoscyamus, and the itching is sometimes relieved by a small dose of Antipyrine.

No drug administered internally can be regarded as possessing any real specific action. The usual rule is to give Tartarised Antimony in the acute and subacute types, and Arsenic in the chronic stages, and, whatever

difference of opinion there may be regarding the value of both these drugs in the early stages, there should be no doubt about the beneficial effects of arsenic in very chronic scaly eczema, and the nearer the disease approaches in character to psoriasis the more valuable is arsenic. The writer never prescribes it under any circumstances for acute eczema, or even for the chronic weeping type of the disease. 3 to 5 min. doses of Fowler's solution are sufficient, and these amounts should rarely be increased. Turpentine has gained some reputation, but its value is doubtful. Pilocarpine has been advocated in the forms of eczema associated with great dryness of the skin. Where there is much œdematous swelling following the eruption in acute erythematous cases Chloride of Calcium possesses almost specific action in checking the local anasarca and itching. Robert-Simon recommends subcutaneous injections of fresh Sea Water, beginning with 30 c.c. increased to 50 c.c. of a mixture of sea water 2, fresh water 5 parts, which form an isotonic solution. The sea water is taken in sterilised flasks from deep areas 20 miles from the shore, and must not be sterilised by heating.

Thyroid Extract has been much recommended especially in the eczema of infants and children, and especially in the arthritic type of the disease.

Local Treatment.—The long list of remedial agents proves that there is no specific for eczema—no royal road to its successful treatment—though there are few diseased conditions so susceptible to improvement or permanent cure. The secret of success in treating eczema lies for the most part in the ability of the physician to use the proper remedy at *each stage of the disease*. The class of agents so valuable in the acute are worthless in the very chronic stages, whilst remedies of unfailing power when used in the chronic cases are fraught with serious danger when applied at the earlier stages of acute cases. The physician who wishes to treat the protean forms of eczema with success must learn to be patient, ever remembering that in the majority of cases the progress towards recovery is a slow one, and having fixed firmly before him the principle upon which his treatment is based, he should be content to wait till his local remedy has had time to act before its failure is accepted. The constant chopping and changing of applications from day to day is one of the great causes of failure in the management of chronic or acute eczema.

Acute Eczema must be treated as a dermatitis. Only the blandest and least irritating of applications should be applied. Any attempt at treating the disease by antiparasitic agents at this stage is certain to seriously aggravate matters. The first step should be to cleanse the surface of all crusts or dried secretion, and for this purpose Chamber's method of applying lint soaked in Normal Saline Solution, covered over with impervious tissue, is perhaps the best. The writer's practice has always been when possible to cleanse the part by gentle and patient mopping of it with cotton-wool soaked in pure Olive Oil. When the crusts are hardened into scabs, a more efficacious method is to apply warm Boric Acid compresses; even then soap may be necessary, but the use of this cleanser must be dispensed with as soon as the scabs have been detached, and it

should if possible never be resumed till the disease has been conquered. Afterwards an overfatted basis soap must be employed. During the progress of the treatment any hardened secretion which from time to time forms may be gently removed by friction with an oiled swab.

Once the diseased surface is freed from all accumulated débris, the important problem must be decided—whether a dry powder, an aqueous lotion, a paste, or a fatty ointment is to be employed. This will to a great extent depend upon the amount of secretion or exudation present. The usual practice is to employ lotions at this stage, and to prohibit greasy or oily applications, but this rule should not be too rigidly followed. Lotions when there is abundant exudation are certainly preferable, but the difficulty must always be kept in mind that as these should not be covered in by oiled silk the lint on which the lotion is applied must be kept continuously moistened. If this be done by simply pouring the lotion upon the lint the latter filters out the insoluble ingredients and only permits of the aqueous menstruum coming into contact with the diseased skin, unless the raw surface be exposed to the air every time the lotion is reapplied. Another serious objection to their employment is due to the fact that as the lint dries during the night a covering is left in contact with the exuded surface, which firmly adheres to it and which is often removed with difficulty even when thoroughly moistened.

These considerations are frequently lost sight of by those who thoughtlessly adhere to the hard and fast law that lotions must *always* be employed throughout the acute stages, and it is not an uncommon experience to find that by persisting in this method the disease is often aggravated by the mechanical irritation caused by the stiffened and dried lint rubbing against the raw surface during the night and by the traction required in the morning to remove the dressing, which often causes pain and sometimes produces bleeding.

Dusting powders and pastes are not open to the above objections, but they tend to cake into hard masses which are not easily removed, and occasionally the physician will find that he can best obviate this by a combination of both methods, employing alternately a lotion containing in suspension the same powder as has been dusted on previously.

In facial eczema a lotion like the following dabbed on frequently with a small sponge and allowed to dry is not open to the above objections, which only apply when lint and bandaging are resorted to:

℞. *Calaminæ Præparatæ* ℥ss.
Spt. Vini Rectificati ℥ss.
Aquæ Rosæ ad ℥x. *Misce.*

Should a lotion be applied upon lint and covered over with oiled silk, the drying difficulty disappears, but the moisture would have the effect of a continually applied poultice, which would keep the diseased skin in a sodden state and retard indefinitely the healing process—a practice which should never be followed.

The objection to ointments is that they make a more or less impervious dressing under which the retained secretion is imprisoned, thus aggravating the eczematous condition, but this can be largely met by prescribing them in a creamy or semi-liquid form.

In a given case of acute eczema with abundant exudation the writer avoids the above difficulties by using a lotion which contains no insoluble residue, and which therefore can be repeatedly employed for moistening the lint without exposing the eczematous surface, the liquid being frequently sprinkled on over the dressing. The following combination is suitable; the small quantity of glycerin is insufficient to cause irritation, and prevents the stiffening of the dressings. Some dermatologists employ a 1 per cent. solution of Picric Acid in the same manner in all acute weeping eczemas.

℞ *Liquor. Plumbi Fort.* ℥ij.
Spt. Vini Rectif. ℥iv.
Glycerini ℥ij.
Aquæ Destillatæ ad ℥x. *Misce.*

When the exuberance of the secretion is checked by the above application soft ointment may be freely smeared lightly over the part, which should be covered with lint coated over also by the ointment, and a light gauze bandage applied to keep it in place without using undue pressure.

There is no limit to the number of such soothing and astringent ointments. The physician will be wise who selects a simple and well-known substance whose strength may be varied to meet the requirements of each case as experience dictates; the following is suitable in most instances:

℞ *Ungt. Zinci Ox.* ℥iv.
Liq. Plumbi Fort. ℥ij.
Olei Olivæ ℥iv. *Misce.*

or Cremor. Frigidi ℥ij., Calaminæ Præp. ℥ij.

Lassar's Paste is undoubtedly a most valuable application in many cases, and it is not so open to the objection of caking which holds in the case of pastes devoid of a greasy basis, and it is free from the drawbacks of a stiff waxy ointment, since it contains so much absorbent powder. Its composition is Oxide of Zinc 48, Powdered Starch 48, Salicylic Acid 4, Vaseline 100, and this may be modified to suit the requirements of each case. With this paste the entire body of an infant suffering from acute eczema may be covered after having previously washed the skin and touched any bleeding spots with a solution of Caustic. The face, head and joints are smeared over with a 2 per cent. ointment of Salicylic Acid in Vaseline, and muslin bandages are firmly applied. In the very acute stage the salicylic acid had better be omitted, and sometimes a ½ per cent. of Menthol may be added to subdue itching.

The vesicular and erythematous types of acute eczema may be treated

upon the above principles, varied to suit the changes which may arise by altering the ointment from time to time to a lotion or dusting powder should the discharge become very profuse or crusts form. The pustular form will also yield to the same remedies, but the crusts must be periodically removed during ointment treatment by the free use of lotions and the occasional application of a 1 in 2,000 Perchloride of Mercury solution. The addition of 10 grs. to each ounce of Zinc and Lead ointment of Hydrarg. Amm. Chlorid. is a valuable means of destroying the secondary microbic infection without increasing the inflammatory action.

The following powders may be mentioned as suitable when the profuse secretion prevents the employment of an ointment—viz., powdered Starch, Arrowroot, Carbonate of Lead, Carbonate of Zinc (Calamina), Carbonate of Magnesia, Powdered Fuller's Earth, Kaolin, Cimolite, Emol, Kieselguhr, Oxide of Zinc, French Chalk, Bismuth Oxide, Nitrate or Carbonate, Lycopodium, Powdered Rice and Talc, and these may be mixed in various proportions, according to the amount of astringent required, the lead being the most active in this respect. Where itching is smart, Camphor in fine powder should be added to the above in the proportion of about 10 grs. to each ounce of powder.

Tar is not included in the above routine. This is the sovereign remedy in chronic and scaly eczema, but though it relieves the itching in the acute form of the disease its application is fraught with danger, owing to its stimulating properties when used early. In the late stage of acute eczema its use is clearly indicated, but the physician must feel his way cautiously as this stage is reached, beginning with not more than 15 mins. Liquor Carbon. Deterg. to each ounce of the lead and zinc ointment.

Itching may be relieved by internal remedies like Antipyrine by teaching the patient to relieve pruritus by scratching the sound skin vigorously at a safe distance from the seat of the eczema, which often affords considerable relief. A small percentage of Menthol or Camphor added to the ointment employed is often efficacious, but it must be omitted if the inflammatory mischief is increased. 1 per cent. Picric Acid solution often relieves the itching of acute discharging eczema without increasing the vascularity.

Should the acute attack not speedily resolve under the above treatment, more stimulating measures will be called for, and it may clinically be regarded as a case of subacute or chronic eczema, and treated accordingly.

Chronic Eczema.—Whether this has originated in an acute attack which has proved rebellious to treatment or has commenced in a chronic insidious process before coming under observation, applications of a more stimulating nature are demanded. The list of local remedies for chronic eczema seems almost without end. The old drugs, which have stood the test for ages, are after all better, more certain, and more innocent than their modern rivals. Thus Tar, Mercurials, and Lead will cope, if skilfully handled, with most chronic forms of the disease. Upon the whole, ointments will be found more convenient and efficacious than lotions, though these latter are indicated under special circumstances. If there be very much exudation or moisture, the greasy nature of the ointment

keeps the secretion in contact with the irritated surface. In some cases this is a serious drawback, and the discharge is, of itself, an irritant, and prolongs the mischief. In these cases a lotion containing an astringent must be first used to check secretion, as in the treatment of acute cases.

After diminishing the amount of secretion a stimulant like Tar can be combined with the astringent lotion. The amount of stimulating ingredient must be small at first, and gradually increased, the physician cautiously feeling his way before employing stronger remedies. A Tar ointment or lotion which may soothe and quickly heal an itchy, dry eczema associated with much infiltration may act like fuel to the fire when applied to a moist, weeping, red eczema. It is therefore a good rule, with chronic weeping eczemas of this kind, to begin with Lead lotions containing a sedative to allay itching and heat; afterwards Tar can be safely used.

Strong Liquor Plumbi in water (1 to 40), to which a ¼ part of Laudanum or Camphorated Spirit is added, soon allays itching and diminishes secretion, but the number of cases in which an astringent ointment cannot be used instead is small. Liquor Carbonis Deterg. (1 to 40) may be added to the above lotion with advantage.

The best routine treatment in all chronic eczemas is application of the following ointment:

℞. *Liq. Carbonis Deterg.* ʒij.
Liq. Plumbi ʒj.
Hydrarg. Ammon. Chlor. ʒss.
Lanolini et Vaselin. ana ʒj. *Misce.*

The proportion of each ingredient may be varied to meet the special indications in every case. Thus, if the secretion be very profuse the amount of lead may be doubled and the tar lessened; should there be dryness, with scaliness, the tar may be safely doubled in amount, whilst the mercurial may be equally increased. The writer's advice to the practitioner is to adopt this ointment, and use it in *every* case of subacute or chronic eczema which he meets with in the first years of his practice, till he becomes thorough master of the remedy and can alter its proportions to suit the varying stages or varieties of the disease, and he will very seldom feel the necessity of resorting to anything else.

Dry eczema of the papular type is very rebellious to treatment; the best routine is to employ a tar lotion (1 in 8) in the daytime and the above ointment at night, omitting the lead ingredient. Coal tar is preferable to wood tar, being less irritating, but many dermatologists prefer birch tar (ol. rusci), beech tar (ol. fagi), juniper tar (ol. cadinum), pine tar (pix liquida). Sutton advises the use of *crude* coal tar, and in very chronic scaly cases he applies it undiluted. The B.P. Liq. Picis Carbonis is the official representative of the old Liq. Carbonis Detergens; both are saturated alcoholic solutions of coal tar. Creosote and Carbolic Acid are preferred by some, and a whole series of Naphthol derivatives have been

employed, but they are certainly inferior. The official Ungt. Picis L. is too concentrated for ordinary uses.

As with arsenic internally so with tar externally, both drugs give their best effects in scaly, dry eczema, and the nearer the case approaches to psoriasis the better the results obtainable from tar, but all forms of chronic eczema should be treated by it. When tar fails in the weeping chronic type of eczema, it will be due nearly always to being applied in too concentrated form. Hutchinson regarded Tar as the one remedy for eczema. If he used two, they were Tar and Lead; if three, Tar, Lead and Mercury.

Powders are as a rule unsuitable even in the red weeping examples of the chronic disease, but occasionally they may be applied for short periods. Pastes sometimes may be employed. Lassar's may be used as the vehicle for any of the above-mentioned more active remedies, and the jellies, plasters and salve muslins introduced by Unna may be also employed with advantage.

Ichthyol is undoubtedly a valuable drug. Unna uses 10 or 20 per cent., or Sulphoichthyolate of Ammonia 2 per cent., which may be incorporated with the paste of Lassar. Morris states that, like Resorcin and Sulphur, its antiparasitic qualities are undoubted. It allays itching, destroys parasites, contracts the cutaneous vessels and checks discharge, hence he uses it also in the treatment of acute eczema.

The weeping stages of all eczemas are treated by Pick with his Salicylic Soap Plaster (5 parts of Salicylic Acid to 100 parts of liquefied Soap Plaster). When a weaker and more adhesive plaster is required, he mixes 2½ parts of the acid with 20 of Olive Oil and 80 of Soap Plaster. These are spread upon strong calico, cut into strips, and firmly applied to the moist surface, where they may be allowed to remain undisturbed for several days. The itchiness is replaced by a burning pain, which rapidly disappears. Four days suffice for the first application before removal. Subsequent dressings may remain one week each or longer. After the scaly stage is reached this is treated by painting with Sublimate Gelatin prepared by dissolving 30 parts of pure white Gelatin in water over a water-bath, and evaporating the liquid solution till its weight is reduced to 75 parts; 25 parts of Glycerin and ·05 Perchloride of Mercury are then added. This method of Pick's is very suitable for the chronic eczema common in the legs.

Just as Lead preparations are indicated for their astringent action where there is much weeping, and Tar for its stimulating action in sluggish cases, so Mercurials are indicated for their alterative action where the wisdom of employing tar is doubtful—*i.e.*, in subacute cases where there is still much redness, irritability, and some induration; afterwards they may be combined with Tar to great advantage, but they should not be employed where a very large surface is affected. A dilute solution of the Bichloride (1 gr. to 3 oz. water) is an excellent alterative, and may be used with great advantage as a lotion where crusts, scabs and dried secretion cover over and irritate the already inflamed surface. The best of all

the mercurial preparations is an ointment of the white precipitate (of the strength of about 20 to 30 grs. per oz.).

Ungt. Hyd. Nit. Dil. is sometimes very valuable, and Calomel ointment (1 in 8) often acts well. These mercurials may be combined with Zinc, Lead, Tar, or other remedies. The Unguentum Metallorum, containing Zinc, Mercury and Lead, is a favourite with many skin specialists. It may be made by mixing equal quantities of the B.P. Zinc, Acetate of Lead, and Nitrate of Mercury Ointments.

To alter or stimulate the sluggish nature of the diseased action in chronic weeping eczema excellent effects are often obtained by occasionally painting the surface with solution of Nitrate of Silver (30 grs. per oz.), and a favourite solvent for the caustic is Spt. Ether. Nit. For a similar reason in chronic very dry eczema, painting over the patches with Blistering Liquid or Liquor Potassæ sometimes gives good results, and contrary to what might be expected it often relieves all pruritus and tingling. This really causes an acute dermatitis, which can then be treated as a case of acute eczema by soothing remedies. Other irritating applications of milder nature are used in dry eczemas for the same purpose as Pyrogallic Acid and Chrysarobin (30 grs. per oz.), Alcoholic Solution of Soft Soap, Salicylic Acid (40 grs. per oz.), strong Alkaline lotions, Chloral, Eucalyptol, Thymol, Iodine, etc. Thickened epidermis may be removed by Salicylic Collodion, Resorcin, or a paste made with Papain or Pancreatin.

For *seborrhœic eczema* Unna uses Resorcin. He states that there is no stage, no region, no age, no skin, nor any complication in which this drug may not be used, save in those rare cases of resorcin idiosyncrasy. He gets the best results from a solution of 1 part of Resorcin and 1 part of Glycerin in 18 of strong spirit. Thin layers of cotton-wool are soaked in a mixture of 1 part of this solution with 4 of water, laid upon the part and covered with oiled silk. The horny layer swells, and soon all thickening and induration pass away after the resorcin has been stopped and a greasy ointment applied to finish the cure.

Trimble injects in this type of the disease a stock Acne Vaccine. The list of agents employed in chronic eczema might be prolonged indefinitely, but the physician who selects the older remedial agents, as Lead, Mercury, Tar and Zinc, will be surprised to find how seldom he will fail to cure with them, and how seldom he will have to seek the newer drugs for the relief of symptoms or complications.

Very chronic cases of scaly eczema with much induration have been successfully treated by the X and Ultra-Violet rays and also by the high-frequency current.

Without a special description of the treatment of each of the so-called special local varieties of the disease, the recognition of the principles discussed and a careful adherence to the details already mentioned will enable the student to treat eczema upon whatever part of the body it may be located.

Eczema madidans, the red weeping variety which attacks the legs especially in patients having varicose veins, is a most inveterate form.

This is the same type of disease found elsewhere, only modified by the abnormal local circulatory conditions, which also tend to produce ulcers. It cannot be treated by any local applications with hope of success unless the passive congestion of the integuments be removed by rest in bed with elevation of the lower limbs. A good routine is to employ a Tar and Lead lotion (2 parts Liq. Carb. Deterg. and 1 part Liq. Plumbi F. to 20 parts water), and after exudation has been checked and all crusts removed to bandage the leg over lint smeared with the lead, tar and mercury ointment already described. The occasional application of the solution of caustic in Spt. Ether. Nit. (30 grs. to 1 oz.) often works wonders. When the patient is permitted to move about in the later stages of the treatment Unna's Zinc Gelatin should be melted and brushed over the limb. This forms an elastic coating of great value in the treatment of all eczemas of the lower extremities and of ulcers of the legs. It consists of Gelatin 4, water 16, Zinc Oxide 6, and Glycerin 12, and with it various antiseptics and astringents may be incorporated.

When rest of the lower extremities cannot be carried out, the eczema may often be successfully treated by the ordinary remedies applied on lint and covered up by the Martin rubber, or preferably by a woven rubber bandage.

Eczema of the anus should be treated upon the same principles as guide the physician in the management of the disease in other parts, but owing to the greater sensibility of the cutaneous nerve supply and to the moisture of the skin in this neighbourhood much pruritus and intertrigo are always present. The treatment should be prefaced by a careful examination of the urine for sugar, and if this be found a rigorous diabetic dietary must be instituted. When there is much discharge present a Lead lotion with a small percentage of tar is indicated, but owing to the difficulty of applying this unless the patient takes to bed a dusting powder must be freely used, any caking following being remedied by the application of the lotion at night. At a later stage the use of Lassar's paste with the addition of Tar and Lead may be resorted to, but the Zinc, Lead and Tar Ointment answers in most cases, all folds of skin being carefully separated by pieces of lint smeared on both sides with the ointment. In women, leucorrhœal discharges may be the exciting cause, and the condition of the vagina and uterus must be seen to. Pruritus, when severe and not yielding to tar, may be relieved locally by the addition of Menthol or Camphor to the ointment and occasionally warm stupes, cocaine being contra-indicated. Internal sedatives or a Morphia suppository may be used, and sometimes counter-irritation over the lumbar spine affords relief. Anal pruritus may be relieved when due to eczema by the use of the tar and lead ointment, substituting Ungt. Conii for the vaseline and lanolin basis. (See under Anus, Pruritus of, p. 50.)

ELECTRIC CURRENT INJURIES—see under Lightning Injuries.

ELEPHANTIASIS.

This has been incidentally referred to under Chyluria, both conditions being the result of filariæ; the scrotum or legs are the parts usually affected,

and it must be remembered that cases of apparently typical elephantiasis may present themselves for treatment in patients who have never been out of Britain. As the disease when uncomplicated does not tend to shorten life, operative measures should not be undertaken till the tumour has become a serious inconvenience from its mechanical pressure or weight. When the leg is alone involved much may be done by keeping the limb elevated at night and wearing a woven rubber bandage all day to keep up firm pressure. The surface of the diseased skin is liable to ulcerate where pendulous folds come into contact with each other, hence the most scrupulous cleanliness must be observed. The practice of mercurial inunctions, biniodide of mercury ointment, blistering, ligature of the femoral artery, etc., has been abandoned, and no known drug has any effect upon the causal filariasis or upon the blocked lymphatics. Castellani has reported favourably of deep injections of Fibrolysin into the buttock combined with tight bandaging of the limb. In mild cases permanent benefit may be obtained by Handley's operation of *lymphangeioplasty*, which consists in introducing deeply into the subcutaneous tissue of the affected part several strands of stout silk thread, which are to be left buried *in situ* after their proximal extremities have been drawn upwards and also buried deep in the normal subcutaneous tissue nearer to the trunk; the lymph is drained by their capillarity, and enters the circulation above the affected part. As the tissues are often infected with staphylococci or other organisms, Vaccine therapy must first be resorted to. Where ulceration has destroyed any considerable portion of the integument of the limb amputation of the leg or thigh may be demanded.

Handley's operation may be successfully employed for the relief of the elephantiasis which sometimes follows the removal of glands in the axilla and groin (see under Lymphangitis), and the writer has had very satisfactory results from its performance by A. B. Mitchell in a case of similar nature in which blocking of the lymphatics of the orbit following erysipelas caused such permanent œdema of the lids as to totally obstruct vision. The writer had tried Fibrolysin injections in this case without any benefit. When the elephantiasis involves the scrotum or labium, and the tumour grows to enormous proportions, it should be removed by careful dissection of the hypertrophied mass from the surrounding healthy tissues by a bloodless operation, after elevation and the application of elastic ligatures to the base of the growth.

Elliott recently has reported a case of Elephantiasis Nostras of the arm following vaccination treated by Massage and intramuscular injections of Antistreptococcus Serum.

Elephantiasis Græcorum is of true leprous origin, and must be treated as leprosy.

Elephantiasis Neuromatosa of Virchow caused by overgrowth of nerve tissue, which finally involves the skin and subcutaneous tissue, can only be treated palliatively by elevation and bandaging or by the radical operation of amputation.

EMBOLISM.

An embolus is generally produced by a thrombosis in a bloodvessel or in one of the cavities of the heart. If the thrombotic process is evident or suspected *prevention* of embolism will lie in absolute rest. Thus in the inflammation of the veins which is so common in the lower extremity the utmost precaution must be maintained to secure immobility of the limb until the thrombus has become organised or absorbed. Friction and massage are answerable for many deaths by detaching large emboli from the interior of inflamed varicose veins. Once these have reached the right side of the heart, little can be done to relieve the sudden asphyxia, as death may be almost instantaneous when the plug is large. If the patient survive the initial shock, the hypodermic injection of Strychnia to keep up the ventricular contractions, and of Ammonia by the veins with the faint hope of aiding the absorption or solution of the embolus, may be resorted to; and Oxygen when available may be useful, especially in the later stages of pulmonary infarction. The ideal treatment of embolism of venous or arterial origin would be the free administration of Citrates to cause solution of the clot, but the mechanical effects of the plugging are usually too urgent to permit time for this, though in hepatic, splenic, or renal infarction or in cerebral syphilis such treatment may be practicable.

Embolism of the superior mesenteric artery or vein, like thrombosis in the same vessel, may be treated by abdominal section and resection of the bowel.

Emboli originating in the walls of arteries or in the left side of the heart may suddenly cut off the arterial blood supply from the brain or limbs. The treatment of Cerebral embolism is discussed in the article on Apoplexy. When the main artery of a limb is occluded gangrene is liable to follow, but by absolute rest and warmth to the part it is sometimes possible to avoid this when the collateral circulation is free, though the artery be completely blocked, the blood finding its way into the main trunk beyond the obstruction through anastomosing branches.

If the embolus is septic, as in ulcerative endocarditis, the condition recognised as arterial pyæmia supervenes, and the after-consequences of the breaking up into abscesses of the infected plug must be met by the usually accepted principles which should govern the treatment of septic infections, though such cases are almost necessarily fatal, notwithstanding vaccine treatment and the free administration of Sulphocarbolates.

Air Embolism occurs sometimes in surgical operations involving large veins about the base of the neck or axilla, and should always be prevented by clamping the vein on the proximal side before cutting it. Once air has been drawn in by the open mouth of a divided vein or through a button-hole incision in its coats the only resource open to the surgeon is to block the opening instantly with his finger and to prevent syncope by lowering the head and injecting Strychnine or Ether hypodermically, and if the symptoms continue to inject serum.

Fat Embolism sometimes follows fractures and operations involving the

marrow of long bones. It may not give rise to any symptoms, or the asphyxia may be so great as to demand prompt treatment. The heart must be assisted by the hypodermic administration of Strychnine or by stimulants given by the bowel, the aim being to keep the patient alive till the fatty material has been eliminated by the kidney or expelled along with bronchial mucus in the frothy or blood-stained expectoration. Oxygen is safer than artificial respiration, and the intravenous injection of serum may be requisite.

EMPHYSEMA OF THE LUNG.

This is usually the outcome of attacks of bronchitis, asthma, whooping cough, &c., especially in subjects who have been born with a deficiency of yellow elastic tissue in the walls of the pulmonary infundibula, and the problem of *prevention* is of more importance than is that of cure. Unfortunately, however, there is no means of recognising or detecting the congenital developmental error till dilatation of the air cells and of the interalveolar passages has already occurred under one or more bronchial attacks.

If the existing cause can be removed judicious treatment will in most instances reduce or confine it to its original sites in the lung. Hence the importance of climatic treatment, which by preventing attacks of bronchial catarrh may save the predisposed patient from a life of invalidism. An equable warm atmosphere as free from dust and winds as possible should be selected along the South Coast of England for residence during the winter months. If experience proves that the patient's bronchial trouble is best suited by a dry atmosphere, Sicily, Egypt, or Algiers as a winter resort, or South Africa or South Australia may be selected as a permanent home.

The presence of adenoids and abnormal conditions of the nasal and naso-pharyngeal regions should be seen to in young subjects, as asthmatic troubles may sometimes be averted by early operative interference. The hygienic surroundings of the patient, whether at home or abroad, should be carefully supervised; an open-air life with protection by suitable clothing against changes of temperature, the avoidance of late hours and crowded rooms, and a generous mixed diet with regular hours for meals, exercise and rest are essential. As regards exercise, whilst this need never be curtailed, all athletic performances which cause high thoracic pressure, as football, feats of endurance on the land and in water, as well as shorter spurts in running, must be forbidden. Obstinate constipation by acting in the same manner is injurious, and must be met by appropriate drugs.

Artisans who cannot change their climate must change their occupation; all those occupations which entail the breathing of a dusty atmosphere, or which cause pulmonary strain as in glass-blowing, must be abandoned. Playing on wind instruments is also most injurious to the weakened air cells.

All bronchial attacks must be discreetly treated; coughing which might be left unchecked in robust subjects may do serious mischief when once

the dilatation and degeneration of the air cells have become established. Under Bronchitis the various indications for the use of remedies have been discussed and need not be here repeated; suffice it to say that though the employment of narcotics or sedatives must be avoided in all cases of bronchial catarrh it will, amongst the emphysematous, be always wise to prevent *unnecessary* coughing. This rarely can be accomplished without danger by the use of narcotics, even Heroin being objectionable. The aim of the physician should always be to act upon the bronchial secretion so as to render it more fluid and therefore more easily expelled by ciliary action. The best routine drug for this purpose is Iodide of Potassium or Sodium combined with Ammonia; when the patient is obviously coughing more frequently than is necessary for the mere expulsion of the secretion Heroin or Morphia in small amount may be added to the iodide mixture. This method is often as efficacious in the treatment of bronchitis with profuse ropy secretion as it is in dry catarrhs. In thin delicate subjects, especially those suffering from the chronic lobular pneumonia following whooping cough and measles, there is no routine combination equal to the Syrup of Iodide of Iron administered in conjunction with Cod-Liver Oil.

Severe wheezing and breathlessness in acute bronchial attacks occurring in emphysematous patients may be relieved by Oxygen inhalations, and when the element of spasm is present Lobelia and other bronchial antispasmodics may be prescribed, but the practice of drenching such patients with nauseating doses of hippo, apomorphine and tartar emetic for long periods is most injurious owing to the condition of the dilated heart and to the tendency towards degeneration of the elastic tissue already present. Cardiac dilatation should be met by heart tonics and Strychnine.

No drug exercises any specific action upon the dilated air sacs; Arsenic is, however, extolled by many, and some authorities believe that Iodides independent of their expectorant properties have the power of at least retarding the degenerative process. The combination of these agents may therefore have a routine place in the treatment of the accompanying catarrh, and may be used as adjuvants to the following remedial measure.

The Compressed Air Chamber has given excellent results in fully established emphysema. The patient is placed in a small chamber into which a free supply of pure air is introduced, which is gradually raised to an extra pressure of more than two-thirds of the outer atmosphere; the exposure should be at least of one hour's duration under the maximum pressure, which is then slowly reduced during about 20 minutes to the normal tension before the patient emerges. During the stay under pressure the vesicular murmur may be observed to return, the hepatic and cardiac dulness to increase, and the circumferential measurement of the thorax to diminish. These effects may be heightened by causing the patient at the same time to expire into rarefied air, but the apparatus for this purpose is necessarily a complicated one, and the results of using the ordinary compressed air chamber are so satisfactory that the simpler method is considered sufficient. This treatment should be resorted to

about 4 times a week, and the stay in the chamber may be prolonged till a couple of hours are spent in it each time.

For the atrophic or small lunged type of emphysema which is simply a part of the senile wasting sometimes observed in old subjects, nothing can be done save what little may be effected occasionally by improved hygienic and dietetic measures.

EMPHYSEMA (Surgical).

This is the result of injuries in which the thorax has been compressed or when a rib has been broken, the air finding its way eventually into the subcutaneous tissue of the trunk and limbs. Unless the accumulation of air becomes so extensive as to jeopardise life by embarrassing the action of vital organs, the case had better be left alone, as absorption always takes place spontaneously in three or four days. When the condition has been general, the entire body being affected, bandaging of the limbs may be necessary from the toes to the chin, a stout pad being placed over the site of injury. Should suffocation threaten, the skin may be tapped by a Southey's trochar and canula in several places at once, or a number of small punctures with a tenotomy knife may be made.

EMPYEMA.

Immediate removal of a purulent secretion in the pleura is imperative even in the absence of all symptoms, chiefly on account of the risk of the lung becoming so fixed and bound down by adhesions that expansion may never occur.

In *children* the pus is commonly the result of pneumococcal infection, and aspiration of the contents may effect a permanent cure without resorting to a free incision. The needle of the aspirating apparatus should be inserted through the sterilised and anæsthetised skin anywhere in the mid-axillary line from the fourth to the eighth rib, selecting the middle of an intercostal space or close to the upper border of a rib. The fluid should be slowly pumped or siphoned out as the patient lies upon the sound side, with the head slightly raised. Should severe coughing occur the aspiration may be suspended without withdrawing the needle till the pulmonary embarrassment passes off. Should the fluid return a second tapping may be tried before resorting to incision.

In *adults*, whether the exploratory puncture proves that the empyema is pneumococcal or due to the influenzal or other pyogenic organism, a free incision should be made, unless when, owing to a very extensive collection of fluid, the heart is greatly displaced and there is much pulmonary embarrassment, a slow tapping may be done to relieve immediate distress, with the intention of opening the chest 24 or 48 hours afterwards.

The Operation by Incision.—A general anæsthetic will usually be necessary; the skin having been previously sterilised, the patient is placed on his back and the operation is carried out partly from below, a high table if available being used. Since purulent accumulations are sometimes localised, or adhesions of the pleural surfaces may shut off or divide the

abscess cavity, the surgeon should invariably before making the incision introduce the needle at the exact spot which he intends to incise. If this be done there need be little hesitation in the selection of a site; the best for most purposes is the sixth or seventh space in front of the posterior axillary line, or in the eighth or ninth in the line of the scapular angle if the ribs be not too close together. The incision should be free, and should run close along the upper border of the rib for at least 2 inches; after the cavity has been entered the lips of the wound should be widely dilated by dressing-forceps, and after the evacuation of the pus the finger may be inserted, when this is possible, to break down adhesions and prepare for the insertion of the drainage-tube. This should be as large and stout as possible, and should have a flange or collar to prevent its slipping backwards into the cavity. It is often advisable to insert two such tubes side by side.

Resection of one or more ribs will be necessary if these are so close together as to prevent the insertion of a drainage-tube with walls of sufficient thickness to prevent the tube being nipped. Most surgeons prefer to resect a rib as a routine step at the beginning of the operation. There are several advantages obtained by this procedure. Thus it permits of the incision being made farther back and thus affords a better drainage ground, and the opening being larger the finger can be used to break down adhesions and large fibrinous flakes or masses can be readily evacuated through it. Moreover, by deciding on resection the original incision, which should be about 3 inches, may be made directly over the rib and, its periosteum being divided, 1½ or 2 inches of the rib may be resected before opening the pleural cavity without dividing the intercostal artery. After incising the pleura the finger should be thrust into the opening so as to partially block it and retard the flow of pus, so that syncope or dyspnœa may be avoided by a too sudden fall of intrathoracic pressure. After the evacuation of the purulent collection a large drainage-tube with a flange or a piece of rubber tubing with a large safety-pin fastened at its external orifice should be left *in situ* and covered over with several layers of antiseptic gauze or wool to absorb any further discharge, and the patient should be made to lie on the affected side.

After-treatment is conducted upon the general surgical principles applicable to any large abscess, the utmost precautions being taken to prevent infection of the wound or pleura by any germs introduced from without during the changing of the dressings. These may have to be replaced frequently during the first 48 hours, and at a later stage every or every second day. The patient should be directed to take deep inspirations for several minutes at a time in order to assist in expanding the lung, or the simple spirometer may be used for this purpose. Irrigation of the cavity is seldom required and may be fraught with serious dangers if the outflow should become blocked. After the discharge has ceased to become purulent, the tube should be removed, and the cavity and wound permitted to heal by granulation.

In cases where operation has been too long delayed and the lung has

become permanently bound down by adhesions, and especially in empyemas of tuberculous origin where the pleura is greatly thickened a large unyielding space is left, which fails to fill up by granulation, the more serious operation of *thoracoplasty* is indicated; or this may be demanded in rare cases of failure after the ordinary resection method. The Estländer-Schede operation consists in the subperiosteal resection of several inches of a number of ribs (from the third to the seventh as needs be) and removal of the thickened parietal pleura, periosteum and intercostal muscles so as to permit of the parietes falling in and obliterating the space. In very chronic cases where the lung is found to be firmly bound down in the vertebral groove its thickened visceral pleura will require incision and peeling off; Delorme peels off the thickened visceral pleura from behind forwards in order to secure as full expansion as possible of the collapsed organ. After the peeling forwards of as much of the thickened pleura as can safely be accomplished, the cavity is packed with antiseptic gauze and covered over with the large skin flap reflected in the first stage of the operation, the loosened pleura being secured to the margins of the skin wound.

Linenthal's new operation is a more rational procedure, and consists of a long incision through skin and muscle in the seventh or eighth space from the angle almost to the rib cartilage, by which means, with the aid of a special retractor or rib spreader the intercostal space can be widened to the extent of four inches, giving ample room for exploration of localised abscess, and by dividing the thickened exudate on the pulmonary pleura by the knife or scissors and the introduction of the fingers or hand the imprisoned lung may be freed so as to effect expansion and avoid the permanent deformity following the Estländer method.

During the slow healing process after empyema operations the patient should as soon as possible be wheeled out into the open air when the climatic conditions are favourable, and a change to a warm seaside resort when practicable should be insisted upon. He should be fed on a dietary such as is indicated in the treatment of chronic phthisis.

Autogenous vaccine treatment is of value in some cases by hastening recovery, and is especially indicated when the lung has been perforated and where large quantities of pus are being expectorated. The old sinuses left after the operation, especially in chronic tuberculous empyemata, often heal up completely upon resorting to the injection of Beck's Bismuth Jelly.

The older methods of Revilliod, Fagg and Bülau by tapping and keeping up *continuous* siphonage through a rubber tube whose end was dropped into a basin of antiseptic solution placed under the patient's bed have given way to resection and incision; they are still occasionally employed in the treatment of pneumococcal empyema in children, but should be abandoned, though this siphonage method of once emptying the pleural sac in young subjects and then closing the punctured wound may be often advantageously resorted to instead of aspiration.

ENDOCARDITIS.

The *prevention* of carditis or valvulitis in acute rheumatism is a most important element in the treatment of that disease. Absolute rest in bed as soon as the diagnosis has become established must be insisted upon; and that this will sometimes prevent the complication of endocarditis in rheumatic fever is probable, but this form of rest treatment must not be confused in the mind of the physician with another of still greater importance. This is the question of *prevention of permanent valvular disease* once endocarditis has become established; here absolute rest in bed for a considerable period (2 to 3 months) after the symptoms of endocardial inflammation have disappeared certainly in a considerable percentage of cases will avert permanent deformity of the valves.

When endocarditis has declared its presence, absolute rest is therefore also a vitally essential part of the treatment. In carrying out the most extreme degree of rest the greatest difficulty will be found in the evacuation of the bowels; the ideal of the bed-pan often proves a delusion, as some patients cannot use it without violent bearing-down efforts, and the physician who will obstinately insist in all cases on its use will often be responsible for serious results which might otherwise be avoided. The writer has personal experience of a physician who well knew the danger of these expiratory efforts, and who nevertheless fractured his fourth left costal cartilage in trying to relieve the bowel in the lying posture. Certainly with patients who cannot use the bed-pan there is *less danger* in permitting them slowly and with assistance to slide out of bed on to the night-chair. Often the difficulty of evacuating the bowel in the recumbent position on the bed-pan disappears when a smart saline has been administered along with a drug like senna, which increases peristalsis; occasionally an enema will meet the case, provided the contents of the bowel are not firm.

Salicylate treatment cannot be accepted as a preventive in the ordinary sense of the term, and it is probably certain that it exerts no beneficial action on the inflamed membrane, and therefore cannot be regarded as a specific remedial agent in the treatment of endocarditis. But the endocardial mischief originally started by the rheumatic toxin is greatly intensified by the high fever and general vascular excitement, as well as in a reflex manner it is aggravated by the severe joint pains. These are all relievable by the salicylate treatment, and therefore it should be continued in the presence of the usual rheumatic manifestations. The endocarditis remains after the constitutional excitement and arthritic pains have disappeared, and when the physician finds himself dealing with this alone the case is clear. Salicylates should be stopped, but if fever and pain return at any time they must be recommenced.

A good routine for the endocarditis is the free administration of Alkalies; 60 grs. Bicarbonate of Potash given with a tablespoonful of fresh lemon-juice may be taken 4 times a day in effervescence. Lees' plan of combining in a mixture salicylate and bicarbonate of sodium is a good one; the former drug can be stopped in cardiac cases when the arthritic

manifestations fade. Yeo recommends pure Salicin combined with Soda.

The effervescing mixture is, however, better, because the citrate of potassium formed by mixing the lemon-juice and alkali together reduces the tendency towards fibrinous deposit on the delicate valvular tissue, and this consideration compels one to avoid the use of Chloride of Calcium, which has unfortunately been recommended as a cardiac tonic in endocarditis. At a later stage the addition of Iodides to the alkali is clearly indicated.

Diet should consist of fluids--milk and soups.

Lees advocates the continuous application of the ice-bag over the heart; relief to cardiac pain and distress usually follows, but the writer believes that continuous application of cold eventually increases the vascularity of the underlying tissues, as demonstrated in the experimental researches of Rossbach, who found that ice when applied to the chest caused anæmia of the bronchial mucosa, but when long contact was kept up the opposite—a hyperæmic—condition supervened. If this treatment be selected the application of the ice-bag should be intermittent. It is a valuable agent when employed in this manner in the grave condition recognised as rheumatic carditis, when both the pericardium, endocardium and possibly the entire organ are involved in the inflammatory process, especially in children.

A warm linseed poultice, upon which a little Unguentum Belladonnæ is smeared, is an effective remedy, or the green extract, rubbed up with Glycerin, may be painted over the cardiac area when there is cardiac pain and distress. Occasionally the application of leeches may be useful.

Blistering gives more satisfactory results than any other method of treatment. This plan of treating in a routine way all cases of rheumatic fever was first carried out systematically by the late Dr. A. Harkin, and the writer had many opportunities of observing the results which he obtained by placing a large blister over the cardiac area in cases where no cardiac complications existed. The temperature usually fell rapidly with the pulse-rate, and the joint pains were for a time markedly relieved. This was before the introduction of the salicylate treatment, when the physician had no remedy save opium for the relief of the constitutional symptoms. Since then Caton has shown that a blister may be used as a preventive of endocarditis, and of permanent valvular disease when applied after endocarditis has supervened. He applies the vesicant between the clavicle and nipple to the skin supplied by the first four dorsal nerves with the view of stimulating the trophic centres. In conjunction with blistering Caton insists upon a prolonged rest of 3 months in bed and the steady administration of Iodide of Sodium with occasional doses of Calomel. It will, however, be wise to combine the iodide with full doses of alkalies.

In the later stages especially salicylates should be avoided owing to their depressing effects upon the cardiac muscle when long continued.

Cardiac tonics—Digitalis and Strophanthus—must be used cautiously, and only then when signs or symptoms of heart failure or weakness are present. Though the pulse-rate may be reduced by these agents the strength of the ventricular contractions is also markedly increased, and this will only increase the mischief when the heart muscle is unimpaired. Sudden failure should be met by Strychnine hypodermically and alcohol avoided when possible, since this stimulant, whilst temporarily helping the heart, usually increases the pulse-rate at the same time.

Iron, Quinine, or the vegetable Bitter Tonics and a change of air and scene are valuable agents in restoring the strength and vigour after the prolonged rest in bed. Exercise should be permitted tentatively at first and with much caution; a return to the active duties of life should be postponed till after the cardiac muscle has attained its normal tone.

Endocarditis occurring during scarlatina, chorea and tonsillitis even where no other rheumatic manifestation is present, must be treated upon exactly similar lines.

The presence of pericarditis does not contra-indicate the use of the before-mentioned remedies, though additional agents may be required, as will be found detailed under Pericarditis. It is a good practical rule to assume where a pericardial inflammation is present in rheumatic patients that endocardial mischief always accompanies it.

ULCERATIVE ENDOCARDITIS.

The primary disease of which this is a secondary result may call for prompt treatment: this is sometimes rheumatism associated with previous long-standing valvular disease, erysipelas, pneumonia, gonorrhœa or diphtheria, but as is usually the case the original malady may have disappeared and left nothing but its sequela behind. Nevertheless a careful search should be made in every corner of the body for any focus of infection. The micro-organisms which are capable of producing the disease are probably various, and there seems little doubt that they may flourish as easily in the hollows of decayed teeth as in the vegetations on a diseased valve. It is needless to say all such foci should be removed when removal is possible, as in the case of teeth, abscesses, gonorrhœal discharges, otorrhœa, &c.

As the infective cocci have found their way already to the heart, various drugs have been vaunted as antiseptics given by the mouth in order to effect their destruction in the blood. It is very doubtful if any drug can accomplish so much, but Sansom maintained that 30-gr. doses 3 or 4 times a day of Sulphocarbolate of Soda often cured the disease by the action of the free carbolic acid liberated from it in the body. He supplemented this treatment by free inunctions of the acid mixed with oil. Ewart in the same manner employed ointment of Protargol, and suggested the intravenous injections of Perchloride of Mercury. The newer Arsenical preparations and Salvarsan have also been tried.

Various Sera have been prepared by injecting into the horse numerous strains of staphylococci, streptococci, and pneumococci. These poly-

valent sera have been credited with curative properties, but their value seems very doubtful when one reflects that their action is not antitoxic, but bactericidal, and Wright maintains that they destroy the natural immunising powers of the body. The serum is useless unless the immunised animal had chanced to be injected with the particular strain of the organism which is causing the disease in the patient, and it can obviously be of no value in rheumatic cases.

Vaccine methods hold out the only hope of combating the disease effectually, the microbe being isolated from the blood of the patient by making a series of blood cultures; the specific strain is injected subcutaneously in graduated doses of the killed organisms. Already several successes have been achieved by this method of treatment.

The various complications which arise during the progress of the malady should be treated on general principles; thus the rigors which occur in the so-called malarial type of the disease are to be met by extra clothing, hot drinks, &c., and the hot stage with opposite measures as in pyæmia and malaria. Abscesses are to be opened when they form; limbs whose main vessels are plugged must be treated as in gangrene, and cerebral embolism met as in apoplexy.

ENDOMETRITIS.

Acute Endometritis.—This affection may be either puerperal, gonorrhœal or due to infection by a dirty instrument. There is considerable risk in the early stages of generalising or at least spreading the infection by energetic local measures, and while the temperature and pulse-rate are still in the acme of the initial rise and there is much local pain, tenderness and discharge, it is the physician's best policy to play a waiting game and to restrict his activity to constitutional measures. Rest in bed should be insisted on, with light diet and a free saline purge. I think some benefit may be looked for from quinine, given in 5-gr. doses three times a day. A hot sitz-bath for ¼ hour helps to relieve the pain; so do hot-water bags to the abdomen and back. Good effects may be expected from the use of prolonged vaginal injections at a temperature of 110° F. 10 to 15 quarts of normal saline fluid should be used twice daily.

When the temperature and pulse have fallen and the pain and tenderness lessened, the condition may be treated as subacute and other local remedies may be used. The most generally applicable are those which are intended to relieve congestion and promote the flushing out of the uterine vessels with blood. The vaginal douche should be continued, and if the physician desires he may make it weakly antiseptic (1 in 10,000 *perchloride, Tr. Iodi F.* 1 dr. to the quart, *lysol* or *cyllin* ½ dr. to the quart, *borax* or equal parts of *boracic acid* and *soda bicarb.* a teaspoonful to the quart), but he should always remember that the most important constituent of the douche is the hot water. A *tampon* soaked in *boroglyceride* or in *Ichthyol* or *Subitol* (10 per cent. in glycerin) may be applied to the cervix every other day for 12 hours at a time. Iodine (1 per cent.

in glycerin) may be used in the same way. Direct *blood-letting* from the cervix by scarification has been recommended, but is unnecessary if the douche and tampon are thoroughly used. If symptoms persist after some weeks, treat as for chronic endometritis.

Chronic Endometritis.—In the majority of these cases the endometrium of the body of the uterus is free from infection, probably owing to the thorough flushing with blood which it undergoes at each menstrual epoch, and the disease is confined to the canal of the cervix. Very often a cervix thus affected has suffered laceration at childbirth, and a tender cicatrix or a well-marked ectropion of the mucous membrane may be present. Copious muco-purulent discharge, with pelvic pain, uterine tenderness and usually menorrhagia are found as symptoms.

The routine treatment of these cases should take this form: Once or twice a week a speculum should be passed and the cervical canal should be swabbed out with an antiseptic applied on a Playfair's probe coated with cotton-wool. For this purpose pure *carbolic acid* liquefied by heat may be used, or 40 per cent. *formalin, iodised phenol* or *Tr. Iodi F.* or a saturated solution of Picric Acid in alcohol may be used. After the application a tampon soaked in one of the glycerin solutions mentioned above is introduced into the vagina, and the patient lies up till the following morning, when she withdraws the tampon and uses a douche of from 4 to 8 quarts of one of the antiseptic solutions recommended for subacute endometritis. These may be used of double the strength already indicated. This douche is repeated daily until the next visit to the physician. Cases with much ectropion often do well if treated with *nitrate of silver* solution (20 grs. to the ounce) poured into a tubular Fergusson's speculum and allowed to remain in contact with the cervix for 5 minutes, and followed by daily douches. *Bier's hyperæmic treatment* has been tried for obstinate cases, the suction being applied through a special glass tube made to enclose the cervix, and each application lasting for from 10 to 20 minutes. It is worth while in cases which resist the methods of treatment suggested above to try the "dry" method. The cervix is swabbed out with a caustic such as pure phenol, the vagina is carefully dried with pledgets of cotton-wool, and dry boracic powder or powdered acetate of alum is then insufflated through a tubular speculum so as to cover the vaginal walls thickly. The powder may be left in place for 4 to 7 days, and may be then removed by douching and the treatment repeated. Gonorrhœal cases have been treated by the application to the cervix of strips of plain gauze soaked in a pure culture of the *lactic acid bacillus,* with the object of destroying the gonococcus by the acid secretion formed. *Ionic medication,* carried out by filling the vagina with a solution of copper sulphate and running a continuous current through it, has been tried with good effect. It should not be forgotten that the discharge in many of these cases is partly due to debility, and that measures for the relief of anæmia and malnutrition may be of benefit.

Cases which resist local drug treatment, or which relapse after ap-

parent cure, should be subjected to the operation of *curetting*. This operation should not be undertaken if there is evidence of suppuration in the ovaries, tubes or pelvic connective tissue, as it is dangerous to some extent under such circumstances, and is not likely to have a permanent good effect. It should be combined with the repair of any deep cervical laceration that exists, and if the perineum is torn and the vulva gaping a perineorrhaphy should be done to protect the vagina and cervix against constant exposure to infection from without (see below, Curettage).

Non-Infective Endometritis.—Under this heading we may group a number of conditions in which the presence of an infective agent is either not suggested or not proven, and to which the title of an inflammatory condition suggested by the name "endometritis" can only be applied by courtesy. They may be divided into the following groups:

1. *Conditions Associated with Hypertrophy of the Endometrium.*—These include cases of retroversion with enlargement of the uterus, cases of slight subinvolution of the uterus after abortion or childbirth (often due to the retention of some part of the secundines), cases of "glandular," "interstitial," and "polypoid" endometritis, and are marked by a leucorrhœal discharge with sacral weight and pain, some dysmenorrhœa and menorrhagia. General hygienic treatment, with the administration of iron, should be tried first in these cases. Local treatment on the lines mentioned under chronic endometritis should accompany it, but is not as a rule very satisfactory. Curetting is more successful, and curetting followed by local treatment is most successful of all.

2. *Conditions Associated with Atrophy of the Endometrium.*—As a rule the most marked symptom in this class of case is hæmorrhage, menstruation becoming both irregular and profuse. A few cases of menorrhagia in young women belong to this type, most cases of menstrual irregularity due to the presence of a submucous fibroid, and lastly many cases of irregular losses in the decade from 40 to 50 years of age. It is especially in regard to this last type of case that a word of warning should be uttered. There can be no objection, except that attaching to the probable failure of the treatment, to a practitioner endeavouring to cure a case of menorrhagia in a young woman by general or local tonics such as Iron, Ergot, Viburnum Prunifolium, Styptol, or the like. On the other hand, *when a woman above 40 years of age consults a doctor for uterine hæmorrhage he is acting in defiance of the patient's interests and of his own if he prescribes for her before he has excluded uterine cancer as the possible cause of the bleeding.* Every physician knows that the only hope of cure in cancer lies in the complete removal of the tumour by operation. Every day during which the tumour is allowed to grow lessens the probability of a complete removal and makes the hope of cure more slender. It is therefore the bounden duty of the doctor to make the diagnosis certain and absolute at the earliest possible moment. No considerations should be allowed to postpone a vaginal examination both with the finger and

the speculum, and if nothing is discovered the investigation should not end there. As soon as possible the uterus should be curetted and the fragments examined microscopically by a competent pathologist in order to exclude the possibility of a corporeal cancer. Few patients will refuse to submit to this thorough examination when the importance of it is explained to them, and the assurance may be given that if no serious mischief is present the operation will completely relieve the symptom on account of which advice was sought.

Curettage.—This operation has been frequently mentioned in connection with the treatment of endometritis. It is indicated in cases which resist a thorough trial of local and constitutional therapy or which are improved by it only to relapse. It may be safely recommended when the main symptom is menorrhagia, where the uterus is bulky and rather tender, and when leucorrhœal discharge persists in spite of treatment. It is contra-indicated in all cases of active inflammation of the uterus, and in cases of inflammation of the ovaries and tubes, especially when signs of a collection of pus (pyosalpinx or ovarian abscess) are present. Before performing the operation the possibility of pregnancy should be excluded, and in many cases the operation should be looked upon as merely inaugurating a course of local (by tampons, douche, &c.) and constitutional (tonic and hygienic) treatment, which may be pursued with better hope of success after curetting.

The operation in most cases requires the administration of an anæsthetic for its thorough performance, as the requisite dilatation of the cervix is painful. The most careful antiseptic precautions should be taken, the vulva shaved, washed with soap, and douched with a 1 in 4,000 perchloride or drachm to the pint lysol or cyllin solution, the vagina is then douched, the speculum, which with the other instruments has been boiled and placed on a sterilised towel or in a tray or basin filled with antiseptic solution, is passed and the cervix seized with a vulsellum. The uterine sound is passed to make sure of the exact direction of the canal, and the dilators, commencing with a 3 or 5 Hegar, are passed through the canal into the cavity of the uterus. Only a minimal amount of force should be used, and the passage, if there be any obstruction at the internal os, should be felt for in the same way as a sound is manipulated through a urethral stricture. After one or two of the smaller dilators have been passed, more force may be safely used. When the canal has been dilated up to 10 or 12 Hegar the sharp curette is passed up to the fundus, and with successive strokes the interior of the uterus is carefully gone over. Only moderate pressure is necessary to remove the endometrium, and too vigorous scraping has been known to result in complete destruction of the membrane with consequent amenorrhœa. After the body has been dealt with the cervical canal should be carefully curetted, and for this a small curette is advisable. The fragments of endometrium should be put at once in a bottle of 4 per cent. formalin and submitted to microscopic examination if thought necessary. The uterus may then be washed out with antiseptic solution through

a Bozeman's catheter, and a strip of iodoform gauze introduced as far as the fundus. Some gynæcologists swab out the cavity after curetting with phenol or some strong antiseptic on a Playfair's probe, but the oozing after the operation makes such an application very uncertain and partial in its action, and I prefer to postpone it until the membrane has been re-formed, when better results may be expected should such a treatment be necessary. Should perforation occur, which may be known by the sudden loss of resistance to the instrument, dilator or curette, and by its slipping through the cervix far beyond the limits of the uterine cavity, no harm will be done if strict antisepsis has been observed. The instrument should be withdrawn at once, no further manipulation should be attempted, a small gauze drain should be passed through the internal os, and the patient put to bed.

The patient should remain in bed for a week; the gauze drain may be removed next day, and daily hot douches should be given.—R. J. J.

ENTERITIS.

The treatment of the inflammation of various parts of the intestinal tube will be found discussed under the headings, Colitis. Diarrhœa, Dysentery, &c. Many cases labelled "enteritis" and treated as such are merely examples of the cathartic action of ptomaines or purgative principles introduced from without, or formed by fermentative or bacterial action within the bowel. These substances produce diarrhœa, which is to be regarded as nature's method of effecting a cure by expelling the irritant which causes the catharsis. After the prolonged irritating action of such products or when the dose has been a large one, there may be established a catarrhal inflammation or general enteritis, which will require soothing treatment by large doses of Bismuth and astringents like Tannalbin or Tannigen, with opiates—agents which may do mischief in the early stage by retaining the irritants within the canal.

Unless the preliminary purgation be excessive it should be encouraged by mild purgatives of the Castor-Oil type, or an intestinal antiseptic like Calomel in minute and frequently repeated doses. Remarkable success has followed the injection of Sea Water hypodermically by Robert-Simon's method.

ENTEROPTOSIS—see Glénard's Disease.

ENTROPION—see Ectropion.

ENURESIS—see Incontinence of Urine.

EPIDIDYMITIS—see Orchitis.

EPILEPSY.

Grave doubts must be entertained about all recent reports of the discovery of a causal microbe in this disease; though the trend of opinion is strongly in favour of a toxæmic theory, this view has not yet led to any

advance in treatment, this being still purely symptomatic or empiric. The management of the patient during an attack, immediately before and after an attack, and in the intervals between the attacks, may be separately considered.

During an attack of convulsions the physician should abstain from too active interference; all constrictions about the neck or throat should be removed, and the patient placed flat upon his back if he has not already naturally assumed this position. A soft pillow may be placed under his head, and attention given to the state of his mouth. If the tongue protrudes, a large cork or piece of rubber tubing may be inserted between the teeth to prevent its being injured. Any food or artificial teeth should, if possible, be removed from the mouth. It is useless to make attempts to restrain the movements by forcibly holding down the convulsed limbs; all that can be done is to watch and see that the patient inflicts no injury upon himself during the clonic spasms, especially by hammering his head against the floor or any hard object.

The following plans have been found to modify the severity of the clonic convulsions in some cases, and very occasionally they may avert a threatening attack when resorted to just before the seizure—viz., pressure over the carotid artery upon each side by thrusting the thumbs deeply against the skin at the root of the neck, and making firm pressure backwards, or compressing the tissues very firmly between the thumbs and the spine. Nitrite of Amyl may be inhaled, and when the attack is of long duration Chloroform may be administered, but the occasions on which the latter drug is indicated during the attack are very rare. When a distinct aura or warning is experienced the above measures may be tried in order to prevent the attack; the best results are to be expected from the Amyl. Tying a ligature tightly round the limb where the aura is felt, or irritating the region by pinching, pricking or galvanism may put off the seizure. Where contractions of muscles warn the patient that an attack is coming on, prompt forcible extension of the contracted limb sometimes is effectual. Many other means have been discovered and resorted to by patients who experience warnings—thus violent breathing, shouting, jumping, electric shocks, ammonia and pungent snuff have been utilised by patients who have found their employment to cause postponement of the attack. Counter-irritation to the spot in which the aura is felt, or blistering of the limb above the spot, sometimes prevents further attacks. If any portion of the body is discovered upon which pressure or irritation causes an attack to come on, Brown-Séquard advised counter-irritation of this site.

The treatment of the patient immediately after the cessation of the convulsive movements should consist in leaving him entirely to the natural undisturbed sleep which usually supervenes; no attempt should be made to arouse him suddenly by shouting into his ear or roughly shaking him. His friends should, however, be warned to watch him for a short time, as sudden homicidal or other impulses in some patients are liable to manifest themselves in the post-epileptic condition.

Between the seizures the following should be attended to:

Diet should be moderate in amount and varied; over-eating after long fasts is most injurious; the meals should be light, all food being thoroughly masticated and taken at regular intervals of 4 or 5 hours, a heavy supper being especially forbidden. Animal red foods should be restricted unless when the patient is following some occupation which entails free muscular exertion. Fish and poultry afford a good routine, with eggs, fresh vegetables and farinaceous foods; tea and coffee should be used sparingly and alcohol in every form avoided. Many patients do best on a strict vegetarian diet, and this is the writer's routine when the patient can be got to consent to it. Gowers stated that no advantage is derivable from a purely vegetarian diet, but he admitted that many epileptics find it advisable to abstain from beef. The best and only rational procedure is to educate the patient to change his diet for a month or two at a time and to keep a correct register of his attacks, from which valuable information may be obtained regarding the most suitable foods for his maintenance. A Koumiss or sour milk dietary may be advantageously used from time to time. A *salt-free* dietary has been shown to be of value by Richet, as by this means the necessary amount of Bromides may be considerably reduced in the drug treatment of the disease.

Constipation, so frequently present, is to be carefully guarded against; this object in the dietary should not be lost sight of, and hence one of the advantages of a vegetarian diet; boiled Spanish onion is a valuable aperient in all cases, and may be eaten freely. As auto-intoxication from the bowel may be the exciting cause of the seizures the intestinal tract must always be kept freely open, and occasional purgation by Salines should be resorted to when the diet fails to accomplish this desideratum.

Hygiene.—The environment of the epileptic has received much attention. An open-air life with abundance of exercise, unaccompanied by the excitement which follows such games as football, cricket or hockey, is essential. Any exercise or pastime which places the patient in a dangerous position during a seizure must be strictly forbidden, as cycling, horse riding, swimming, rowing, &c. This latter remark applies forcibly to the selection of a trade or occupation for the epileptic. An outdoor employment is always to be preferred, and as these are necessarily limited by the last-mentioned consideration the chief haven is that of farming or gardening.

The Township or Colony System meets all the requirements of the artisan and lower middle classes, where an open-air life spent in market gardening or other occupation affords a means of profitably enjoying a useful if uneventful existence. But the benefit of such institutions shows itself even more clearly in the facilities which it affords for the mental and moral training of young epileptics whose backwardness or deficient abilities cannot be improved by ordinary school lessons. The colony system can rescue many such feeble-minded patients from the certainty of their becoming hopeless wastrels. Easy mental exercises can be combined with simple carpentry, basket-making, or other primitive handicraft.

The question of marriage may be considered; this should always be

firmly discountenanced, and the marriage of a male with a female epileptic should be regarded as little short of criminal unless the female be beyond the child-bearing period.

A careful examination must be made for the discovery of any source of reflex irritation, such as intestinal worms, eye strain, adenoids, nasal polypi, mechanical dysmenorrhœa, scar tissue involving nerve trunks, adherent prepuce, ear troubles, &c. These should all be remedied, the hygiene of the mouth seen to, and the possibility of masturbation should be delicately inquired into and stopped by moral education.

Drug Treatment.—Bromides are the most valuable of all agents employed in idiopathic epilepsy, but their action is probably confined to their power of diminishing the hyperexcitability of the cortical centres without effecting any curative power over the still unknown causal agent in the production of the seizures. As regards the relative value of the salts of bromine little need be said; where one is markedly beneficial any of the others will also prove efficacious. The best routine practice is to employ the Bromide of Sodium, as its base is less depressing than potassium, when large doses must be given for long periods. 60 grs. may be daily taken in three divided doses of 20 grs. each freely diluted after meals, and this amount may be continued for many months or even years without intermission. Sometimes, but not often, larger doses may be required, and some physicians press the remedy till its full physiological effects of drowsiness and loss of the palatal reflex are obtained. It is claimed by many observers that smaller doses suffice when sodium chloride is eliminated as far as possible from the diet, or when Chloral is combined with the Bromide. Valuable information may be obtained regarding dosage by a scrutiny from time to time of the register of the attacks kept by the patient or by an intimate associate. The dose should be reduced as the attacks become less frequent, and sometimes when this is undesirable the symptoms of bromism may be minimised by changing from one bromide to another. Bromipin or Brominol, which is an additive compound of bromine and sesame oil, may often be advantageously substituted for the soda salt in doses of 20 to 30 mins. of the 33 per cent. solution in syrup. Hydrobromic Acid is extolled by some authorities, but the writer finds it the least reliable of all the bromine preparations.

After a first seizure this treatment should be kept up for at least a year, since every epileptic seizure is believed to leave the nerve centres more susceptible to further attacks, but should the convulsion recur a prolongation of the treatment for two years after the second or subsequent seizure should be insisted upon. Before finally stopping the bromide, one large dose may be given nightly whilst the day doses are suspended, and a single large dose (60 grs.) may be used at bed-time only when the epilepsy is of the true nocturnal type throughout. The tendency towards acne may be minimised by combining 2 to 3 mins. Fowler's Solution with each dose.

Bromides certainly exercise a much more powerful action over the typical *major* attacks than over *petit mal*, but this does not mean that they

should not be employed in the minor attacks also. One serious difficulty in pushing bromide treatment, especially in the latter type of the disease, is the appearance of symptoms of mental deterioration which are so liable to supervene; the patient and his friends get convinced that the mental condition is solely caused by the treatment, and they sometimes refuse to continue it. It certainly should not be pushed so far in *petit mal* as can with perfect safety be done in the major type of the malady. As soon as the diminished frequency of the attacks as counted by the chart or register demonstrates that the bromide has the disease under some degree of control it may be gradually reduced to 40 grs. per day, and ultimately to 30 grs., but its administration must be kept up for years as a rule. About 1 case in every 10 will be able to dispense with the drug entirely.

Brown-Séquard advocated the following solution of mixed bromides with iodide—viz., Pot. Brom. ʒj., Ammon. Brom. ʒiij., Pot. Iod. ʒij., Pot. Bicarb. ʒj., Tr. Calumbæ ʒj., Aquæ ad ʒvj. Of this a teaspoonful in water was given thrice daily before meals and ʒiij. at bed-time. In *petit mal* the ammonium salt was increased and the potassium one diminished, and he continued this for 8 to 10 years without harm, the dosage of bromide being almost 1½ drs. daily exclusive of the iodide: a tonic bitter with Strychnine or Arsenic was given after meals.

Other drugs should be tried when the patient's register has proved that the bromide possesses no influence in diminishing the number and severity of the seizures.

Borax is the best of these. Before placing the patient upon full doses (10 grs. *ter die*) it will be wise to test its action in half this amount combined with the bromide. It may in its turn, if it fails, be combined with Tr. Belladonna 10 mins. or $\frac{1}{150}$ gr. Atropine, but it is so liable to upset the stomach and to cause dermatitis that its use cannot be long continued. It is a good routine in the treatment of *petit mal* during the intervals when the bromide is stopped. Nitroglycerin in small oft-repeated doses has sometimes proved of value alone, or in combination with bromide; if it is to do any good, this will become apparent after 1 to 2 weeks' trial; should it fail, Digitalis may be tried in a similar manner. These drugs are indicated in *petit mal*. Camphor Monobromide is beneficial in both types, and is less objectionable than Chloral when an hypnotic is required.

Antipyrine in the major form has proved a valuable adjuvant to bromides, but its use should not be long continued. Flechsig combines Opium with the bromide treatment in alternating courses, commencing with 1½ grs. daily, which are gradually increased till 15 grs. opium are taken daily by the end of the sixth week. 2 drs. potassium bromide are then administered every day for the next six weeks; this is reduced to 1½ drs. during the third course of a month, and finally to 1 dr. daily during the next 12 weeks, no opium being given after the termination of the first six weeks. The writer has no experience of this method and would be slow to try it, owing to the danger of establishing the opium habit, but it might be quite safe in hospital practice where the patient was under close supervision.

Trousseau's routine when bromides failed consisted of Belladonna or Atropine alone; he gave the green extract in doses up to 1½ grs. *ter die*. Not more than 1 min. of the B.P. Liquor Atropiæ should be given.

Salts of Zinc (5 grs. of the oxide), of Silver (⅛ gr. of the nitrate), of Gold (1/10 gr. double chloride), of Copper (¼ gr. ammonio-sulphate), of Cerium (3 grs. of the oxalate), of Nickel (5 grs. of the bromide), of Lithium and Strontium (30 grs. of the bromide), of Calcium (15 grs. of the chloride)—these are but a few of the inorganic substances which have been tried and at times found valuable. But of organic compounds and vegetable preparations there is practically no end. These may be passed over with the exception of those already referred to.

In epilepsy occurring in syphilitic patients the routine treatment after a course of mercury when this drug has not already been freely administered should be large doses of Iodides (60 grs. *per diem*), but recent statistics prove that there is no such thing as a true syphilitic epilepsy.

Status Epilepticus.—This is often fatal. Chloroform should be administered at once and a large dose of Chloral Hydrate (60 grs.) should be given by the rectum. Nitrite of Amyl may be tried at the same time. Gowers obtained excellent results from the hypodermic injection of a full dose of Hyoscine (1/150 to 1/60 gr.). Bromides are useless, but occasionally a full hypodermic of Morphia is beneficial, and blood-letting has sometimes apparently saved life. Where hyperpyrexia is present the cold pack or ice to the spine and head should be employed. If the patient can swallow, full doses of Cannabis Indica with Hemlock Juice may be given or Coniine (1/10 gr. to 1 gr.) may be administered by the skin. In the comatose stage with failing heart and respiration 1/16 gr. Strychnine may be injected, but this drug should not be given in the early convulsive stage.

Many other methods which have from time to time been suggested and carried out for the cure of epilepsy may be mentioned. Surgical procedures for the relief of intracranial pressure or irritation have been instituted, even to the extent of removal of a portion of the cortical centres; the results do not justify such operations being undertaken for the cure of the idiopathic type of the disease, and the same remark applies to the heroic procedure of ligaturing the longitudinal sinus in two sections. Alexander's operation for the removal of the sympathetic ganglion and the operation of ligaturing the vertebral or carotid arteries have been abandoned.

Electricity has proved of little value; the continuous current has been reported as useful when applied for long periods to the thyroid gland in some cases, but the results of the various methods of using the static and high-frequency currents and other forms of electricity are at the best evanescent, and may be attributed to suggestion as in the next procedure.

Hypnotism has undoubtedly in mild cases been followed sometimes by a marked diminution in the number of attacks or by a long postponement of seizure when the suggestion has been made to the patient during the hypnotic state that he will not suffer from future attacks, but when a

seizure does follow he is possibly rendered more susceptible owing to the blighting of his hopes.

Serum Therapy has been tried, the patient being injected by his own serum or by the Cerebro-spinal fluid from another epileptic, with the chimerical idea of rendering him immune to the influence of the unknown toxin which is supposed to produce the convulsions. Any apparent benefits noticed after the injections are probably due to suggestion, and this remark applies to the old practice of inserting a seton into the nape of the neck, and many other long disused methods of treating the disease.

Crotalin extracted from the poison gland of the rattlesnake has been injected hypodermically with results which tempt no one to use it.

Jacksonian Epilepsy.—The convulsive attacks which begin in a particular group of muscles following a localised injury of the cranium, such as that in which a spicula of bone is driven in upon the cortical area, or where an adherent cicatrix involves this region, are known as examples of what is styled *traumatic* epilepsy. These focal symptoms are a clear indication for surgical interference, and as long as the convulsions remain strictly confined to the muscles associated with the injured centre there is a fair hope of the success of trephining. To lose time by bromide treatment is a serious mistake in these cases, as once the convulsions cross the middle line and have become general there is but a faint hope of success following surgical procedures. This remark holds true for the convulsions caused by a small cerebral tumour located in the cortex of the Rolandic area, which if removed early by a trephining operation may cause permanent disappearance of the Jacksonian convulsions, but even if the tumour be large, palliation of the symptoms may be effected by making a large opening.

EPIPHORA.

The treatment of the different conditions in which the tears flow over the cheek instead of through the nasal duct will depend upon the nature of the obstructing cause. Thus if the punctum be displaced by ectropion or entropion these deformities should be removed by the operations described under Ectropion. Displacement of the punctum without apparent ectropion or entropion is best remedied by converting the minute circular orifice into a slit by the introduction of a fine probe-pointed Weber's knife. Stricture of the nasal duct, if present, must be permanently dilated. This may be accomplished by passing a probe down at repeated intervals through the narrowed duct; to cause wide dilatation the probe may be kept *in situ* for a short time. Astringent solutions may be injected after a very large probe has been used for some time.

Should there be much difficulty in passing the probe, either canaliculus may be slit up for a portion of its extent. This is best done by inserting through either punctum a fine grooved director into the sac along the canaliculus, and slitting up the canal in part or in its entire length. After this any form of probe, medicated bougie, tent or style, may be employed to keep up dilatation. Benson recommends the use of a piece of leaden

wire with a probe-pointed extremity, which can be worn in the duct at night and removed by the patient in the morning.

Weber, Stilling, and others overcome the obstruction by incisions made with variously shaped knives, and the actual cautery and the galvano-cautery have been used with advantage to cause obliteration of the entire lachrymal sac after milder measures have failed. The lachrymal sac may be dissected out by Kuhnt's method after the injection of paraffin, and even the lachrymal gland may require removal. When, however, chronic dacryocystitis causes epiphora without stricture of the nasal duct, the affection may be successfully treated by the patient frequently pressing upon the lachrymal sac in such a way as to force its contents down into the nose, astringent or caustic solutions being employed to relieve the conjunctival inflammation present. Acute dacryocystitis should be treated by slitting the canaliculus or the skin over the sac, and applying Nitrate of Silver freely to its interior.

EPISPADIAS.

This condition, due to absence of the roof of the urethra (the opposite state to hypospadias), is nearly always associated with ectopia vesicæ, or extroversion of the bladder, and the only treatment of any service is a plastic operation, performed by dissecting a flap from the abdominal surface and two flaps from thé groins, with a view to cover in the exposed bladder region. After the cicatrisation of these flaps, another plastic operation, as devised by Nélaton, may be undertaken to remedy the epispadias, but the best procedure for preventing the incontinence of urine and the formation of phosphatic concretions in the artificially formed bladder is to transplant the lower end of the ureters into the rectum with their adjoining portions of bladder mucous membrane.

EPISTAXIS.

The bleeding may be a conservative phenomenon when not due to local injuries or ulcerations, and if slight it should not be meddled with; thus in plethoric subjects, and in those suffering from congestive headaches, the discharge gives relief, and measures for its arrest should not be undertaken unless the flow has already been plentiful. In cases occurring in renal disease, purpura, hepatic cirrhosis, &c., attention must be paid to the general condition, and Chloride of Calcium given in 20 gr. doses, repeated every 3 or 4 hours.

The patient being placed on his back, with the shoulders and head elevated and the arms raised as high as possible above the head, pressure is made upon the nostrils by pinching them between the finger and thumb, when usually the hæmorrhage will be found to cease. Should this fail, cold compresses or ice to the temples and occiput, and sinapisms to the calves of the legs, may be tried, or Hutchinson's plan of seating the patient upright in a chair with his feet in a deep pail of hot water may be resorted to. The reflex action following these applications often speedily causes closure of the bleeding vessels through the vaso-motor supply.

If bleeding continues the nostrils should be washed out with saline solution, and a careful examination made for the discovery of the bleeding spot. This may be touched with the electric cautery at a low heat when found in its most common site on the lower part of the septum at its anterior aspect. A probe dipped in strong Chromic Acid may be applied to the spot. Adrenalin Solution is sufficient in most cases, a pledget of lint or gauze being soaked in the liquid is to be used as a plug for the anterior nares. This drug has displaced all other local astringents, as tannin, perchloride of iron, &c. Cocaine is also efficacious, but recurrences are more common after its use. The writer's routine method was to pack the nostril with Puff Ball, which always succeeds, but it is difficult to keep the parts aseptic, and the adrenalin is therefore preferable when at hand.

Of recent remedies a piece of gauze steeped in normal Horse Serum will be found a convenient and effective hæmostatic. A rubber bag in the form of a penny balloon which is placed *in situ* in the nostril in the collapsed state and afterwards inflated with air is a painless and efficient method; it should, like the adrenalin plug, be removed after 24 hours and reinserted if necessary.

When repeated hæmorrhages follow the forcible detachment of hard crusts or scabs from the anterior portion of the nostril in *rhinitis sicca*, the bleeding points should be touched with the cautery at a low heat, and the membrane kept oiled by a thin unguent consisting of 1 dr. Citrine Ointment in 7 drs. Almond Oil. The crusts may be detached by a stream of saline or alkaline solution made to pass through the nasal cavity and out of the opposite nostril, if the palate be elevated by keeping the mouth wide open, and *hot* water may be so employed with advantage when the hæmorrhage continues.

Where notwithstanding the above measures the epistaxis continues, the bleeding spot being situated posteriorly, there will be no resource left to the surgeon but to plug the posterior nares. This is one of the simplest and least painful of operations in the eyes of the practitioner—till he has tried it. Having once performed it, he will hesitate to repeat or recommend it. It should never be undertaken unless the loss of blood is serious, and all other means of checking it have failed. By means of a Bellocq's canula, a thin double whipcord or hempen ligature is passed through the nostril, and one end brought out through the mouth. To this end a compact roll of lint, about the size of the terminal joint of the little finger, is attached. Traction upon the cord in the nostril hauls the lint tightly against or into the aperture of the posterior nares, where it is held in position by a plug of lint packed into the nostril in front. Over this plug the ends of the cord may be tied so as to render displacement impossible. It is advisable to leave a piece of string attached to the plug behind; this may be left hanging in the pharynx, or from the mouth. By pulling upon it, the posterior plug can be easily removed at any time through the mouth.

Some operators discard the canula and other paraphernalia and insert the left forefinger into the mouth till it blocks the posterior nares, after

which a thin long strip of gauze is introduced anteriorly through the nostril, and by a probe packed firmly against the left finger-tip which is kept *in situ* till the entire nostril is tightly plugged. Another and simpler plan is to insert the nasal rubber bag as far back as the pharynx, and then inflate it strongly to obliterate the entire space.

After the removal of the plug in 24 or 36 hours it is not advisable to resort to syringing or douching, as these may start the bleeding again, but if there should be much fetor a stream of cold saline containing adrenalin may be cautiously used to wash out the nasal cavity, and the patient should be forbidden to blow his nose. A short course of Calcium Chloride may be advantageously resorted to to diminish the risk of a recurrence. When the haemorrhage has been excessive the usual remedies indicated in anaemia must be employed, and the hypodermic administration of a large quantity of normal saline or transfusion may be required.

EPITHELIOMA—see Rodent Ulcer.

EPULIS.

Early removal is necessary, and as the tumour seldom originates in the gum tissue, but nearly always in the periosteum of the tooth socket or in the periodontal membrane, it is certain to return unless the alveolar process be removed along with it. A tooth upon each side of the epulis having been extracted, the limits of the incision in the bone may be marked out by two vertical cuts made by a fine saw or chisel. Between these points the growth and adjacent alveolus is cut out by sharp pliers, any teeth involved in the tumour being brought away *in situ*. Sometimes a wedge-shaped piece of the jaw with the tumour and teeth may be removed by simply making two converging incisions with the saw or chisel. The wound is to be treated by ordinary surgical methods, and after complete healing a dental plate bearing artificial teeth may be employed to remedy the deformity caused by the removal of the growth.

Slight vascular growths obviously springing from the gum tissue should be examined microscopically after excising a fragment, and if found innocent they may be removed by curetting or by the cautery.

ERYSIPELAS.

Mild cases often require only local treatment. *Constitutional Treatment* in severe cases will consist of a diet of the most sustaining and easily digested food, solid meats being forbidden till fever disappears. A liberal allowance of good soup, beef tea, or chicken jelly, with milk in large quantity is essential. Alcoholic stimulants are often indicated in severe cases, and it is a mistake to give stimulants alone; when possible, they should be incorporated with the food. Thus, whiskey or good brandy may be mixed with the milk (one wineglassful to each pint or quart); and port wine (one wineglassful to each pint of beef tea) may be freely given. The previous habits of the patient, the stage at which the disease is found when the case comes under the physician's notice, the condition of the heart and vessels, the amount of cutaneous surface

involved, and the temperature will give valuable aid in arriving at a conclusion about the amount of alcoholic stimulants necessary. As a rule, large amounts are well borne, especially in erysipelas following operations on intemperate or irregularly living subjects. Mild cases will require no stimulants; they do better without them.

A Saline purge should be administered in order to thoroughly empty the intestinal canal at the commencement of the treatment. A Mercurial may be given 8 hours before the saline if the patient be robust, but it should not be repeated.

Of drugs used internally Iron is the most valuable, but it must be given in large doses; the older generation of surgeons believed in the almost specific action of 30 to 60 min. doses of the Tincture of the Perchloride, and pushed it even in spite of high fever and furred tongue. It may advantageously be combined with Quinine, or full doses of each may be given alternately with 3-hourly intervals, and the latter drug may be combined with full doses (℥j.) Aromatic Spirit of Ammonia when signs of cardiac weakness begin to show themselves. Strychnine hypodermically may be also necessary, or Digitalis may be given with the iron.

The fever of mild cases is easily controlled by Aconite—¼ min. of the tincture given every 15 minutes till 10 or 15 doses are taken. This is a favourite method of treating short fevers, and as the entire amount of the drug used should only be equal to one full B.P. dose there is no danger of weakening the heart. The drug should never be used in erysipelas after the first or second day, as the toxins then begin to poison the cardiac muscle. Pilocarpine hypodermically has been extolled, but its use is certainly contra-indicated after the second or third day.

Salicylates, Sulphocarbolates, Benzoates, and a host of drugs have been administered by the mouth with the idea of destroying the streptococci; there is no evidence that any such action can be obtained from them.

Serum Therapy is very uncertain and usually disappointing.

Vaccine Treatment, on the other hand, has given good results, and life can undoubtedly be saved by it in severe cases which would otherwise prove fatal. When time permits, the ideal procedure is to obtain a culture of the specific coccus from the local lesion, and inject away from the seat of the disease 5 to 10 millions of the sterilised streptococci, with half this dose on the following day or days. The dose should be in inverse proportion to the severity of the case, mild types of the disease requiring 20 millions and severe ones 5 to 10 millions. Usually a polyvalent stock vaccine is employed. Recently the apparently fantastic method of deep muscular injections of 5 c.c. boiled milk has been vaunted, on the theory of the value of non-specific proteins.

The disease is infectious to patients who have open wounds or abrasions of the skin, and the most rigid isolation should be insisted upon in hospitals, and especially in lying-in institutions, and the physician in attendance upon an erysipelatous patient should not officiate at an accouchement unless he has been most rigorously disinfected.

Local Treatment.—Though mentioned last, this is to be undertaken as soon as the disease has manifested itself, and the choice of local applications is endless, each surgeon preferring the remedy which his own experience has given him confidence and facility in the use thereof. For simple superficial cases the time-honoured plan of freely dusting powdered Starch, Wheaten Flour, Chalk, Zinc Oxide, or other inert powder to cover up the inflamed skin from the air is still followed by many. These agents can be dusted on the skin in a thick layer from a common flour-dredger, and the part covered over by lint, which when the face is involved may be applied as a mask with apertures left for the mouth and eyes. White Lead paint and pastes made with Infusorial Clay, Fuller's Earth, &c., are preferred by others, since they are less liable to be brushed off. Watery lotions are less satisfactory, though often used when the swelling is great. Ichthyol is the favourite routine application, notwithstanding its unsightliness; it may be mixed with an equal amount of lanolin and smeared on with the fingers, or dissolved in its own weight of glycerin and painted on the affected region with a feather or soft brush and covered over with lint.

The Green Extract of Belladonna rubbed up with twice or three times its weight of glycerin may be applied in a similar manner where there is much smarting and tension, but this should not be applied to extensive surfaces owing to the danger of absorption. Small areas may be coated with Carbolic Collodion, Traumaticine or Carbolic Oil (1 in 10).

A paste made by mixing equal weights of powdered Chalk and Lard and 6 per cent. Carbolic Acid is used by Duckworth. Antiseptic ointments in endless variety are recommended. The best of these is Koch's, which consists of Creolin 1, Iodoform 4, and Lanolin 10: Creosote, Boric Acid, Carbolic Acid and Iodine ointments are favourite applications.

Antiseptic Lotions are also used, as Perchloride of Mercury (1 in 1,000), Permanganate of Potassium (1 in 500), Picric Acid (1 in 100), Nitrate of Silver (1 in 100), Argyrol (1 in 10), Perchloride of Iron tincture (1 in 4), Hydrogen Peroxide (1 in 20), Sulphurous Acid (1 in 5), Carbolic Acid (1 in 40), Boric Acid (saturated). Tucker treats all cases of facial erysipelas by a concentrated solution of Sulphate of Magnesia under oiled silk.

Tr. Iodi Fort. certainly reaches deeper into the tissues than any watery applications.

With the view of limiting the spread of the disease by acting upon its circumferential zone in order to establish an increased protective leucocytosis or phagocytosis other methods are employed. The value of painting the sound skin beyond the thickened margin of the diseased area with a solution of Nitrate of Silver (60 grs. to 1 oz.) was recognised as an empiric method long before the natural defensive mechanism of the tissues was understood. The solid Nitrate may be used. Strong Iodine Tincture, Iodised Phenol, Pure Carbolic Acid, strong Bromine solution, Creosote made into a paste with Kaolin, and many other powerful antiseptics and caustics are employed in this manner to encircle the

diseased area, leaving a ring of healthy skin between the site of their application and the circumscribed margin of the diseased action. A further step in advance is to inject by the hypodermic needle weaker solutions of these agents into the skin beyond the diseased margin: Carbolic Acid (10 per cent.), Resorcin (5 per cent.), Salicylic Acid (saturated), may be injected, a few minims being inserted with each puncture. This treatment is painful and not free from danger, but the method of limiting the advance of the erysipelatous margin by the application of Collodion, strips of adhesive plaster, or by the pressure of a rubber band, though often futile, may be tried. A more drastic procedure is to incise the skin by making a number of cross hatchings or scarifications with a vaccination lancet at a short distance beyond the margin of the disease. Judd swabs the skin with a 95 per cent. Carbolic Acid over limited areas at a time, extending for ½ inch beyond the margin, and washes the acid off with Alcohol. All these methods are rendered unnecessary by resorting to the vaccine treatment.

When erysipelas sets in after a surgical operation it will be usually necessary to remove some or all of the sutures, and to freely flush the incised surfaces with an antiseptic and to provide for drainage.

Cellulo-cutaneous or phlegmonous erysipelas and diffuse cellulitis or cellular erysipelas are to be treated upon the above lines, and the surgeon should lose no time in resorting to vaccine treatment. In grave cases when a culture of the specific organism is considered necessary, the polyvalent vaccine, or in its absence the antistreptococcic serum, should be at once injected whilst the necessary culture is being prepared. As these types of the disease are usually only met with in alcoholic and debilitated subjects stimulants must be freely given and strong soups administered at short intervals. The urine should be tested for sugar and diabetic dietary resorted to when necessary. Large doses of Iron with Quinine are clearly indicated, and the weakness of the heart remedied by Digitalis and Strychnine.

In these types of the disease there is always much brawny infiltration, and the surgeon should not wait for pointing of abscesses, but a number of deep and free incisions into the boggy tissue must be made without delay to save the vitality of the underlying structures, after which warm Boric Acid Compresses should be applied. Poultices are objectionable in all types of erysipelas, but where there is much fœtor or gangrene hot charcoal cataplasms should be applied and renewed frequently, the parts being flushed with an antiseptic solution on each change of poultice.

When the disease attacks the mucous membrane of the nose, mouth, pharynx, or larynx prompt measures must be taken to obviate the dangers caused by interference with the breathing and swallowing. Vaccine treatment is essential, though nose cases usually do well by simply painting the inside of the nostrils with the Ichthyol and Glycerin Cream every hour and occasional syringing with Boric Acid Solution. When the disease attacks the pharynx or larynx, scarification must be resorted to early to avoid suffocation from œdema of the tissues, and

the bleeding should be encouraged by spraying warm Boric, Carbolic or Saline solution into the mouth and nostrils. Tracheotomy may be imperatively demanded, especially in children, when the disease causes œdema of the glottis.

The conjunctiva is sometimes involved in facial erysipelas, and usually yields to warm 4 per cent. Boric douching; but the surgeon should always be on the watch for deep-seated inflammation, and this may be silently progressing under the great œdema of the lids without exciting suspicion. The writer makes a rule of examining the globe from time to time in all cases of facial erysipelas with great œdema of the lids. Orbital cellulitis ending in panophthalmitis and total destruction of the sight has more than once come under his observation as a result of erysipelas of the face. Pus should be evacuated as soon as evidence of its presence is forthcoming.

Toxæmic symptoms are to be treated on general principles. Thus pyrexia, when not yielding to the Quinine and Iron employed as a routine, should be relieved by diaphoretics and tepid sponging. Small doses of Antipyrine relieve the feverishness and also the headache, which is often severe. Hyperpyrexia must be promptly met by the cold bath, cold pack, or effusion. Delirium will yield also to these last-mentioned agents when it is associated, as it usually is, with a high temperature. Ice should be applied to the scalp and forehead, and a strong saline purge should be given. Insomnia should not be treated by opiates; it is better to remove the condition which is causing it when this is possible. Thus patients often fall asleep after the reduction of the temperature by sponging or after relieving the tension in the œdematous part by punctures or by removing one or more sutures in a throbbing wound; Paraldehyde is the safest of hypnotics. Rigors are an indication for exploration of the deep-lying tissues, and even when no signs of pus are present a number of deep incisions should be promptly made when the tension in the part is very high. Heart failure, as already mentioned, should be met by Strychnine hypodermically.

ERYTHEMA.

The first indication is, when possible, to find out the cause of the accompanying dermatitis and remove it. Thus irritants as strong direct sunlight, contact with dyestuffs, certain plants like *Primula obconica*, the X rays, &c., must be eliminated, after which a mild astringent ointment as Ungt. Zinci, containing 30 min. Liq. Plumbi F. per oz., may be applied. Dusting powders, as Zinc Oxide, Fuller's Earth, Starch, &c., meet most requirements.

When the cause is some toxic agent circulating in the blood, as seen in the numerous forms of drug dermatitis following the administration of iodides, copaiba, boric acid, sera of various kinds, &c., the first step in the treatment obviously will be to cease the administration of the offending medicine, when, should the eruption not speedily vanish, the above ointment or a dusting powder may be applied.

Erythema following the use of certain articles of food, as shellfish, strawberries, cheese, pork, pastry, &c., as a rule rapidly disappears after the removal of the exciting cause, but in some instances there may be great difficulty in detecting the causal agent, in which case one article after another must be suspected and eliminated from the dietary, and this should be changed *en bloc* when possible. Thus the most persistent chronic erythematous rash under the writer's care was eventually found to be due to the use of a small quantity of condensed milk which had been preserved by the addition of boric acid or borax. These food erythemas are often associated with urticaria and the formation of large wheals accompanied by intense pruritus (see under Urticaria).

After the removal of the offending ingredient in the dietary the erythema sometimes tends to become chronic, or the cause may escape detection, when symptomatic treatment will be the only resource left to the physician.

Alkalies internally tend to diminish the skin congestion; Magnesia is the most esteemed of these. They are serviceable in those dyspeptic conditions where some irritant produced in the stomach or intestines during digestion is carried to the blood, and hence to the nerve endings in the skin. The primary condition will require dietetic correction, and the following combination often proves suitable. If mild purgation does not follow, a smart saline should occasionally be administered. The Tartarised Antimony is supposed to have some specific action on the skin in acute superficial inflammatory conditions.

℞ *Antim. Tartarati gr.* j.
Tr. Rhei Co. ℥iss.
Liq. Magnesii Bicarb. ad ℥xij. *Misce.*

Ft. mist. Cpt. ℥ss. *ter die post cib.*

When there is much œdema accompanying the rash, as in urticarial cases, Chloride of Calcium in 20-gr. doses three times a day is the best routine.

Itching may be relieved by a weak Lead and Tar lotion as the following:

℞ *Liquor. Plumbi Fort.* ℥iij.
Liquor. Carbonis Deterg. ℥iv.
Spt. Vini Rectif. ℥ij.
Aquæ Camphoræ ad ℥xx. *Misce.*

A warm Sodium Bicarbonate Bath or sponging with the alkaline solution is often of value in relieving the tingling and pruritus.

Erythema Elevatum Diutinum.—The treatment of this rare and obstinate type of erythema is unsatisfactory and tedious. The best routine is to envelop the affected parts in an unirritating ointment composed of Zinc Oxide with 10 per cent. Liq. Plumbi Fort., and apply a bandage

with moderately firm pressure. Salicylate of Soda should be given internally, and a milk diet with farinaceous food and occasional saline purgatives administered.

Erythema Induratum, known as Bazin's Disease, affecting the skin over the calves of both legs, is best treated by prolonged rest and bandaging or strapping, and the ulcers which form should be dressed with weak Creosote or Diluted Citrine Ointment. The affection is believed in many cases to be of tuberculous nature, and vaccine treatment has been recommended. Walker employs the X rays, which can be applied without resorting to prolonged rest. Open-air life and the most generous diet and tonics should be prescribed.

Erythema Intertrigo, caused by the irritating secretions pent up between two layers of superimposed skin, as under the breast, about the buttocks and scrotum, is easily prevented by separating the layers of skin with a piece of lint dusted over on both sides with Zinc Powder or Fuller's Earth. When the intertrigo has become established an astringent ointment of Zinc and Lead may be applied. In chronic cases a true eczema may develop, which will require Tarry preparations. The *Erythema Gluteale* which affects the buttocks and perineum of infants is of the same nature, and is caused by the contact of urine-soaked napkins. This should be treated by the application of a very stiff ointment which will not easily melt, as ½ oz. powdered Starch, ½ oz. Calamina, and 2 oz. Zinc Ointment or Lassar's Paste without the salicylic acid.

Erythema Iris should be treated with Salicylates internally and Lassar's Paste locally. Allan treats this disease as a superficial burn by applying pads of wool soaked in a 1 per cent. solution of Picric Acid.

Erythema Multiforme, when not of true rheumatic origin, may be due to dietetic errors or to the production of toxic substances in the alimentary canal. As the eruption rarely lasts more than a few weeks, little need be done locally save by applying a dusting powder or astringent lotion. Constitutional treatment is of more importance, and the suspicion of its rheumatic origin suggests that Salicylates may be employed as a routine internally. When there is much exudation Ichthyol in 20-min. doses or Chloride of Calcium (20 grs.) may be given three or four times a day and the dietary minutely scrutinised with the view of discovering some irritating or toxic ingredient. Saline Purgatives are clearly indicated.

Erythema Nodosum, though sometimes of tuberculous origin, is closely allied to the last mentioned. As much pain and tension are usually present, local treatment should always be combined with rest in the horizontal position with the legs elevated. The best results are obtainable by enveloping the legs in several layers of warm, absorbent wool, and applying with moderate pressure a light gauze or woven bandage from the toes to the knee. Should there be any erythema multiforme also present Salicylates may be given. Mild examples of the disease will require nothing but a coating of Collodion, severer types may be treated by a Lead and Opium lotion applied under oiled silk, and in

very painful cases a warm poultice smeared over with the green extract of Belladonna or fomentations of Poppy capsules may be tried, but as a rule moist heat is not so suitable as dry heat and moderate pressure.

Brownlie paints the nodes freely with a solution of Ichthyol (1 part) dissolved in a mixture of spirit and ether (3 parts).

Erythema Pernio is the name given to Chilblain, and its treatment is detailed under its own heading.

EXOSTOSIS.

Osteomata are essentially innocent growths, and cease to enlarge after maturity of the skeleton, and whether spongy or of ivory hardness should be left alone unless they exert mechanical pressure on neighbouring nerve trunks or other structures. When pedunculated, the neck can be cut across with the chisel or saw or snipped in the bone forceps, after which the bony growth with its cartilage is easily removed. When the peduncle is small the growth may be removed with chisel and mallet, gouge, sharp spoon, saw, cutting pliers, or bone forceps. Sometimes after exposure the knife will be found sufficient when the base is fibrous and not bony. The majority of exostoses should be left alone, unless by their presence they are causing disturbance or producing deformity. Hard or ivory growths upon the cranial bones may be removed by freely exposing their bases and cutting on the normal bone around the base removing the tumour intact. This plan is essential in the subungual exostoses if recurrence is to be avoided.

EXTRA-UTERINE PREGNANCY.

The treatment of extra-uterine pregnancy may be summed up in one word—operation. The only question is when and how, and in settling this question the precise stage in development which the pregnancy has reached must be taken into account.

1. *Unruptured Tubal Pregnancy.*—This condition is rarely diagnosed, mainly because there are no symptoms which would lead the patient to suppose that she is not normally pregnant, and should seek advice. When it is diagnosed the removal of the pregnant tube either by the abdominal or vaginal route should be urged without delay, as there is the ever-present risk of rupture taking place with a fatal result from hæmorrhage.

2. *Intratubal Rupture of the Ovisac, with Death of the Ovum.*—This condition may be diagnosed when the patient gives the history of 6 to 8 weeks' amenorrhœa, followed by pain in the affected side, possibly accompanied by some collapse, and followed by the characteristic brownish shreddy vaginal discharge. The further course of the case may be in one of the following ways:

The *ovum may be expelled* from the tube *completely and the bleeding may cease,* leaving the ovum with a few clots in Douglas's pouch to be absorbed. This is a rare result, and cannot be diagnosed with certainty.

It is much the wisest plan to inspect the tube through the abdomen or vagina, to remove it if still bleeding, and to clear out all clots.

The ovum may be expelled from the tube, or may be retained in the tube in whole or in part and the bleeding may continue, the effused blood oozing through the abdominal ostium of the tube and accumulating in the pelvis, forming a *pelvic hæmatocele*, walled in by a layer of fibrin attached to the pelvic peritoneum below and to coils of intestine above. There is the probability of this hæmorrhage going on for a long time; when it has finally ceased a large mass of clot is left in the peritoneal cavity; its absorption will be both slow and incomplete. There is considerable risk that it will be infected from the bowel, leading to abscess formation, and there is a certainty that in the most favourable event the pelvic contents will be glued together by dense adhesions. To avoid these dangers and inconveniences the hæmatocele should be dealt with surgically either by way of the abdomen or vagina, the clots turned out, and any bleeding-point secured.

The ovum infiltrated with blood may remain in the tube (tubal mole) and the hæmorrhage may cease. This may be regarded as a favourable result, but he would be a bold man who would take on himself to say that a pregnant tube, even after the death of the ovum and in the absence of signs of active hæmorrhage, had lost its capacity for mischief. There still remains the possibility of further hæmorrhage or of sepsis, and the wisest plan is to remove the tube.

3. *Extratubal Rupture.*—In these cases the ovisac ruptures through the wall of the tube into the peritoneal cavity. The accident is attended with sudden shock, pain and collapse, and usually with the signs of internal hæmorrhage, so severe as to threaten the life of the patient. The clinical picture presented is that of an "acute abdomen," and such cases are constantly mistaken for cases of "fulminating appendicitis" or of rupture of an internal viscus. In most cases the diagnosis may be made by observing the signs of internal hæmorrhage, and by the acute tenderness in Douglas's Pouch on vaginal examination. Immediate operation is indicated to secure the bleeding vessel and to save the patient. While a surgeon is being procured the practitioner should direct his efforts to the furtherance of the preliminary preparations for an operation. An attempt should be made to rally the patient by submammary injection of normal saline solution; ½ gr. of morphia may be administered hypodermically, and the foot of the bed should be raised so as to maintain the circulation in the head and upper part of the body. It is best to avoid internal stimulants for fear of increasing the hæmorrhage.

4. *Rupture of the Ovisac without Death of the Fœtus.*—In rare cases after the rupture of the ovisac the placenta retains its attachment to the wall of the tube sufficiently to maintain the nutrition of the fœtus, which may go on to develop for the customary period, lying loose in the abdominal cavity or enveloped in false membranes. The placenta continues to grow and spreads over the pelvic organs and peritoneum,

possibly gaining attachment to the intestines. At term spurious labour sets in, of course without result, the fœtus dies, and the placenta shrivels up. The dead fœtus may become mummified or calcified or may become the centre of a suppurating mass with the liquefaction of its soft parts and the gradual extrusion of its bones through fistulæ leading to the skin or into internal organs. Such a case, if seen in the earlier months, should be operated on at once for fear of separation of the placenta and hæmorrhage. If seen in the later months, it is probably wiser to defer operation until a week or two after spurious labour has set in, so as to allow of the placental sinuses becoming thrombosed and so obviate the risk of serious hæmorrhage following the removal of the placenta.

FACIAL SPASM.

Painless spasm of the facial muscles arises from some reflex irritation of the facial nerve on one side, and when recent will disappear on the removal of the exciting cause, as in the form caused by dental caries or nose trouble. The severe type of Blepharospasm which involves the orbicularis palpebrarum usually disappears if the eye trouble causing the photophobia be treated promptly. All cases when chronic may, however, remain rebellious to treatment even when the exciting cause has been removed.

Sedatives, like Bromides, Indian Hemp, Morphia, Hyoscine, &c., may afford some temporary relief, but their continuous administration is obviously fraught with danger owing to habit formation. Blistering over the mastoid may diminish or stop the spasm for a time, Electricity in every form is usually futile, but galvanism sometimes has afforded benefit in mild cases. Mayer recommends resection of the supraorbital nerve when this is sensitive, and when pressure over it inhibits the spasm.

Stretching of the facial nerve sometimes is curative, but as a rule the tonic spasm returns when the resulting facial paralysis passes off. Noceti and others treat the condition by paralysing the nerve temporarily with an injection of 1 c.c. of a 1 per cent. Cocaine solution in 80 per cent. Alcohol introduced into the nerve trunk at the stylo-mastoid foramen. The injection may require repetition after two or three days' interval. The severe spasm accompanying trigeminal neuralgia (tic douloureux) can only be relieved by medical and surgical measures directed to the cure of the abnormal condition of the fifth nerve.

Habit-spasm or facial tic is a psychomotor phenomenon usually involving several groups of muscles on both sides of the face, as in the grimaces of neurotic children. Its treatment will consist in moral and educational methods by which the self-control of the patient is strengthened, and the involved muscles kept in a healthy tone by massage and slowly regulated movements carried out in front of a mirror several times daily.

FAVUS.

The X rays, if applied daily by an experienced operator, afford the best results, especially when the scalp is invaded; shedding of all the hairs of the head in a few weeks occurs.

When complete epilation of the scalp has been effected an antiseptic ointment should be well rubbed in to destroy any of the spores which may be left in the empty hair follicles. Any germ destroyer may be used of which the physician has gained experience in the treatment of ringworm: Iodide of Sulphur Ointment (1 in 20) will be found the most reliable. Chrysarobin, Resorcin (Ihle's Paste), White Precipitate, Copper Oleate, Iodised Phenol, and Salicylic Acid, all of the strength of 20 grs. to 1 oz., are efficacious, and Sulphur Ointment may be used.

When the X-ray treatment is not available, or where only small patches are present, the crusts should be removed by keeping the scalp soaked in spirit or boracic lotion under oiled silk, or by constant swabbing with oil or petroleum, or by poulticing. After the removal of the crusts the hairs should be industriously epilated by forceps, a definite area being attacked each day, and any of the above ointments rubbed well into the empty follicles. Some dermatologists employ blistering as in tinea to obtain epilation and disinfection. Lotions consisting of Perchloride of Mercury (1 in 250), Sulphurous Acid (1 in 4), Thymol or Menthol (10 per cent. in Alcohol) are preferred by some. Favus on the naked skin is easily removed by the above measures.

Vaccine treatment has been tried; the results are not satisfactory. Alopecia may be permanent in neglected cases, but the normal growth of hair may be calculated upon when the X rays have been skilfully applied so as not to cause severe dermatitis or burns. As the disease is conveyed to the human being from the cat, reinfection should be guarded against by the destruction of any affected animal.

FLAT FOOT.

Preventive treatment in the most common or static type of this deformity is of great importance, and when the affection is detected in its initial stage it may be arrested or removed by rest or a change of occupation which will not entail prolonged standing or weight carrying. The patient should be trained to stand and walk with the inner line of the feet kept parallel, the toes not being splayed outwards but looking directly forwards. Laced boots should be worn which do not cause the great toe to be turned outwards, and he should patiently practise standing and walking on tip-toe; this will strengthen the calf muscles, and may be advantageously supplemented by massage and douching, and with exercises such as walking on the outer border of the naked feet and circumduction movements at the ankle joint.

When some deformity is present but reducible in a perfectly flexible foot cure can be effected by "crooking" the heel of the boot. This means the thickening of the inner side of the heel by $\frac{1}{8}$ inch and bringing it forward under the instep for a distance of $1\frac{1}{2}$ inches. In some cases it is also advisable to raise the inner side of the sole by $\frac{1}{4}$ inch. In all cases the boots should be made to measure; they should fit accurately around the ankle; the heel should be broad but not too low, and the front part of the boot should be wide enough to allow of complete "spreading" of the toes.

Where rigidity of the foot is present, or where complete reduction is impossible, flexibility must be restored (1) by complete rest in bed, (2) by rest in bed combined with reduction and putting in plaster, (3) or by wrenching the foot with Thomas's wrench, plastering, and rest. Afterwards, the foot being reduced to deformity capable of easy reduction, treatment is carried out as above. Where these methods fail some surgeons advocate tendon transplantation or the removal of a wedge-shaped piece of bone, including the articular surfaces of the scaphoid and astragalus, or a section being made obliquely through the os calcis the posterior portion of this bone is displaced forwards and downwards in order to constitute a new arch. These operations, however, are often unsatisfactory in their results.

Metatarsalgia, or Morton's Disease, is often associated with flat foot, but even when evidence of this is wanting much relief to the excruciating neuralgic pain felt over the third and fourth metatarsal bones may be obtained by placing a pad *behind* the heads of the metatarsal bones and by the measures suitable for the treatment of the early stage of flat foot. The boots should be large, and should be so made that the front part of the sole under the toes lies perfectly flat in contact with the ground as the patient assumes the standing posture. The skin should be kept dry by powdering the socks with Boric Acid. A metal plate, or celluloid inset, should be moulded from a plaster cast of the foot and inserted inside the boot resting on the sole. Rarely will bone operations be requisite, but the head of the third or fourth metatarsal should be excised if out of its normal position.

FRACTURES.

The general principles of treatment only need be detailed. These consist in the reduction of the deformity by placing the fragments of bone in their normal position, the application of such simple mechanical contrivances as will maintain their apposition till union occurs, and when necessary the use of appliances to keep up such extension as will overcome spasm of the muscles tending to cause over-riding of the broken bones, and at the same time to employ such local measures as will keep the joints and muscles in their normal healthy state.

When a fracture comes under the care of the surgeon, no time should be lost in carrying out these principles. As in the case of dislocations, the great barrier to reduction is the reflex contraction of the muscles, and the sooner the attempt at restoration of the broken fragments to their normal position, the easier will the operation become. The popular idea of the importance of "setting" a fracture as soon as possible after its occurrence is therefore based upon sound pathology, and the surgeon is liable to blame if he delays the reduction till an ideal form of splint or apparatus is at hand; it is thus wise to extemporise splints till more suitable appliances can be obtained.

The patient's clothing should be carefully removed by slitting up the seams in order to cause as little movement as possible of the broken

fragments, otherwise a sharp spicula of bone may cause much injury of the soft tissues or even be made to perforate the skin, changing a simple into a dangerous compound fracture. He should be placed upon a firm hair mattress, and the most gentle and thorough examination of the injured limb should be carried out, after which the surgeon, when his appliances are at hand, proceeds to reduce the deformity. This should in all cases be achieved without the use of force, by so arranging the position of the limb as to cause the most complete relaxation of all its muscles and joints in order that the fragments may be brought into accurate apposition without rough pulling or hauling, which only excites reflex spasm and thwarts his efforts at reduction.

This is achieved by an assistant grasping the limb firmly above the seat of fracture, whilst the surgeon makes very gentle steady traction in the line of the axis of the limb upon the lower part, during which the bones come into apposition, guided by the gentlest pressure of the fingers when necessary. Care must be taken that no muscle, fascia or tendon is left interposed between the divided ends, and if any great difficulty be experienced from muscular spasm an anæsthetic should be administered.

Accurate adjustment of the bones having been secured, a well-padded splint of wood, gutta-percha, leather, poroplastic felt, wire gauze, perforated tin or zinc is applied on each aspect of the limb. These splints should be so shaped, moulded, or lined with padding as to apply when bandaged an even pressure over the limb. As they are adjusted to the fractured member gentle extension or traction is to be kept up until the whole is enveloped in a good calico bandage. The use of a few straps and buckles, or better still a broad piece of adhesive plaster, to secure the splints in position before the application of the bandage is a great convenience. Buckles should always rest upon the splints, and not upon the skin. Much skill and experience is required in graduating the pressure of the bandage, which should not be tight, and the seat of fracture should be left free and exposed when possible.

Before completing the bandaging the limb should be carefully measured and contrasted with its fellow in order to demonstrate that full reduction has been accomplished, and it is a good rule in all cases to obtain a skiagram after the setting operation has been completed.

The limb should be maintained in the position which affords the most complete relaxation of the muscles. The less it is interfered with the better, though careful inspection is to be constantly maintained, especially after the first 24 hours, lest the bandages might get tight from subsequent swelling, as gangrene might thereby result. The surgeon satisfies himself from time to time by passing his finger over the seat of fracture that the fragments are kept in position, and by passing his eye over the entire limb, and contrasting it with its fellow on the sound side, he sees that no rotation or deformity arises.

Absorbent cotton-wool affords the most tempting padding; it should, however, be sparingly used. The writer, when in charge of the fracture cases in his house-surgeon days, discarded it entirely, owing to its liability

to become lumpy and uneven, and used instead a padding of strips of good old flannel, which best answers every purpose.

Some surgeons discard all wooden and metallic splints in the treatment of most simple fractures of the leg, and at once employ an immovable plaster of Paris casing for the entire limb, made by applying over cotton-wool wetted bandages previously impregnated with the dry powder. By carrying the casing above the knee the patient may be permitted to walk about in a few days; this "ambulatory" method of treatment is one, however, which the inexperienced surgeon should be slow to follow. The objections to the plaster of Paris treatment are that it prevents inspection of the seat of fracture, and offers a barrier to massage and early passive movements; these difficulties may be overcome by sawing the bandage through vertically so that the casing may be easily removed and reapplied with the aid of buckles or bandages. Starch, Glue, Gum and Chalk are used in a similar manner. The best use that these immovable casings can be put to is to employ them at a later stage to replace the ordinary splints after union has been well started between the broken fragments.

It will often be necessary to apply other splints in addition to those adjusted round the broken bone with a view of securing complete rest to the joints above and below the fracture, when their movement tends to disturb the position of the fragments. Extension and counter-extension may be required in special cases. Space will not permit of any enumeration of the various special appliances which are used in the treatment of different fractures. Those of them of any use fulfil their purpose only in as far as they carry out the simple indication of insuring rest and accurate approximation of the fragments of the broken bone while nature makes good their repair.

Of late years considerable advance has been made in the more radical fixation of the fragments by cutting down upon the site of injury and suturing them together with silver wire, or securing immovable apposition by the insertion of steel plates and screws, staples with perforated metal plates, ivory pegs, or steel pins. These methods are invaluable in many cases where time is of overwhelming importance, as they can enable the patient often with safety to attend to important duties which cannot be postponed.

Treatment by open operation is indicated in transverse fracture of the patella and fracture of the olecranon owing to the wide separation of the fragments. In the former case it will usually be sufficient to suture the soft tissues with strong chromicised catgut. This was successful in holding together a fractured patella, though the patient developed delirium tremens after the operation and succeeded in divesting himself of his splints. For fracture of the olecranon a long screw or wire loop may be used for bringing the parts together.

For fractures following gunshot wounds, where the bone shows loss of substance and non-union occurs, the gap should be made good by insertion of a bone graft usually taken from the inner surface of the tibia.

Fractures of the lower jaw may be held in position by Hammond's

dental splint, by a plate applied along the lower border through a skin wound, or by a bone graft.

In the treatment of simple fractures a subject of vital importance is the duration of the time during which immobility is to be strictly maintained; 32 years ago L. Championnière pointed out that immobility was not necessary, and that more callous was thrown out if the fragments were not kept rigidly fixed in apposition by immovable splints. In the first edition of the present work written 26 years ago the writer stated: "As a rule it may be said that the mistake is sure to be made of keeping the entire limb in a state of absolute rest long after the necessity for such has passed away, to the great retardation of recovery. In most cases gentle massage, or kneading and cautious passive movements, may be commenced after the middle or end of the third week, the splints being again applied. This effectually prevents the formation of adhesions, and greatly increases the vitality of the tissues, and minimises subsequent pain and stiffness." These views were considered by many authorities at that date as heterodox, notwithstanding the doctrine of L. Championnière, but the exhaustive researches of Mr. W. H. Bennett and others have since demonstrated their truth, and *early* massage is accepted by all authorities as an important if not essential routine in the treatment of the fracture. But the pendulum in the opinion of the writer has swung too far in the direction opposite to the old malpractice, and massage and joint movements are carried out on the first or second and subsequent days of the fracture. When there is much œdema and effusion, massage certainly should be commenced at once.

The best routine will be to delay massage to near the end of the first week even when the fracture is in the vicinity of a joint, in which case it is most clearly indicated. After a few days of gentle stroking and kneading of the muscles cautious passive movements and then voluntary movements of the neighbouring joint may be permitted daily and the splints reapplied. The plan of discarding these altogether from the first, as advocated by L. Championnière, after setting the fracture is always open to the serious danger of accidental displacement during changes of posture and whilst the patient is asleep. Massage and gentle movements in order to remove swelling and pain, to prevent adhesions and to keep up the nutrition of the muscles must not be confounded with massage undertaken to cause some movement between the fragments in order to increase the production of callus, which must still be considered a doubtful practice.

The first step in the treatment of *compound* fractures is to insure thorough sterilisation of the wound in the skin and soft parts by flushing with an unirritating antiseptic as warm Boric Acid solution or one of the numerous Hypochlorite solutions, after which all torn or lacerated tags of soft tissue and loose particles of bone not attached to periosteum should be removed. The fragments being brought into accurate apposition, they are to be maintained in this position by suitable splints and the wound treated on approved surgical principles; as a rule primary skin union is not to be expected, and suitable drainage provision is usually necessary. In

most cases thorough disinfection, examination, and replacement of the fragments will require a general anæsthetic. In severe injury of a limb with an extensive destruction of the soft tissues and bloodvessels, and much comminution of the bone, especially with contamination from without by foreign matter, the only resource left to the surgeon will be amputation.

Fracture of the Clavicle is dealt with under its own heading.

FRECKLES—see Chloasma.

FRIEDREICH'S DISEASE.

No known drug possesses any influence over this malady. Arsenic, Gold, Salts, Silver, and many remedies recommended in Ataxia have no beneficial effect whatever. Much may be done by training the patient according to the educational methods of Fraenkel to relearn through constant practice the performance of the co-ordinated movements which the progress of the disease has abolished.

FROST-BITE.

The frozen part may in most instances be brought to its normal condition, even if white, hard and insensible, by the heat of the patient's own blood when brisk friction is employed to restore the local circulation.

Artificial heat should never be employed, as it may be followed by too rapid reaction, congestion, inflammation or gangrene being liable to supervene. The gradual restoration which follows vigorous friction with dry snow is the most satisfactory termination. The part should be afterwards enveloped in dry wool, flannel or furs.

When gangrene of the tissues has already occurred, the surgeon will probably find amputation necessary. It will be advisable to use antiseptics freely and wait for a well-marked line of demarcation if there be but a small bulk of the tissue destroyed. Where the gangrene affects a very superficial film of tissue, Perchloride of Mercury (1 in 2,000) or Permanganate of Potassium (1 in 400) may be freely used. Hermance uses Ichthyol in the slight cases, and where the parts become raw he finds the best application to be Acetanilid Ointment, but the raw surface may be treated by any mild astringent and antiseptic ointment as Ungt. Acid. Borici.

GALL-BLADDER AND BILE-DUCTS, Inflammation of.

The *acute catarrhal* form is an extension of a similar condition in duodenum and stomach, and its treatment is that of simple catarrhal Jaundice. When the cholecystitis is due to gall-stones the agents to be used will be found detailed in the next article.

Chronic catarrhal cholecystitis may also be the result of gall-stones, but more frequently it is due to causes which interfere with the periodical evacuation of the gall-bladder, as the pressure of scybala in the right bend of the colon, tight lacing and ptosis of the liver—a part of the condition present in Glénard's Disease. Rest in bed with the view of effecting

replacement of the displaced organs, followed by free purgation, will meet the requirements of most cases. Drainage of the gall-bladder is generally undertaken only in the next type of the disease, but cure of a simple chronic catarrhal state of the gall-bladder may be confidently expected to follow the removal of calculi; drainage has proved effectual when an operation was undertaken to remove gall-stones and these were found absent.

Suppurative cholecystitis, whether or not due to gall-stones, is the result of *Bacillus coli* or other infective agent. The treatment of this form and of its most virulent *gangrenous* type must be prompt if life is to be saved. The abdomen should be opened without delay, the gall-bladder freely incised, its purulent contents evacuated and free drainage provided. In the gangrenous or acute phlegmonous variety of the disease the gall-bladder must be completely removed.

Catarrh of the Bile-Ducts (*Cholangitis*).—The term *Acute catarrh* of the common bile-duct is synonymous with *catarrhal jaundice.* As this condition is nearly always the result of a gastric or duodenal catarrh which extends up the entrance of the common duct its treatment is that of the primary affection. The error in diet which has caused the catarrh having probably been corrected before the jaundice appears, there is little use in administering emetics, which would only do harm by increasing the gastro-duodenal inflammation. If vomiting is present, it may be encouraged, however, by directing the patient to drink large quantities of tepid water till the stomach has been thoroughly washed out. One dose of Calomel (3 grs.) may then be given, followed by a smart saline purge (℥ss. Glauber's Salt). As the absence of bile in the intestine tends to cause constipation the saline will require repetition every second morning. The best routine treatment for the gastro-duodenal catarrh is to allay the nausea by a simple effervescing mixture of 40 grs. Bicarbonate of Potassium given in effervescence with Lemon-juice, after which the following gastric sedative should be administered:

℞. *Bismuth. Carb.* ʒiij.
Sodii Bicarb. ʒiij.
Sodii Salicyl. ʒij.
Mucil. Acaciæ Rec. ℥iss.
Aquæ Chlf. ad ℥viij. *Misce.*

Fiat Mist. Cpt. ℥ss. *ter in die p.p.a.*

Pain, if present, over the hepatic region may be relieved by a large poultice or by the application of a warm liver pack covered up by mackintosh tissue or oiled silk. The diet should consist of milk with the addition of a little lime or Kali water, and at a later stage soups free from fatty matter. The above treatment is equally efficacious in those cases arising from inflammation about the head of the pancreas.

Chronic Catarrhal Cholangitis is, practically always, the result of the

irritation of gall-stones, and its general treatment will be discussed in the next article. When the obstruction of the common duct is incomplete there is often added the condition known as *Charcot's hepatic intermittent fever*, owing to the admission of *Bacillus coli* or other infective organisms within the biliary passages. The treatment of the rigors and sweating resolves itself into the alleviation of the symptoms, as in other infections, by full doses of Quinine or Salicylates and warm alcoholic drinks, etc., whilst hepatic pain is to be relieved by the liver pack and saline purgatives. The surgical removal of the biliary concretion or obstructive factor should be undertaken at the earliest stage possible in order to prevent suppurative cholangitis, cholecystitis and liver abscess, which, when once established, are liable to prove fatal. Where operative measures fail or are contra-indicated Vaccine treatment by injections of sterilised *Bacillus coli* should be carried out.

GALL-STONES (Cholelithiasis).

Preventive treatment is a practical consideration, since many individuals are to be met with who are known to have passed gall-stones with the fæces, and preventive measures are as clearly indicated in those who have had operations performed for the removal of these calculi in order to prevent their return. The causes which tend to the production of gall-stones must be realised; some of these are removable; others, though permanent, may nevertheless be minimised. The most potent factor is, however, one over which the physician has little control—*i.e.*, infection of the gall-bladder and biliary passages by the typhoid bacillus and *B. coli*, and possibly by other organisms. The next most important cause is stagnation of the bile, due to displacements of the liver by tight lacing or to ptosis of the organ in Glénard's disease—conditions which must be met by judiciously selected corsets, mechanical supports or abdominal belts. As stagnation of the bile is also induced by sedentary habits, free muscular exercise, gymnastics, swimming exercises, especially in fresh water, open-air life and outdoor active occupations are essential. In the obese and those who for other reasons are prevented from such exercises, the only resource will be found in thorough abdominal massage preceded by bathing, douching or other hydropathic measures. This treatment should be prescribed for all so-called "bilious" subjects, in whom there is often an undoubted family predisposition to the formation of biliary concretions.

Constipation is to be avoided, and free saline purgation should be effected once or twice a week in order to keep the intestinal tract in as healthy a state as possible and to insure a complete evacuation of the contents of the gall-bladder. Hence an occasional full dose of Calomel or Blue Pill every week or ten days is a useful adjuvant to treatment. Intestinal antiseptics are clearly indicated, but as the action of all such drugs hitherto used for the purpose of disinfecting the alimentary canal is very unsatisfactory little advantage can be expected from their routine administration. Continuous small doses of Calomel are obviously out of court in a condition so thoroughly chronic as the one under consideration.

An occasional course of Urotropin is believed by some enthusiasts to retard the growth of organisms in the biliary passages, but as the drug is so rapidly eliminated in the urine it is doubtful that it can effect any such result in the gall-bladder.

Salicylates are believed to act upon the bile and render it more fluid; the same remark applies to Benzoate of Soda, Soaps made from soda and oleic acid and to Bile Salts, and these agents are therefore also indicated when there is reason to believe that calculi have already formed.

Diet is of great importance, but as in most other diseases a fanciful restricted regimen based upon chemical theories does more harm than good. The diet should be as varied as possible, over-eating being forbidden, but as much meat (especially white meat) as is necessary for the support of the body may be permitted; highly spiced or rich seasoned dishes should be avoided. Animal fats and carbohydrates should be limited, and greasy cooking should give way to plain boiling and roasting. Alcohol in every form its injurious. It is a well-recognised fact that the greatest tendency towards cholelithiasis is often met with in spare eaters. This is probably due to the small amount of fluid which such individuals imbibe and the obstinate constipation which is thereby engendered.

An abundant supply of fluid is undoubtedly the most important ingredient in the diet in every case, but the increase of fluid should not consist of milk, as this article had better be indulged in to a moderate extent only, unless skimmed milk or buttermilk be substituted for it. Effervescing Kali, Soda, Seltzer or Apollinaris water may be freely taken between meals and in moderate amounts at meal-times. Tea made by the Russian method with lemon and a little sugar without cream, only the China leaf being employed, is the best routine diluent, and since so little of the China leaf is necessary it may be freely partaken of at all times, and it may be taken in the early morning instead of the usual mawkish draught of warm water on rising. The writer strongly advises all patients suffering from a tendency to gall-stones to avoid meals in bed when possible.

Olive Oil as an article of diet is invaluable, and it is a good rule when possible to make this fat take the place of butter, cream and the fat of meat. It may be freely used with salads and as a substitute for butter in various cooking operations.

Hepatic Colic.—The first indication is the relief of pain; when this is agonising and unbearable a hypodermic injection of Morphia ($\frac{1}{4}$ to $\frac{1}{3}$ gr.) must be given at once, and it is advisable to always combine with it 1 min. Liquor Atropiæ. This latter drug does not prevent the pain-relieving action of the narcotic, but it probably neutralises the paralysis of the muscular fibres of the duct which follows when morphia is given alone. Hence this latter consideration should tempt the physician to withhold morphia when the pain is bearable on the chance of the stone being delivered into the duodenum. Chloroform affords complete relief, and during the absolute degree of relaxation following general anæsthesia the stone may slip through the orifice of Vater. In mild attacks a large hot poultice or hot pack or stupe may be applied over the liver, but these

measures are inferior to a bath in water as hot as the patient can tolerate —105° to 110° F.—and in this under the surveillance of the physician he may be safely kept till signs of muscular prostration begin to show themselves, and during the subsequent relaxation of the tissues of the duct the stone may slip through.

Copious draughts of water as hot as can be borne by the mouth often afford relief, and when vomiting is present this treatment can be continued with the hope that if the stone be already near the orifice of the duct its expulsion may be facilitated by the mechanical pressure of the abdominal muscles and diaphragm as the spasm diminishes. The physician should always keep in mind that the entire phenomenon of hepatic colic is nature's method of expelling a foreign body, and though the relief of severe pain may be imperative it is not the best practice to, immediately upon the approach of suffering, fly to profound narcotics when these can be avoided.

By the addition of a little Bicarbonate of Soda the efficacy of the hot water is increased, and Yeo combines 20 grs. Salicylate of Soda with 60 grs. bicarbonate in each pint of the hot solution to be swallowed in mouthfuls during the paroxysm.

Emetics sometimes give relief probably by their power of allaying spasm, and some patients in subsequent attacks discover this method for themselves and resort to lukewarm water draughts to effect emesis upon the approach of an attack. It is inadvisable to administer irritating substances like zinc sulphate, tartar emetic and mustard, as these are liable to induce swelling of the mucosa about the entrance of the duct; if the physician decides to produce emesis after tepid water has failed a hypodermic of Apomorphia is the best procedure.

Robson has found that 1 gr. Exalgin dissolved in a teaspoonful of hot water and repeated every half-hour for three or four times often relieves the paroxysm. Antipyrine or Antifebrin, and Opium, Ether or Chloroform in small doses may be given by the mouth; Adrenalin has been found to relieve the pain in some cases. When pain is continuous a Morphia Suppository may be employed.

The following combination of pain-relievers may be left in the hands of an intelligent patient for the treatment of expected attacks till the arrival of the physician:

℞. *Liquor. Morphiæ Hyd.* ʒiv.
Tinct. Cannab. Ind. ʒij.
Olei Menthæ Pip. ʒij.
Spt. Æther. Sulph. ʒiv.
Spt. Chloroformi ʒvj.
Spt. Æther. Nit. ad ʒiij. *Misce.*

Ft. Mist. Signa.—"*A teaspoonful with a tablespoonful of whiskey to be taken in a wineglassful of water when the pain comes on. To be repeated in* 30 *minutes if the pain continues and every* 2 *hours afterwards till relief is obtained.*"

Olive Oil.—This drug, as will be mentioned later on, is employed as an agent to assist in the disintegration of gall-stones, but it is, moreover, recommended strongly as the best routine treatment for the relief of the severe pain during an acute attack of hepatic colic when given in doses of 5 or 6 oz. Some observers state that they never saw the oil vomited (the opposite has been the writer's experience). It may be given with a tablespoonful of whiskey or brandy, and 5 drops of Oil of Peppermint. It is claimed for it that it very often causes the rapid expulsion of the calculi, and greatly increases the flow of bile, and sometimes instantly relieves the pain. Blum injects 15 oz. of the warm oil into the rectum.

On the relief of pain and the absence of evidence of the passage of the stone, the question crops up of the wisdom of administering drugs with the view of aiding its expulsion or effecting its disintegration. In common duct obstruction the physician can be usually certain of the lodgment of the stone when deep jaundice supervenes, but he should remember that this does not follow cystic duct blocking, which, however, shows itself by considerable enlargement of the gall-bladder.

Of the drugs believed to have a specific or solvent action on the stone Salicylates occupy a prominent place; 20-gr. doses of the sodium salt three or four times a day render the bile more fluid, and are consequently administered as a routine to aid in its solution.

Benzoate of Soda appears to possess similar action, and Glycerin was formerly much used.

Olive Oil is largely administered for this purpose; 4 to 8 oz. or even more may be given once or twice a day. Obviously it does not enter the ducts till after digestion, when a portion of it is converted into a soap or fatty acid; this is believed to cause disintegration of the cholesterin mass composing the calculus. The number of cases in which this treatment has succeeded in the hands of many physicians warrants a trial of the drug in all instances before resorting to operation. It should be given when fasting. Oleic Acid and Soaps made from it are also administered, and salts of the Bile Acids are sometimes given (5 grs. Sodii Taurochol.) in Keratin-coated pills, or Ovogal with great advantage. Turpentine and Ether (Durande's cure) are also vaunted, but there is little evidence of their value.

Chologen, which is believed to be a mixture of Calomel and Podophyllin, in tablet form is greatly used on the Continent.

Alkalies exercise some solvent action, and there can be no doubt of the efficacy of the Carlsbad and Vichy Waters when freely administered at the spas, and a resort to Carlsbad in chronic cases is a routine recommendation with many physicians.

Drugs and agents are sometimes employed with the view of exciting peristaltic action in the common and cystic ducts. Thus a large dose of Calomel (10 to 15 grs.) followed by 1 oz. Castor Oil is occasionally efficacious in expelling the contents of the gall-bladder, and many instances are on record where numerous calculi large and small have been cleared out by this method. It is not, however, a safe practice to follow where a large

stone has recently lodged in the common duct and caused deep jaundice. Its best results are seen in chronic cholelithiasis, where the gall-bladder contains calculi which are not actively blocking the cystic duct, and the writer has several times seen operative procedure rendered unnecessary in cases where this had been already decided.

Massage and "pumping movements" with the view of dislodging the stone are to be condemned. The Faradic current with one pole over the gall-bladder and the other on the spine has been recommended with the view of exciting strong peristaltic action in the gall-bladder and ducts, and it may be tried without risk of rupture.

Surgical Treatment.—There is a consensus of opinion that surgical measures should be resorted to at earlier stages than has been the practice of former years. Operative interference is considered justifiable under the following conditions: (1) In gall-stones impacted in the common duct associated with persistent jaundice and repeated attacks of pain. (The period during which medicinal remedies are to be persevered with must be decided upon by the severity of the general symptoms and the condition of the patient, but it is safe to say that the mistake is still frequently made of delaying too long before operating.) (2) When attacks of hepatic colic with or without jaundice occur repeatedly. (3) When the gall-bladder is markedly enlarged without jaundice. (4) When the gall-bladder is enlarged and jaundice is present, if cancer is probably not the cause. (5) In all suppurative conditions of the gall-bladder. (6) In all cases where infective cholangitis is present. (7) In cases where biliary fistulæ have formed.

The nature of the operation required will depend upon the physical conditions discovered when the abdomen is opened. Thus, if the stone be found blocking the common duct high up, the operation of *Choledochotomy* or *Choledocho-lithotomy* is performed. This consists in incising the duct over the calculus as the latter is grasped between the finger and thumb, and after its extraction, the duct being explored for the presence of other stones, the wound in the wall of the biliary passage is to be either carefully sutured or drainage provided by the introduction of a rubber tube. When the stone is found firmly impacted in the ampulla of Vater the operation of *Duodeno-choledochotomy* should be performed. This consists in opening the duodenum by a vertical incision, and after enlarging the orifice of entrance of the duct the stone is delivered through the opening. In all cases of stone in the common duct not only should this be carefully explored, but the gall-bladder must be examined and any calculi found in it must be removed at the same time. Formerly in some cases the operation of *Cholelithotrity* has been successfully performed without incising the duct, the stone having been crushed by padded forceps or broken up by inserting a needle—an operation not to be recommended.

The operation for stones located in the gall-bladder is comparatively easy in the absence of adhesions and acute inflammation. *Cholecystotomy* is performed by making a vertical incision 2 to 2½ inches long external to the border of the right rectus muscle, commencing 1 to 2 inches below

the costal arch. This is the usual situation of a tumour if present. The point of the tenth rib is a good guide in the absence of swelling. Having felt the gall-bladder by the finger thrust into the wound (after ligature of all bleeding-points), its contents are evacuated by a free incision made in the fundus, and the calculi removed by a scoop after the peritoneal cavity has been carefully isolated by gauze packing. The margins of the wound in the bladder walls are invaginated and secured by a catgut purse-string suture around a piece of rubber tubing quite long enough to carry the contents of the gall-bladder over the edge of the bed and into a receptacle placed to receive them there.

After all discharge has ceased, the tube may be removed and the fistulous opening left to close spontaneously. The tube can usually be removed after about 8 or 10 days. This operation is indicated in all cases of empyema of the gall-bladder, whether due to calculi or not, but where the cystic duct is found impervious or where the gall-bladder has been functionless—*i.e.*, does not contain bile—it should be removed as presently to be described.

Cholecystendysis is indicated in a small percentage of cases where the gall-bladder is quite healthy and its contents free from pus. It consists in the removal of a small calculus through a limited incision in the walls of the gall-bladder, which are then closed by a double row of sutures and the organ returned within the abdominal cavity, the skin wound being closed afterwards without providing drainage. The operation of incising the gall-bladder and suturing it with or without drainage has, in the hands of Kehr, a mortality of only 2 per cent., and the statistics of Mayo give only a death-rate of 1·47 per cent.

When acute cholecystitis is found to be present and the walls of the gall-bladder are in a sloughing or gangrenous condition, or where these complications are absent and the gall-bladder is found to be greatly thickened by chronic fibroid changes, or where the cystic duct is strictured or contains a firmly implanted calculus, the operation of removal of the gall-bladder—*Cholecystectomy*—must be performed. This is effected by separating the organ from the lower surface of the liver, ligaturing the cystic duct and the cystic artery separately, after which the gall-bladder is taken away and the stump of the cystic duct cauterised or its mucous membrane dissected out. The operation should be carried out whenever any growth is discovered in the walls of the gall-bladder, whether calculi be present or not. It is distinctly contra-indicated if the common bile-duct is obliterated.

The operation of *Cholecystenterostomy* is indicated where there is a permanent stricture of the common duct or where this is obstructed by inflammatory or cirrhotic changes in the head of the pancreas, or by cancer in this latter situation or in the duct itself. It consists in short circuiting or establishing a direct communication between the gall-bladder and duodenum or jejunum. When it is possible to effect a junction between the upper dilated portion of the constricted duct and the bowel the operation known as *Choledochenterostomy* may be admissible. These

operations are also indicated for the relief of permanent biliary fistulæ which open on the surface of the body and cause the discharge of large quantities of bile.

When external fistulæ are the result of gall-stones left *in situ* which could not be removed at the time of operation these may sometimes be dissolved by the injection of Oil of Turpentine through a rubber tube passed along the duct to the impacted stone.

GANGLION.

These small tumours appear oftenest on the back of the wrist, and, when seen early, are in most cases easily dealt with by flexing the wrist so as to make them tense and prominent, when with the firm pressure of the surgeon's thumbs the cyst wall is ruptured and the jelly-like contents squeezed into the surrounding tissues. A smart blow with a smooth hard object effects the same result. When the ganglion resists such pressure a penny-piece wrapped up in two or three layers of lint may be tightly bandaged over it for several hours, the local circulation being carefully watched in the meantime, or milder pressure may be applied over strong Iodine applications. Failing this, a tenotomy knife may be inserted under the scrupulously sterilised skin, making a valvular incision and dividing the wall of the cyst on its lateral aspect. Mere puncture of the ganglion with the point of the knife, as usually recommended, is often useless, as the fluid speedily gathers again. After the incision 1 c.c. of the following should be injected :

Absolute Alcohol	10 parts.
Camphor	45 parts.
Ac. Carbolici	45 parts.

This causes a localised inflammation of the lining membrane of the cyst, and prevents further secretion of the distending fluid.

Another plan is to pass a strand of carbolised thread or horsehair through it under aseptic precautions, and permit it to remain for 5 or 6 days, after which the punctures are to be sealed up by a dry antiseptic dressing.

When, notwithstanding these measures, the fluid reappears, the only treatment is to excise completely the ganglion. This is the recognised routine method of dealing with the large compound ganglia, which are always of tuberculous nature. In the dissection the whole of the diseased sheath must be taken away, and its prolongations followed up even in some instances to the opening up of the smaller joints. All melon-seed bodies with every portion of the walls of the sac must be removed. The space should then be freely smeared with Bipp (Morrison), and the wound closed with sutures under an antiseptic gauze dressing. The joints involved should be exercised passively and actively within a period of at most 10 days to prevent ankylosis and gluing of the tendons in their new sheaths. The plan of injecting Iodine or other irritant into compound ganglia is not to be recommended.

GANGRENE.

On the first signs of threatening gangrene in a patient wearing tight bandages, splints, &c., the restrictions should be immediately removed, the limb slightly elevated and enveloped in warm, dry, antiseptic, absorbent wool. The same measures should be followed in the gangrene caused by Carbolic lotions.

When the senile form of gangrene is feared, much may be done to prevent the death of the toes or portions of the feet by keeping the lower extremities warm and the foot free from all pressure by tight boots. Thick woollen night-socks should be worn, and hot-water bottles avoided, any threatening symptoms being met by rest in bed with elevation of the limb and warm wool coverings.

When very local or circumscribed in extent and superficial in position, as in slight degrees of traumatic gangrene, the sloughs may be hastened in the separation process by the application of moist warmth as charcoal poultices or warm boric compresses. But the surgeon should aim in all cases of gangrene at asepsis when possible. A *dry* gangrene becomes rapidly changed into a *moist* one as soon as bacterial organisms are admitted; therefore, sterilisation of the skin by an antiseptic should be a routine precaution before elevating the part and enveloping it in warm antiseptic absorbent wool under a light bandage pending the decision upon operative procedures.

As a rule, in gangrene of the *senile* type involving the feet or legs, as soon as the death of the part is obvious and the pulsation has disappeared in the posterior tibial artery at the ankle, amputation should be decided upon without delay. To wait for a well-marked line of demarcation is only to submit the patient to the dangers of an exhaustive septic inflammation. Amputation should therefore be resorted to immediately, the incisions being made high up and well above the dead area, and in all cases above the level of the knee-joint, the lower third of the thigh being now the recognised site for removal of the dead limb, because the upper part of the posterior tibial artery or the lower portion of the popliteal is nearly always blocked.

In *diabetic* gangrene there is usually less urgency. The limb should be disinfected, dusted with Iodoform powder, and enveloped in dry wool, and if the gangrene shows no signs of spreading the toes may be removed and the stumps dressed after a line of well-marked demarcation has formed. If, however, pulsation has already disappeared in the posterior tibial, amputation above the knee should be resorted to without further delay. Diabetic dietary should follow up the operative procedure, but the diet should not be too restricted owing to the danger of coma. On account of this latter danger some surgeons prefer to operate under spinal anæsthesia. Opium is, however, not contra-indicated in the after-treatment or at the onset when pain is prominent.

Moist spreading gangrene is always due to the admission into the tissues of some septic organisms; these may be present when the skin wound is trivial or when severe trauma has injured the soft parts, with contamina-

tion from earth or dirt of any kind. As soon as the true septic or infective nature of the gangrene has become obvious, the only hope of saving life lies in immediate amputation performed high up, the incisions being carried through the healthy tissues, care being taken to prevent infection of the surgical wound by the secretions from the affected area. The allied condition known as Malignant Œdema will require the same prompt and radical treatment.

In *traumatic* gangrene without infection the condition is akin to that which sometimes follows the ligature of a main vessel, and operative procedure may usually be safely delayed till after the shock of the accident has passed away, so that the result of the natural attempt at restoration through the anastomosing vessels may be determined. Even here it will be unwise to wait too long owing to the danger of the dry type becoming changed into a moist spreading gangrene even when there is no skin wound. When there is extensive destruction of the tissues as in compound fracture caused by crushing machinery, &c., followed by rupture of vessels and great extravasation of blood, the injury being certain to end in the death of the limb, amputation should be performed as soon as the first serious symptoms of shock have passed away.

In the senile, diabetic and traumatic types of the disease, when both legs or arms are involved at the same time, there is little hope to be expected from operative or other measures, but one limb should be immediately amputated so as to permit the patient to recover from the shock of the operation, when after an interval of several days the second operation may be carried out, the gangrenous limb being in the meantime subjected to rigorous antiseptic treatment.

The treatment of gangrene of the Lung, of Raynaud's Disease, Cancrum Oris, Bedsores, Frost-Bite, &c., is described under the heading of each affection.

GASTRALGIA—see under Gastric Neuroses.

GASTRIC CANCER—see under Cancer.

GASTRIC DILATATION, OR GASTRECTASIS.

Acute Dilatation of the Stomach is a very rare and generally fatal malady, the cause of which still remains a mystery, and its treatment must be entirely symptomatic. If vomiting has not occurred the stomach becomes dangerously dilated, or this may even follow shortly after a copious emesis, and in either case the state of paralytic distension must be immediately relieved by passage of the rubber stomach-tube and lavage. Drugs by the mouth are useless; a full hypodermic dose of Morphia should be given with the view of soothing the nervous excitement and possibly of controlling the enormous secretory action of the gastric mucosa. The colon should be flushed out by a large quantity of normal saline solution, and as much of this should be left in the bowel as the patient is able to retain. Saline solution should be injected at several points into the loose subcutaneous tissue in order to overcome the dehydration of the blood caused

by the profuse secretion from the stomach. It may be advisable to transfuse with the saline or to administer defibrinated blood by the veins. Collapse may be relieved by warmth to the surface of the body and sinapisms to the calves of the legs and pit of the stomach. Whiskey or brandy should be administered *per rectum*. The writer was fortunate in meeting a typical example of this formidable malady which yielded to the above treatment. After the attack has passed off, should the patient survive, the stomach should have complete rest for 48 hours, the rectum being utilised for feeding purposes; the first food permitted should be strong clear soup or peptonised milk in small quantities.

The acute paralytic distension and dilatation of the stomach which sometimes supervenes after abdominal operations appears to be of similar nature. It should be treated by the immediate use of the tube, and a thorough wash out of the organ; or a gastrostomy may be performed, and the paralysed organ thoroughly irrigated through the fistulous opening. Normal Saline or Glucose solution should be injected hypodermically.

The *Atonic* form of dilatation due to loss of tone in the gastric muscular walls is usually secondary to other stomach ailments, to gluttony or the imbibition of large amounts of fluids, or to a true gastric neurosis, and must be met by a scrupulously regulated diet. This should consist of small quantities of semi-solid, easily digested or peptonised foods administered every two hours or more frequently, the patient being confined to bed at the commencement of the treatment.

Lavage should be carried out every second night to wash away the remains of all undigested food so as to start afresh with a clean and empty organ. It is imperative that not more than 5 or at most 10 oz. of fluid should be poured into the stomach at one time before siphoning off the contents. The night lavage gives the organ a long rest before the commencement of feeding on the following morning, and the plan so efficacious in gastric ulcer may be carried out during the first half of the day. This consists in feeding the patient with peptonised milk administered with a spoon, only a single spoonful (½ oz.) being allowed at a time so as to cause the liquid to pass directly into the duodenum, and so permit the weakened organ to have the maximum of rest. The dietetic treatment is to be assisted by abdominal massage, hydropathic measures and electrical or vibratory stimulation.

Symptoms caused by delayed digestion may be relieved by Pepsin and HCl, by Papain, Trypsin or Taka-Diastase and Alkalies; fermentative changes may be retarded by the administration of a 3 to 5 min. Creosote Capsule as in myasthenia gastrica (see Gastric Neurosis). The underlying neurosis may require a course of Weir Mitchell treatment, but this should not be attempted till local treatment has soothed irritability and restored some degree of tone in the weakened walls of the stomach.

Gradually the semi-solid or restricted liquid diet is to be replaced by one of undercooked minced red meat as in the Salisbury dietary, and farinaceous foods may be given at intervals with Papain or Taka-Diastase when the solids are suspended. Liquids must be administered in

small quantities at meal-times, and only in moderate amount between meals.

The atonic dilatation which follows dyspeptic conditions, where the patient has acquired the habit of belching, wind-sucking, or swallowing air with his saliva, yields to the above-mentioned treatment only after the pernicious habit has been stopped. Undue importance should not be attached to nervous symptoms in atonic dilatation, as these very often are the result of the abnormal state of the digestive function instead of being the cause of it. Hence in a case which has started in gluttony or other dietetic error, the nervous phenomena which arise from the enfeebled digestion, if erroneously regarded as proof of the presence of a general neurotic condition, will only be aggravated by a resort to the Weir Mitchell or other antihysterical treatment.

GASTRIC DILATATION AND PYLORIC OBSTRUCTION.

When caused by temporary or periodical blockage or kinking of the duodenum owing to Glénard's Disease, or more especially to ptosis of the right kidney, rest in bed is essential till the symptoms of dilatation or distension pass off. If the cause of the primary enteroptosis is of recent origin, as after prolonged strain or rapid emaciation, the rest in bed if sufficiently prolonged may cure the primary as well as the secondary condition. The general treatment is to be conducted upon the same lines as in atonic dilatation, small liquid or semi-solid meals taken at short intervals, and periodic lavage to wash all residue of food from the dilated organ are clearly indicated if relief does not speedily follow rest. Where vomiting every two, three or more days has occurred, abnormally large quantities being brought up at a time, little is to be expected from rest or abdominal supports, corsets or binders, which are useful in mild cases. Assistance may be obtained by the patient altering his position in such a way as to permit the contents of the stomach flowing through the pylorus, and this may even prove useful in the atonic type also.

The patient should be taught to use the tube and wash out the stomach every night if he refuses to submit to a radical operation (gastropexy) for the replacement of the stomach, and suturing it in its normal position by shortening the gastro-hepatic omentum and the gastro-phrenic ligament. Gastro-enterostomy may be tried, but its results in this condition are often very disappointing, and the same remark applies to the operation when performed for simple atony. Even when vomiting is remedied the acquired neurotic condition which has been induced by the visceroptosis may permanently remain, making the victim's life unbearable. Little can be said for Bircher's gastroplication operation, which consists in making a series of horizontal tucks by passing wide sutures from the smaller to the large curvature with the view of diminishing the capacity of the organ in its transverse diameter.

Dilatation of the stomach caused by adhesions which drag upon the duodenum from the gall-bladder may be relieved by operative methods suitable to each individual condition. Sometimes success has followed

the injection of Fibrolysin, and this has also been advocated in the next type of stenosis.

Cicatricial Stenosis of the Pylorus.—In the common form of dilatation of the stomach due to the cicatrisation of old duodenal ulcers, or ulcers at the pyloric end of the stomach, considerable relief may be obtained by a well-regulated dietary and constant lavage, especially when the obstruction is many degrees removed from being complete. But even in these latter cases there comes a time when operative interference is demanded.

Several operations are available: (1) *Loreta's*—this consists in making an opening into the stomach in the region of its smaller end, and stretching the fibrous tissue of the stenosed pylorus by inserting a dilator or the finger. (2) *Hahn's* operation is simpler; after the stomach wall has been exposed a portion of the anterior surface is invaginated by thrusting the forefinger into the narrowed pyloric portion, and so dilating it without making any incision in the stomach wall. (3) *Pyloroplasty:* This consists in making a transverse or longitudinal incision through the anterior wall of the stenosed pylorus; the central portion of each lip of the incised wound is next forcibly retracted till the transverse incision is converted into a vertical one, and its lips are then secured by sutures inserted in the transverse direction or at right angles to its vertical axis. (4) *Pylorectomy:* The operation in which the pylorus with the adjacent portion of the stomach is removed. (5) *Gastro-duodenostomy:* This operation is an extension of pyloroplasty, in which the duodenum is made to communicate with the pyloric end of the stomach through an opening made in the anterior wall of the latter.

These operations have practically given way to (6) *Gastro-enterostomy* or *gastro-jejunostomy*, the latter title implying the portion of intestine which is usually selected for the anastomosis. No. 5 is, strictly speaking, a gastro-enterostomy operation, but to prevent confusion it is better to associate the term gastro-enterostomy with gastro-jejunostomy. The object of this operation is to effect an anastomosis through an opening between the stomach and small intestine so that the gastric secretion and food pass directly through the stenosed organ into the intestine by the newly made route. There are two methods of performing the operation, which are known by the terms *anterior* and *posterior*, according to whether the fistulous opening is to be made in the anterior or posterior wall of the stomach. By common consent posterior gastro-enterostomy is regarded as the most suitable for nearly every case of pyloric obstruction due to cicatricial contraction, though the anterior operation is more expeditiously and easily performed, and is often more suitable in cancer of the stomach. A free incision being made in the middle line or through the right rectus muscle, the colon and stomach are drawn out of the wound and turned upwards; an aperture is made in the meso-colon in order to expose the posterior wall of the stomach, and a line on the latter is selected for the site of the fistulous opening. This should be near the lower curvature extending downwards in the direction of the long axis of the portion of

jejunum. The portion of jejunum to be opened is next sought for; the site of its incision is an important matter in order to avoid the danger of kinking afterwards. The best point, according to Moynihan, should be as close to the duodeno-jejunal flexure as possible, the anastomosis being made vertical and in the middle line, thus avoiding a loop. An elliptical piece of mucous membrane is then to be excised from the stomach and intestine, and the anastomosis completed by a double row of sutures. Mayo makes the opening run obliquely from above downwards and to the left, the piece of jejunum running from right to left. The meso-colic aperture is to be carefully closed round the anastomosed bowel by sutures in order to avoid the possibility of a future hernia.

The parts are returned to the abdominal cavity after a scrupulous toilet has been effected and all bleeding-points arrested, and the edges of the wound in the different layers of the abdominal wall are brought together by separate sutures.

Upon being put to bed with his shoulders raised, rectal injections of normal saline are to be commenced and continued till all efforts at vomiting have passed away, after which small quantities of water, followed by similar amounts of liquid nourishment, may be cautiously administered by the mouth.

The mortality of the operation has by improved methods in technique fallen to a trifle; thus in the hands of Moynihan gastro-enterostomy for gastric ulcer has not exceeded 1 per cent.

Stenosis of the pylorus in infants is either due to muscular spasm or hypertrophy of the circular muscular fibres, and is speedily followed by gastric dilatation, which usually fails to respond to restricted feeding, and must be promptly met by gastro-enterostomy. Sometimes this state is met with in adults as a remnant of the congenital condition, and such cases get along fairly well for a long period by resorting to liquid diet and constant lavage, but ultimately a pyloroplasty or gastro-enterostomy will be required. When the condition is met with in aged and debilitated patients who have suffered for many years, restricted feeding and lavage afford a better prospect for prolongation of life than that held out by an operation.

Gastric Tetany is regarded as the result of a toxæmia by products formed in the dilated organ, and as it has sometimes supervened during lavage or upon the introduction of the tube it cannot be safely met by this method of washing out the dilated stomach. The patient should be made to vomit when possible by drinking large draughts of lukewarm water, which should be repeated in order to thoroughly wash out the organ. Warm Saline solution should be injected into the rectum and into the loose cellular tissue about the armpits, breasts and groins to remedy the dehydrated condition of the blood and tissues. A hot pack, as in the treatment of uræmic conditions, has proved a valuable remedy in the writer's hands in eliminating the toxic products through the skin. Gastro-enterostomy has been successfully performed in some cases after the symptoms have abated.

Malignant Stenosis of the Pylorus causing gastric dilatation should be treated in the main upon the above lines. After abdominal section, if the malignant growth is limited in extent, pylorectomy may be found a practicable operation, and the pylorus and the neighbouring region of the stomach should be removed. Where the removal of the diseased mass is difficult, a gastro-enterostomy may be performed first, and after an interval when the patient has regained sufficient strength the pylorus may be excised. In hopeless cases beyond the reach of a resection prolongation of life may be afforded by a gastro-enterostomy when the pain and vomiting are incessant.

In these cases, a considerable amount of exhaustion being already present, the duration of any operative procedure is often a vital point, and the surgeon may well consider the advisability of performing the *anterior* operation, in which the stomach opening is made in the front wall of the organ nearer the cardiac than the pyloric end, and the anastomosis effected with the jejunum about 18 inches from its junction with the duodenum.

There is yet another type of gastric dilatation which, however, never reaches to the great dimension of the previous varieties. This is the form in which an open ulcer exists at the pylorus; the irritation caused by the existing hyperchlorhydria causes reflex spasm, and keeps the opening shut. The best procedure in such cases is at once to resort to gastro-enterostomy.

Duodenal Dilatation.—This is usually due to Glénard's Disease, and will disappear on the removal of the cause; when Lavage and the palliative measures mentioned on p. 307 fail, operative procedures must be undertaken.

GASTRIC INFLAMMATION (Gastritis).

Acute Catarrhal Gastritis or acute *Gastric Catarrh* is usually accepted as a synonym for Acute Dyspepsia. In the article on Dyspepsia the causes of an acute attack are discussed; amongst these are errors in diet or cookery, &c.; the improper food acts like a powerful irritant to the gastric nerves, pain and vomiting supervening almost as after the administration of an emetic, and the typical acute dyspeptic attack has probably no element of catarrhal inflammation in it whatever, the patient recovering within an hour. Where, however, the irritating cause is repeated often, catarrhal inflammation may be accepted as present when the attacks cease to speedily pass off after the original exciting cause has been stopped.

The treatment in the main is that of an attack of simple acute dyspepsia, but as vomiting has almost always occurred before the patient comes under observation there is seldom a necessity for administering an emetic; a local irritating emetic like zinc sulphate should never be given; copious draughts of lukewarm water with the view of washing out the organ are all that are requisite; to these a little Sodium Bicarbonate may be advantageously added, as the alkali assists in the removal of ropy mucus.

Feeding by the mouth should be stopped for a day or two in severe cases until the membrane gets rest, nutrient enemata being resorted to in the

meantime. Vomiting and pain should be met by *small* doses of Morphia combined with Bismuth and Hydrocyanic Acid (see recipe on p. 237). Where there is a thick coating of fur on the tongue with much nausea and retching a plain effervescing mixture every two hours gives better results. 40 grs. Bicarbonate of Potash should be administered in solution with each ½ oz. fresh lemon-juice, and a large sinapism may be applied to the gastric region. As soon as vomiting ceases, a brisk saline purge should be given, and a spoonful of iced milk mixed with effervescing kali water or liquor calcis may be administered every few hours.

The catarrhal condition subsides upon the withdrawal of the cause, and as this is usually due to errors in the selection or cooking of the food, imperfect mastication or irregularity in meal-hours, &c., these points should be thoroughly investigated, and the general directions detailed in the article on Dyspepsia carried out.

The treatment of *Acute Toxic Gastritis* is that of the poisoning by the mineral irritant which is operating as the cause of the acute inflammation. This will be found under Arsenic, Phosphorus, Mercury, &c., in the article headed Poisoning.

Acute Phlegmonous or Suppurative Gastritis is a rare and almost invariably fatal disease for which little can be done, as the affection runs a course too rapid to admit of vaccine or serum therapy. Relief may be obtained by rectal and hypodermic injections of normal Saline solution and by Morphia given hypodermically.

Chronic Gastritis.—As acute catarrh of the stomach is usually accepted as a synonym of acute dyspepsia, so chronic gastric catarrh is by many regarded as identical with the tangled web of symptoms known as "chronic dyspepsia." That the primary error is not of inflammatory nature in the strict sense in which we use this term is at once obvious when we see how speedily the chronic dyspepsia disappears upon removal of the exciting cause.

The first step in the treatment should be a minute search for every possible factor which causes simple dyspepsia. These have been dealt with in the article on Dyspepsia, and need not be here recapitulated. The gastric symptoms may be counted upon with confidence to fade away as soon as the diet, imperfect mastication, belching habit, oral sepsis, improper cookery, &c., have been corrected. Rarely will drugs be required unless in those very chronic alcoholic cases where the disturbing factor has been long in operation and has established an atony leading to gastric dilatation, in which case the dyspeptic condition has glided from that of a simple dyspepsia into an inveterate gastric neurosis, or ulcers may have formed. In addition to the remedies mentioned under Dyspepsia, lavage, massage, electricity and even gastro-enterostomy may be then demanded, as detailed in the articles on Gastric Dilatation and Gastric Neuroses.

GASTRIC NEUROSES.

The connection between functional affections of the stomach and the tangled web of symptoms recognised as dyspepsia has already been dealt

with in the article on Dyspepsia, which should be studied in association with the following remarks. The gastric neuroses are usually divided into the Sensory, Secretory and Motor types.

The success of every step in the management of a gastric complaint obviously depends upon accuracy in diagnosis; organic affections being eliminated, the next procedure should be to investigate the well-recognised causes which produce simple acute or simple chronic dyspepsia. It is a very common error to assume that every symptom of disturbed digestion occurring in a neurotic subject—hysterical, neurasthenic, neuralgic or migrainous—is due to a true neurosis of the stomach. It is an unquestionable fact that many highly neurotic individuals digest their food normally, hence the mere discovery or recognition of a general neurosis should never be accepted as evidence that the gastric disturbance is part of this until the ordinary every-day local causes of dyspepsia can be eliminated. These, as laid down in the article on Dyspepsia, are errors in cooking and dietary, imperfect mastication, belching or wind-sucking, caries of the teeth, irregularity in meals, &c.—causes which operate upon the digestive function of the typically healthy and neurotic alike. It is therefore futile to treat a case of dyspeptic trouble in an hysterical patient by Weir Mitchell or other method when the commoner causes are left uncorrected. These being in every instance eliminated, the treatment of a gastric neurosis may be then entered upon with confidence.

SENSORY NEUROSES.

Gastralgia, or Gastrodynia.—The treatment will resolve itself into the management of the case during the attack and during the intervals between the paroxysmal seizures.

Pain must be relieved promptly, as this is often as agonising as in angina, gall-stone colic, or acute perforation. The ideal treatment would be a hypodermic of Morphia were it not for the fact that the attacks are certain to recur and the repeated resort to the narcotic would establish the morphia habit. There is less danger of this if the drug be given by the mouth combined with other sedative agents. A good routine pain reliever will be found in 45 grs. Bicarbonate of Soda with $\frac{1}{8}$ to $\frac{1}{4}$ gr. morphia. Antipyrine 10 grs. or a proportional dose of any of the new analgesics, or 5 mins. Oil of Peppermint combined with an equal quantity of Chloroform or Ether, may be tried.

Ewald's favourite combination for the relief of gastric pain and hyperæsthesia in irritative conditions of the gastric nerves, with or without vomiting, is—

℞ *Morph. Hydrochlor.* *gr.* iij.
Cocainæ Hydrochlor. *gr.* vj.
Tinct. Belladonnæ ʒij.
Aquæ Amygdal. Amaræ ʒj. *Misce.*

Ft. solutio. *Sig.*—10 *to* 15 *drops every hour.*

He also advocates washing the stomach out with ½ per cent. Chloroform water.

Mustard applied over the stomach or an iced poultice to this region may cut short the attack. The continuous current sent through the gastric region or the Faradic current applied to the sympathetic or pneumogastric sometimes does away with the necessity of narcotics.

A full draught of hot water containing a drachm of Bicarbonate of Soda may cut short the attack, and if vomiting follows so much the better, as by this means the stomach is washed out.

Mild attacks of gastralgia often yield to a 3 to 5 min. capsule of Creosote or to the same dose of Hydrocyanic Acid given with 30 grs. Bismuth Carbonate. Sometimes a full dose of powdered Charcoal in wafer paper cuts the attack short. In severe paroxysms the inhalation or internal administration of a few drops of Nitrite of Amyl may be tried.

Between the attacks the underlying neurosis must receive judicious attention, and the usual agents found suitable in hysterical conditions should be administered, as Valerianates, &c. Some authorities regard the gastralgia as a true neuralgia of the gastric nerves, and treat it with large doses of Quinine and Iron between the attacks. Arsenic is a drug of great value, and Siebert affirms that functional gastralgia will be speedily cured by arsenic. The best routine will be to give 1 min. Fowler's Solution before meals in 2 drs. water for a few weeks, and then 2 mins. with 30 grs. Bismuth after meals for a couple of weeks. The Salts of Silver appear to act in a similar beneficial manner.

Prolonged rest in bed is essential. Apart from the consideration of the underlying neurosis and its treatment, anything which experience demonstrates to be an exciting cause must be remedied, as prolonged fatigue of body or mind, fasting or dietetic errors.

Gastric Hyperæsthesia may be constantly present without gastralgia, and, like it, is often worst when the stomach is quite empty. Arsenic and Nitrate of Silver in *small* doses afford the best routine for these cases when given in alternate courses of 2 or 3 weeks' duration a short time before food. Large doses of Bismuth with $\frac{1}{16}$ to $\frac{1}{32}$ gr. Morphia may be given after or between meals. A blister to the pit of the stomach is the writer's preliminary method in all cases. In very irritable patients relief may be obtained by the application under oiled silk of a liniment consisting of 1 part of Lin. Belladonna and 4 of Lin. Chloroform.

Heartburn, when not accompanied by pyrosis or water-brash, may be regarded and treated as gastric hyperæsthesia; when occurring in acute attacks it should be relieved by large doses of alkalies, as in the treatment of gastralgia.

Anorexia Nervosa is best treated by the Weir Mitchell method with complete isolation and forced feeding if necessary. Mild cases sometimes speedily respond to the introduction of the nasal tube, through which the stomach is to be moderately filled with liquid food: the forced feeding, acting through its moral influence, soon induces the patient to eat in order to avoid repetition of the operation. Bitter tonics should be

persevered with; Strychnine, which nearly always aggravates the usual symptoms of hysteria, may be safely given in small doses before meals.

The abnormal sensations included under the head of sensory neuroses, such as *Bulimia*, *Polyphagia* or *Akoria*—the opposite condition to anorexia—and *Pica* or *Coprophagy*, where indigestible substances or dirt are hankered after, if not due to insanity, must be treated as manifestations of the hysterical condition. The dietetic regulations for such patients, it is hardly necessary to say, will require the strictest supervision.

SECRETORY NEUROSES.

Hyperchlorhydria is the most important of these, but the mistake of confusing this affection with the more common condition universally recognised by the simple term "acidity" should never be made. The disease under consideration is characterised by the presence of excess of free *hydrochloric* acid in the gastric secretion, and cannot be recognised without a careful examination of the gastric contents. In health the percentage of free HCl varies from ·1 to ·2 per cent., and the total acidity to under 70 per cent. (As hyperchlorhydria is commonly present in gastric ulcer cases, this latter affection must be eliminated before the treatment of a gastric neurosis is entered upon.)

In the article on Acidity the fact is made clear that in many if not in the majority of patients suffering from acid dyspepsia the acidity is due to the presence of *organic* acids—butyric, lactic or acetic. These are derived from the food ingested or are formed during imperfect, delayed or interrupted digestion, their presence being commonly due to eating over-baked fatty foods, to imperfect mastication or bolting, or to pyloric obstruction, or to a motor neurosis which keeps the food too long in the stomach. It is an important fact which must not be lost sight of in the treatment of all stomach affections in which acid sensations are prominent that these may be really due to the *absence* of HCl or diminution in the secretion of healthy acid gastric juice.

The lines of treatment of hyperchlorhydria when this is due to a pure secretory neurosis are clear. The underlying hysterical or neurasthenic condition must receive careful attention, and menstrual irregularities and chlorosis will require correction. The diet is of great importance; farinaceous and fatty foods of all kinds should be given in small amount; undercooked red meat or Salisbury diet answers most indications. A line of treatment directly opposite to this is recommended by Walks and Fischal, who administer a diet in which Cream and Olive Oil figure conspicuously on the theory that vegetable oils or animal fats lessen the production of HCl, and at the same time hasten the digestion of albumins. This method of dietetic treatment is more satisfactory in cases of hypersecretion than in pure cases of hyperchlorhydria where the gastric juice may be normal in amount, though hyper-acid. It may, however, be tried in the latter condition, and if found satisfactory it may be safely continued. Where the excess of acid has already induced irritability of the stomach and vomiting, a pure milk diet may be tried. Peptonised foods usually aggravate matters.

As the hyperchlorhydria is usually intermittent, and acute attacks often cause much distress, relief should be sought in the administration of large doses of Alkalies; Bicarbonate of Soda may be freely given even for considerable periods, and there is no remedy of such constant value as the Papain, Soda and Magnesia combination mentioned upon p. 11 in the article on Acidity. When a large dose of alkali is administered during digestion the sudden neutralisation of the HCl arrests the digestive process, as pepsin only acts in an acid medium, but with papain the function is hastened, as this vegetable ferment acts in an alkaline, neutral, or even acid medium. The magnesia, in addition to its alkaline reaction, corrects the constipation which is usually present.

An occasional lavage of the stomach is highly beneficial in all severe cases. Gastro-enterostomy has been recommended for hyperchlorhydria, but the operation should be restricted to those cases which are not examples of a pure gastric neurosis.

Hypersecretion or Gastrosuccorrhœa.—When this condition is continuous it is known as *Reichmann's Disease* or *Pyloric Spasm*, where large quantities of acid gastric secretion are constantly manufactured independent of the presence of food. Whilst the underlying neurosis is being attended to by appropriate agents the diet should be restricted to albuminoids, undercooked lean meat, fish or poultry, with a limited amount of fluids at meal-times. Alkalies may be freely given as in the combination just mentioned, and when this is administered farinaceous foods may be safely permitted. Copious draughts of lukewarm water should be taken with the view of washing out the stomach, and it is a good practice to carry out stomach lavage every second or third day, using a weak alkaline solution for the purpose. When the condition resists this treatment a diet consisting of large amounts of cream and olive oil with fresh saltless butter and dry toast or biscuit may be tried.

The acute intermittent type of this neurosis known as *Rossbach's Gastroxynsis* should be treated promptly at the commencement of the attack by an emetic such as a very large draught of lukewarm water, which should contain a full dose of Sodium Bicarbonate to neutralise the excess of acid, as this may cause severe irritation of the epiglottis as it comes up the gullet.

The rubber stomach-tube may be passed as soon as the attack declares itself, but even then an alkaline solution should first be introduced into the organ before siphoning off the contents, as vomiting often comes on during the process. It will be well to thoroughly wash out with weak Permanganate of Potash or Creosote solution, and Nitrate of Silver (10 grs. to the pint) has been used to finally wash out any remaining secretion, care being taken that the whole of the liquid is siphoned off.

After the relief of the distress caused by the excess of scalding acid secretion Alkalies should be steadily persevered with and Bismuth given along with them in full doses.

Hypochlorhydria—the opposite condition to hyperacidity—is best met by free Hydrochloric Acid and full doses of Pepsin combined with Strych-

nine, given along with or soon after meals, vegetable bitters being prescribed before food.

℞ *Acid. Hydrochlor. Dil.* ℥iij.
Liq. Strychninæ Hyd. ℥j.
Glycerin. Pepsinæ ad ℥iv. *Misce.*

Fiat Mistura. Cpt. ℥j. *ex* ℥ij. *aquæ cum cibum.*

When the subacidity is accompanied by fermentative changes which cause excess of the *organic* acids—a common condition—then the Papain and Alkali combination should be resorted to, as under these circumstances free HCl often aggravates matters, and Creosote is very valuable. The diet must be light and as easily digested as possible; in severe cases bordering upon the next-mentioned type, the dietary must consist of peptonised foods.

Achlorhydria.—In this neurosis, which is a degree further added to subacidity, and in *Achylia Gastrica*—a condition in which there is neither HCl nor pepsin secreted—the treatment is the same, only the dosage of the acid and pepsin combination must be greater, and all foods must also be peptonised till the normal secretion begins to return, after which gradually increasing quantities of simple food, as milk and strong soups, may be administered. This type of neurosis in all its degrees of severity, from simple hypochlorhydria to achylia, supplies many of the cases which were formerly labelled *Atonic Dyspepsia.* When in addition to the diminution or absence of the normal secretion, and as the direct result of this deficiency, fermentations are set up, the clinical picture changes to *Irritative Dyspepsia,* where pyrosis, vomiting, heartburn, &c., are prominent from organic acidity (see under Dyspepsia). In this latter condition the vegetable bitters should be withheld till Papain and Alkalies with a minute dose of Morphia ($\frac{1}{20}$ gr.) have soothed the gastric irritability, after which pepsin and acid may be administered and an occasional lavage is beneficial. Sometimes Pancreatic preparations are more suitable than pepsin, and their action is not weakened by the administration of Creosote.

MOTOR NEUROSES.

These include *Peristaltic Unrest* or *Hypermotility, Nervous Vomiting, Rumination* or *Merycism, Belching, Gastric Spasm, Gastric Atony* and *Pyloric Insufficiency.* All these common conditions may be but the symptoms of organic stomach disease or of a simple dyspepsia caused by the continual violation of the health laws which should govern the selection and proper cooking of food, mastication, regularity of meals, oral asepsis, &c., and treatment of each varied condition on the lines of a true gastric neurosis should not be commenced till all these primary causes have been eliminated. Upon the other hand the difficulty is not lessened by the fact that theoretically any one or more of these neuroses may be the only visible sign of an underlying general neurosis, though

often hysterical or neurasthenic manifestations are also present. It must never be forgotten that the imperfectly performed gastric function (due to local conditions) will of itself produce nervous symptoms liable to be accepted by the theorist as proof of the presence of a general neurosis which does not exist. But, as insisted upon before, the mere presence of hysteria must not determine the diagnosis. Take, for example, the case of *belching*. This generally is a mere habit first started by some temporary flatulent distension produced by an accidental error in diet. The individual by voluntary effort eructates or belches up the gaseous contents of the stomach, more air is swallowed in the act during the descent of the diaphragm, and the stomach becomes more and more distended. The same results follow constant attempts at swallowing saliva. As the air passes into the bowel, borborygmi are produced and some relief obtained, but if there be any irritable condition of the stomach present spasm of the pylorus prevents this, and the stomach becomes blown up like a balloon, a condition known as *gastric spasm* or *pneumatosis* being produced. This "wind-sucking" is possibly never the result of a neurosis, and is cured readily in its early stages by explaining the dangerous results following the purely volitional act of belching. It is more liable to become a habit in neurotic patients, and Rumination is a similar habit only removable by educational methods.

Nervous Vomiting is, however, a true neurotic phenomenon, and can only be removed by a rigid treatment directed against the underlying neurosis. Regular lavage by its moral effect often speedily effects a cure.

Peristaltic unrest (Kussmaul) and the borborygmi which often are produced by emotional excitement may be remedied by rest after eating. The diet should be restricted to small quantities of solid food; a very limited amount of fluid should be ingested, and constipation must be guarded against. The condition is more frequently the result of motor weakness than of motor excess, in which case the stomach contents are delayed instead of being hastened in their passage through the pylorus, as is frequently stated to be the case. Occasional lavage is beneficial, only a limited amount of fluid being poured into the stomach each time before siphoning off. Small doses of Strychnine, if they do not intensify the symptom, are often highly valuable.

Pyloric insufficiency always yields to Strychnine, as it depends upon a paralytic or weakened state of the sphincter caused by over-stimulation. The drug should be administered as soon as the diagnosis is made clear by passing the rubber tube 30 or 40 minutes after a test breakfast, when the organ will be found empty. This premature emptiness is rarely, if ever, due to hypermotility, which would be increased by strychnine, and it is doubtful if this latter condition really ever exists alone. Local massage and electricity are useful adjuvants to the strychnine treatment.

Atony of the stomach is a common if not a constant condition after all severe exhausting illnesses, and in its established form—*Myasthenia Gastrica*—it is the best-marked type of a true gastric motor neurosis, and as such supplies the most typical example of the *Atonic Dyspepsia* of old

writers (see Dyspepsia). The underlying neurasthenia must be met by a prolonged rest from all mental labour, and, when possible, by a complete change of environment, with moderate open-air exercise and the benefits of cheerful companionship with changes afforded by varied travelling and sight-seeing. This is a line of treatment essential when the affection is the result of over-study, prolonged anxiety or grief, or too close application to business occupations.

When travelling is impossible, hydropathy, golf, gymnastic exercises, massage, and electrical treatment may be tried. Owing to the feebleness of the gastric muscle and the tendency towards dilatation of the organ, Weir Mitchell treatment should not be resorted to at once, though this is an ideal method later on.

The diet must be carefully regulated, as in cases of dilatation; only small amounts of easily digested solid foods should be given at intervals of two or three hours, and liquids should be confined to the intervals between meals. At first a short rest after each meal should be insisted upon; gradually, as the meals become more voluminous, less precaution is necessary.

Lavage will be indicated where, owing to the long delay of the food in the stomach, secondary fermentative processes set up organic acidity, but the amount of fluid poured into the stomach before siphoning must be limited. The passage of the stomach contents may be facilitated by gentle abdominal massage, vibratory or electrical stimulation.

Drug treatment can achieve much. In the absence of irritability a vegetable bitter before meals may be given. Strychnine is, however, the main remedy upon which reliance is to be placed. It should be administered shortly after meals in combination with Pepsin and HCl. The pepsin can be omitted often with advantage in the early stages of treatment, when it is necessary to peptonise the food. Papain and Alkalies are invaluable when organic acidity is present. By administering Pancreatic preparations or Taka-Diastase starchy and farinaceous foods may be safely permitted. Pepsin should never be added to the food previous to swallowing, though pancreatic ferments can be so utilised with advantage both in rectal and mouth feeding.

The treatment of atony of the stomach, when this has ended in inducing a permanent dilatation of the organ, is more fully detailed in the article on Gastric Dilatation on a previous page.

GASTRIC ULCER AND DUODENAL ULCER.

An early diagnosis is of vital importance, and X-ray methods, by demonstrating important results after a bismuth meal, have cleared up many difficulties in the recognition of both gastric and duodenal ulceration.

Uncomplicated *acute* gastric ulcers, when treated early, usually heal rapidly. The main agents for insuring this are rest and proper feeding, drugs taking a subordinate place.

Rest.—There must not only be rest to the stomach as far as is com-

patible with the demand for nutrition, but bodily rest as near to absolute as possible is also essential. The patient should be put to bed and encouraged to lie flat upon his back or in whatever position affords him the greatest ease and comfort. It is a good rule for the physician to state at the onset that this rest-cure must be maintained for a definite period—say 6 weeks—so that the patient may at once become resigned to his position, and cease worrying from day to day expecting to be permitted to leave his bed and being daily disappointed at not being allowed his freedom. He may be permitted to read, but the holding up of a heavy volume or any other exertion bringing his voluntary muscles into constant or periodical action must be forbidden.

Rest to the stomach is to be afforded at the start by rectal feeding should pain or vomiting be prominent or should hæmorrhage be present. In the absence of all these the feeding by mouth with small amounts of liquid nourishment may be commenced. The milk may advantageously be peptonised or fresh milk diluted with half its bulk of lime or Kali water may be used. The object of the physician should be to administer the liquid nourishment in such small quantities at a time as will enable it to pass through the pylorus directly into the duodenum, thus avoiding gastric digestion as far as possible. In obstinate cases this may be usually satisfactorily accomplished by a nurse feeding the patient with a spoonful of milk at a time. If the vessel containing the liquid nourishment be handed to the patient he is liable at times to take such a draught of its contents as will reflexly call upon prompt closure of the pylorus till the casein is precipitated and the digestion of the mass is attended with all the ill consequences of a meal of solid food.

This usually arrests vomiting, and after a few days the amount given at a time may be gradually increased as the intervals are lengthened, and by the end of about 8 or 10 days smooth semi-liquid arrowroot or other impalpable farinaceous food may be cautiously tried in small quantities. Strained soups may be permitted should the patient resent a pure milk dietary. By the end of the second week he may be allowed to swallow 5 oz. milk every hour during the twelve hours, which are ample for all the requirements of the body. A week later custard-pudding or carefully prepared boiled crumb of bread and milk may be given two or three times a day as an approach to the normal feeding-time of three or four times daily is made.

Lennartz commences with milk, and beaten-up egg given in teaspoonful doses, and inside a week adds raw minced meat to the liquid, followed in a few days by boiled rice, reaching a full mixed diet in 4 weeks. Rafsky recommends a partial rest-cure for 3 months, and gives 6 pints of milk daily in 8 oz. amounts.

Rectal feeding is imperative where severe vomiting or recent hæmatemesis has been present. The entire colon should be flushed out with a large tepid enema of water containing a teaspoonful of Bicarbonate and of Chloride of Sodium, soapy injections being unadvisable. A nutrient enema of peptonised milk (5 oz.) is after a short interval to be intro-

duced every 4 hours by a rubber tube 3 or 4 feet in length attached to a funnel, and every morning before recommencing rectal feeding the rectum or colon is to have one thorough wash out. When the patient shows tolerance of the enemata it will be wise to double the bulk of each and to lengthen the interval between them, by which means three or even four ½ pints of fluid may be administered during the waking hours. The peptonisation of the milk may be safely permitted to proceed much farther than if prepared for mouth administration; thus it should be allowed to continue till marked bitterness is produced. Beaten-up eggs, gruel and ox-blood and finely chopped meat and pancreas have been recommended, but the best results are obtainable from freshly peptonised milk and peptonised beef tea or chicken soup injected alternately. Eggs are especially liable to irritate the rectum after a time, but uncooked white of egg can often be peptonised along with the milk or soup.

A week is the limit during which the rectal feeding should be persisted in for maintaining the nutrition of the body; often 3 or 4 days suffice. But circumstances often arise in which a combined mouth and rectal alimentation may be advantageously employed for long periods, and the writer frequently directs that the small quantities of milk administered during the first 10 days by the mouth should be supplemented by a nutrient suppository every 4 hours, and this is a most satisfactory practice, against which no objection can be seriously made.

By the above rest and dietetic method, most cases of gastric ulcer can be effectually dealt with, and perfect healing of the sore secured in 4 to 6 weeks, and often less, but the return to solid food must be tentative and cautious, the experiment being best made first with well-boiled soft white fish, followed afterwards by tender young chicken, minced under-cooked red meat, or a portion of the fillet of an under-cooked sirloin.

Drugs are indicated only for the relief of symptoms arising during the treatment. Thus Morphia is always most valuable when irritability of the stomach is present, but it should be given in such minute doses as do not affect the cerebrum, as first suggested by Trousseau; a morphia perule ($\frac{1}{20}$ gr.) is often most effective in preventing vomiting. Being not larger than the head of a pin, it seldom is ejected, and Brinton believed that opium always facilitated the healing process in the ulcer.

Sippy, with rest and dietetic measures, employs Alkalies as part of the routine to neutralise the hyperacidity, giving in duodenal cases sometimes as much as 100 grs. Sodium Bicarbonate every hour alternating with the feedings by milk and cream. The complications which arise in severe cases will, however, usually afford marked indications for the exhibition of drugs, thus:

Pain.—When this is severe, a small blister (3 by 3 inches) should be applied in the middle line half-way between the sternum and umbilicus. It is more efficacious and often less irritating to the patient than a large sinapism. Warmth may be soothing, but occasionally ice affords relief. Pain should always be an indication for rest if the patient be not already

lying up for treatment. Morphia in $\frac{1}{20}$ gr. doses may be safely given at short intervals, and some physicians still place their faith in the pain-relieving reputation of Bismuth, which has been given up to the amount of ½ oz. $\frac{1}{200}$ gr. Atropine may be tried where opium is contra-indicated, or 2 mins. Hydrocyanic Acid or a ¼ gr. Cocaine may be combined with the bismuth. Often a small soft gelatin capsule containing 1 min. Creosote acts as a local analgesic, and a small piece of ice swallowed whole may be taken along with it.

In subacute and chronic ulcer the pain, which is often markedly aggravated by changes of posture, is usually due to the traction on old adhesions, and has been successfully met by injections of Fibrolysin. A. B. Mitchell, in a case where this treatment was being pursued (but which demanded abdominal section owing to perforation), found that old fibrous adhesions away from the seat of ulceration were already so softened and disintegrated that they broke down on a touch from the finger. The pain in chronic ulcer has been sometimes relieved by a 1-min. dose of Fowler's solution.

When the pain in recent and active cases is due to hyperchlorhydria marked relief may be obtained by administering alkalies. Carlsbad and Vichy Waters have been given with much success for this purpose, and Jaworski has demonstrated that the former has the power of diminishing hyper-secretion. Ewald likewise pronounces in favour of Carlsbad Water. Olive Oil in ½ doses has its advocates, and it certainly tends to diminish the hyperacidity.

Vomiting.—When this does not yield to minute doses of Morphia a sinapism or ice to the epigastrium and small particles of ice by the mouth and rectal feeding must be instituted. In rare cases vomiting may be actually produced by the nutrient enema when it was previously absent as a symptom. 12 to 24 hours of starvation may then be the only resource left to the physician during which normal Saline or Glucose solution should be injected subcutaneously. As a last resource a full dose of Morphia hypodermically may be given. Effervescing liquids may be tried, but they are often useless, and Champagne usually aggravates the condition. The writer has seen sour Buttermilk retained when everything else was speedily rejected; especially when a small quantity of Kali water is previously mixed with it its sedative action is most valuable.

The Bismuth mixture on p. 237 may be used in ordinary cases as a safe routine, and Cocaine, though useless by itself, may be combined with it.

HÆMATEMESIS.—Rest must be insisted upon, and ice applied to the stomach between two layers of lint, or a light extemporised ice-bag made of gutta-percha tissue may be laid over the epigastrium. All food by the mouth must be stopped, and even ice by the mouth, if given at all, should be only permitted in such minute quantities as will serve to assuage intense thirst. A little may be safely permitted for sucking in the mouth if the water be allowed to flow out without swallowing it.

Rectal feeding must be resorted to, but before introducing the peptonised milk an enema containing 60 grs. of Chloride of Calcium dissolved in 4 oz. water should be given. In severe hæmorrhage, when this is not retained, the physician should give a large subcutaneous injection of Saline solution, with which 30 grs. of the lime salt may be combined.

20 mins. Adrenalin Solution (1 in 1,000) may be given every hour for three doses in a teaspoonful of water should the hæmorrhage continue, and both drugs may advantageously be used at the same time, the calcium being given by the rectum and the adrenalin by the mouth. A full hypodermic of Morphia is often very necessary to allay the profound nervous excitement usually occasioned by the bringing up of large quantities of blood. All so-called astringent remedies, including ergot, tannin and turpentine, should never be given.

The Hart treatment of gastric ulcer is said to be of special value in bleeding cases. It consists in rest and restricted dietary, with the administration of 1 dr. of fresh serum obtained from the blood of the horse diluted with 3 drs. water three or four times a day, or 10 c.c. of Horse Serum given subcutaneously or intramuscularly.

Severe recurring hæmatemesis is a clear indication for surgical measures as soon as the shock of the hæmorrhage has subsided.

Many authorities insist upon the importance of Iron in the treatment of all cases of gastric ulcer, and it is a routine in Lenhart's method; he gives 5 grs. of the sulphate in pills *ter die*, beginning at the end of the first week. Ewald likewise commences Iron and Arsenic as soon as the acute symptoms have subsided, and he maintains that both drugs are always well borne in the disease. In hæmorrhagic cases, after the bleeding has been stopped, certainly iron is more clearly indicated, and the best method of employing it is to give teaspoonful doses of a 2 per cent. solution of the Perchloride mixed with a wineglassful of solution of egg albumin in water (1 in 3) sucked through a glass tube. The administration of iron by the rectum, as recommended by several, is probably a mistake, since the metal is eliminated by the mucosa of the rectum. Saundby administers 2 grs. Sulphate of Iron with 60 grs. Magnesium Sulphate in 1 oz. water, and Bourget washes the stomach out with a 2 per cent. solution of the Perchloride, to which ½ per cent. Chlorate of Potash has been added.

Nitrate of Silver in full doses (2 grs.) given in pill has been recommended in mild recurring hæmorrhage in acute cases, and as a routine in simple chronic cases with the view of exciting healing; and Stewart injects the stomach with a 1 in 1,000 solution (17½ oz.), which is siphoned off after 2 to 4 minutes, the stomach being then washed out; a large dose of Bismuth suspended in water is left in the viscus.

Perforation.—Operative measures must be resorted to with as little delay as possible as soon as the signs and symptoms of this grave complication have manifested themselves. The case for operation may be stated in the following sentence: Without operation 5 in 100 cases at the most can be expected to survive; with operation a similar number

may be expected to die. This places the mortality of the operation for gastric perforation at only 5 per cent., the figure which Mayo Robinson believes it will reach when all cases are operated upon promptly after the perforation. At present the mortality is much higher because many cases are included in the statistics where operation has been postponed till peritonitis has been established. Having established the diagnosis of acute perforation, no time should be lost in arranging for operation. Whilst preparations for this are taking place the patient should be given a hypodermic injection consisting of $\frac{1}{4}$ gr. morphia with $\frac{1}{150}$ atropia; he should be set up in bed with the shoulders well raised, so that extravasation, if it takes place, shall be downwards towards the pelvis and not upwards towards the subphrenic region; he should be kept quiet and warm—warmth being essential in the prevention of shock. Nothing should be allowed by mouth, and the administration of saline by the rectum is withheld at this stage, unless shock be marked, owing to its influence on the subsequent production of broncho-pneumonia, one of the most serious complications of these cases. The abdomen is now prepared for operation by dry shaving and painting with Tr. Iodi; on the table a further painting with Tr. Iodi will alone be necessary before the incision is made.

The incision is made through a vertical line lying one inch to the right of the middle line above the umbilicus. A perforation will usually reveal itself by a puff of gas when the parietal peritoneum is incised. The perforation is then incised; the edges are rapidly drawn together by 2 or 3 sutures of stout catgut; and these sutures covered in by a Lembert suture or by a purse-string suture including peritoneum and muscle. Owing to the œdematous nature of the tissues around a perforation it is necessary to place the sutures wide of the perforation, otherwise they will cut through and allow the opening to gape.

There is now but little diversity of opinion in regard to the necessity for performing a gastro-enterostomy in all cases of perforation. In the writer's opinion the only contra-indication is the general condition of the patient. If the general condition is even fair the subsequent management of the case will be made incomparably easier by a well done posterior gastro-enterostomy.

Unless a septic peritonitis is established it is unnecessary to spend time on sponging out extravasated fluid. This removes a highly protective material from the abdomen and renders the bowel wall more susceptible to the toxins. But provision should be made for free drainage by placing a wide-bore tube with gauze wick deep down into the pelvis and sometimes also into the right kidney pouch.

The patient is then returned to bed, placed in the Fowler position, normal saline solution is instilled drop by drop into the rectum by the Murphy method; fluids are not allowed by the mouth for 24 hours, but after that time a little warm soda bicarbonate solution may be allowed in teaspoonfuls.

The treatment of so-called *chronic* perforation in which adhesions have

formed and a localised peritonitis or perigastric abscess results, and of the *subacute* or leaking perforation, must differ with the different conditions found after an exploratory incision. Where the ulcer is on the anterior surface of the stomach the operation of *Gastrolysis* may be undertaken; this consists in separating the adhesions and dealing with the ulcer by excision or otherwise. But as these chronic perforations are usually inaccessible and situated on the posterior surface, suturing of the ulcer is often not possible, and the best routine procedure is to perform a gastro-enterostomy and allow the adhesions to remain undisturbed without attempting a gastrolysis.

Chronic Gastric Ulcer.—This type of ulcer may exhibit its presence by a return of the usual symptoms some time after the patient has been freed from all pain and discomfort by a prolonged rest-cure, in which case it really belongs to the class recognised as the *recurring ulcer*. It is, however, liable to finally pass into the chronic type and become identical with those examples of the disease constantly met with by the physician in which, without any history of an acute attack, the patient has suffered for years from symptoms of gastric ulcer with or without occasional slight attacks of hæmatemesis.

If the rest-cure has not been already tried, or if only a short stay in bed has been submitted to, the question arises of whether a prolonged rest in bed with restricted diet should be recommended or immediate resort to operation decided upon. The patient usually settles the problem for himself by accepting the former alternative. In which case it must be insisted upon that a period of less than 12 weeks of absolute rest and dieting is useless, and he should be warned that at the termination of this time an operation may be still necessary.

The treatment to be pursued during the three months of the rest-cure is to be upon the same lines as have been described for acute cases. Rectal feeding will, however, be rarely required in these patients, and a larger bulk of the liquid nourishment may be permitted, but this should not exceed 2 oz. of milk per hour for the first week, and double this quantity, or at most 5 oz., should not be exceeded till the end of the first month; most patients can live upon this latter quantity when at absolute rest; it works out at about 3 pints of milk consumable during the waking hours. It may, however, be supplemented by strong clear soup, or beef tea at times. Most physicians recommend that minced meat, fish, bread, &c., should be given after a couple of weeks, but the patient should rigorously adhere for at least 2 months to a perfectly fluid diet, or one in which impalpable farinaceous foods like arrowroot, corn-flour, or oaten flour are alone used as in the dietary for typhoid fever. The milk should not be peptonised unless under special circumstances. Renneted milk may be used freely and uncooked white of egg with a little chicken soup, and occasionally Benger's food may be given. If the patient does not tire of the smooth or liquid diet it may be prolonged after he is permitted to move about. Olive Oil as an article of diet is sometimes most valuable, and may be freely used in many cases.

Drug treatment is of more importance in the chronic than in the acute type of ulcer owing to the almost constantly present gastric catarrh, and the best routine is the combination of Papain 2 grs. with 30 grs. Bicarbonate of Soda, and an equal amount of Heavy Magnesia and $\frac{1}{20}$ gr. Morphia, given every 6 or 8 hours alternately with a 2 or 3 min. capsule of Creosote 3 or 4 times a day; or ʒj. doses of Bismuth Carbonate.

Lavage may safely be employed in many cases if a very soft tube be used, though this agent is inadmissible in the acute type of ulcer where spontaneous perforation is more liable to occur than in ulcers with greatly indurated margins, as in the condition at present under consideration, but the stomach should never be distended with more than 10 oz. of liquid at a time. Where the patient can induce vomiting by swallowing a $\frac{1}{2}$ to 1 pint of lukewarm water containing a teaspoonful of bicarbonate of soda this method answers all purposes when much catarrh with mucous secretion is present. The addition of Creosote or other antiseptic to the water used for lavage is often beneficial, and Professor Stewart's method of washing out with Nitrate of Silver might be tried.

The pain of chronic ulcer must be carefully investigated; often this remains permanent after complete cicatrisation has occurred, in which case it is due to the dragging of adhesions and can usually be differentiated from the pain which is caused by food or hyper-acid secretion coming into contact with the ulcerated surface. Fibrolysin injections may be resorted to before operation is decided upon in such cases.

When the symptoms continue or, as is much more frequently the case, when they return after the patient resumes an ordinary diet, the case should be pronounced to be one in which an operation is necessary. The danger of complications, as hæmorrhage and perforation, and the liability to a life of chronic invalidism, or to the termination of the affection in cancer being pointed out, the patient usually consents to place himself in the hands of the surgeon.

Operations for Gastric Ulcer.—The exact nature of the operative procedure cannot be decided upon till the stomach is exposed and the actual condition in each case is determined, but the growing tendency amongst all surgeons is to the routine of doing a posterior (no loop) gastro-jejunostomy by von Hacker's method, in which a vertical application of the jejunum to the stomach is effected as described under Gastric Dilatation. Finney's gastro-duodenostomy is less satisfactory. Watson Cheyne, believing in the tendency to spontaneous cure if the stomach can be secured rest, advocates Gastrostomy and feeding by a tube passed through the pylorus.

If the ulcer be recognisable as such it should always be excised. Ulcers near the cardia are the most difficult owing to their inaccessibility, but fortunately they are not very common in this situation. In all cases of excision the operation is completed by a posterior gastro-enterostomy, otherwise the ulcer will in the great majority of cases recur.

Mitchell has pointed out the importance of partially occluding the duodenal exit in order to secure patency of the artificial one; this he

accomplishes by a purse-string suture of the pylorus, the needle passing deeply into the substance of the muscle. The mortality of gastro-enterostomy for chronic ulcer is now reduced below 1 per cent.

The formation of a peptic ulcer in the duodenum or jejunum after gastro-enterostomy is becoming a rare event since the introduction of the perfected methods above described in the posterior no-loop operation, as insisted upon by Moynihan, Mitchell and others, with partial or complete obliteration of the pyloric orifice so as to keep the new route patent.

Hour-glass contraction of the stomach, if found present, requires radical operative methods. *Gastroplasty*, or the division of the stricture between the two sacs, is not a successful procedure, as recurrence is liable to follow. *Cylindrical Gastrectomy*, in which end-to-end union is effected, meets many cases.

Gastro-enterostomy often is followed by recurrence. Monprofit and Clément have devised anastomosis operations by means of which each pouch may be drained separately into the jejunum. The best procedure is *Gastro-gastrostomy ;* this consists in making an anastomosis or direct connection between the two pouches by folding over the pyloric pouch upon the gastric one, and then performing a posterior gastro-enterostomy in order to drain both.

Operation for Hæmatemesis.—This if possible should never be attempted when the patient is in an exhausted anæmic condition; the hæmorrhage usually can be effectually controlled by medical treatment as detailed upon p. 321.

In recurring severe hæmorrhages (*gastrostaxis* or *gastrorrhagia*), as the next attack may prove fatal, a gastro-enterostomy should be performed. When this is decided upon no interference with the bleeding ulcer need be thought of; as soon as the collapse of the stomach walls has occurred after the operation, if bleeding has been active it stops, and never returns.

Many surgeons maintain that, once the diagnosis becomes established, surgical measures should not be delayed, but the recent tendency to modify this is becoming marked, and the opinion is growing that the rest and dietetic treatment so often successful in gastric ulcer should have a trial before the knife is resorted to.

DUODENAL ULCER

The general indications are mainly the same as in ulcer of stomach—rest and milk feeding; but it is not clear that spoon-feeding is so desirable. Larger amounts of milk with cream may be given every couple of hours, and a large dose of alkali, as in Sippy's method, should be administered every hour or two till the gastric acidity is neutralised and kept at a low standard. Antilytic Serum (fresh normal horse serum) administered by the mouth has an almost specific action, and it should always be tried for the relief of hæmorrhage whilst awaiting operative procedures.

Four operations, according to Moynihan, are available:

1. After opening the abdomen the ulcer is searched for, and if found to be very small and situated upon the anterior surface of the duodenum

it may be simply *excised*. This is done by making two horizontal incisions, including a narrow elliptical piece of the duodenal wall containing the ulcer; the lips of the wound thus formed are forcibly retracted so as to convert the horizontal aperture into a vertical slit, in which position it is then sutured. A modification of this operation consists in prolonging the extremity of each end of the horizontal incision so as to reach the stomach and extend towards the second part of the duodenum, after which the large wound is to be dealt with as in Finney's operation.

2. The duodenum may be resected with or without the pyloric portion of the stomach.

3. Resection and end-to-side anastomosis, the pylorus being left intact, following Bland-Sutton's method.

4. *Gastro-enterostomy*.—This is the procedure suitable in the very great majority of all cases of simple duodenal ulcer. The posterior no-loop operation, with a vertical application of the jejunum to the stomach, gives the most satisfactory results; the steps of the operation are described under Gastric Dilatation. A. B. Mitchell has shown the necessity of partially occluding the duodenal route by a free infolding of the ulcer, and Moynihan adopts this procedure as a necessary routine in all cases. After all suturing has been completed and dressings applied the patient is placed on his back in bed for a couple of hours, when he should be well propped up and permitted to swallow a small quantity of water, and Moynihan allows a cup of tea after a few hours, to be repeated 3 or 4 times during the first 24 hours. Solid food, fish, sweetbread and bread and butter may be permitted in 8 or 10 days, and ordinary diet at the end of the third week.

Moynihan, in his brilliant classic on "Duodenal Ulcer," gives the details of almost 200 cases upon which he has operated, and states that his mortality up to the end of 1909 was 1·6 per cent. for his entire series; there was no death amongst his last 121 cases operated upon.

Perforation of Duodenal Ulcer.—This must be met by immediate operation, and the technique follows closely that described for the treatment of a perforated gastric ulcer.

The question of the necessity of performing a gastro-enterostomy is practically settled by recent experience, as after the suturing of the margins of the perforation the ulcer should always be freely infolded, and this leads to more or less occlusion of the duodenal route. Hence the posterior operation should be performed when possible in all cases. Sometimes the anterior operation may be indicated where expedition is a vital point and the condition of the part determines its suitability. It will be often a wise precaution to wash out the stomach during the operative proceedings.

After the completion of the operation the patient should be propped up in bed by pillows in the sitting posture, and Murphy's method of continuous rectal infusion should be started at once; this relieves thirst and diminishes the risk of septic infection.

The recent results of operation for duodenal perforation in chronic ulcer must be considered as somewhat startling; my colleague A. B. Mitchell has performed the operation with complete success in no less than 17 consecutive cases. He points out that the reflex closure of the pylorus which usually follows perforation of the duodenum limits the amount of extravasation into the abdominal cavity, and hence better results may always be expected than when the stomach has perforated.

In *chronic* perforation the procedure should be upon the same lines. The abdomen being opened, the abscess should be incised and free drainage established; a fistula, however, often remains. The pylorus should in these cases be occluded by infolding and a posterior gastro-enterostomy performed.

GENU VALGUM (Knock-Knee).

Both this condition and the opposite one of *Genu Varum*, or *bow-knee*, are nearly always the result of rickets; occasionally they may result in weak, underfed boys by prolonged standing or the carrying of heavy weights which cause the ligaments of the knee-joint to stretch.

The treatment of both affections in the early stages will consist of rest in bed in order to take the weight of the body from off the yielding bones or ligaments. The internal remedies—Cod-Liver Oil, &c.—well regulated dietary, suitable to the rickety condition, are to be persevered with, whilst massage and forcible though painless manipulation of the bones are to be daily practised.

As open-air life is to be maintained as completely as possible a splint may be applied along the limb, reaching from the pelvis to well below the foot, so as to prevent the child from standing. By careful padding of the splint and by the judicious use of an elastic bandage a mild degree of pressure may be continuously kept up in order to straighten the bent bones, and the child can be carried out into the open air. A double Thomas's hip splint with knee-bars and head-piece is usually very suitable. In poor children where the adjustment of splints becomes an impracticable procedure the leg may be straightened under chloroform and a plaster casing applied to the entire limb.

When the child is allowed to get about it should have the inner side of the sole and heel of the boot thickened by $\frac{1}{4}$ to $\frac{1}{3}$ inch. This keeps the strain of walking off the internal lateral ligaments of the knee-joint, and makes the child turn the toes inwards. Both these factors give assistance in preventing further development of genu valgum.

The knock-knee and bow-knee of adults do not yield to the above treatment; the splints or irons irrationally applied in these cases cannot act upon the rigid bones, and only tend to stretch the sound ligaments, but Thomas's knock-knee brace is often useful; operative procedures are essential if the deformity is to be removed.

Osteotomy by removing a wedge-shaped piece of bone from the inner side of the femur permits the long axis of the bones being brought into line. *Macewen's* operation is the most suitable; he chisels through the

femur above the epiphysis for two-thirds of its extent and then breaks the bone across; the limb is next encased in a plaster of Paris splint after the deformity has been overcorrected and the toes turned in. Where the tibia is the chief seat of the deformity, *Morton's* operation is required; this consists in the removal of a wedge-shaped piece of bone from the tibial tuberosity. The deformity may often be remedied by merely sawing through the tibia below the epiphysis; in either case the fibula must be divided or fractured (osteoclasia) if it cannot be bent. In bad cases both the femur, tibia and fibula may all require division. Bow-knee is dealt with upon similar lines.

Bow-legs occur from rickets, and may be associated with the two previously mentioned deformities or exist alone. In young children the condition can usually be remedied without operation. Complete rest in the horizontal position in bed is essential. The weight of the body must be taken off the softened bones for a considerable period. Cod-Liver Oil should be administered, the diet carefully supervised, and the nutrition of the body improved in every possible way, while the tone of the muscles is to be assisted by massage and douching. Manipulation of the softened bones may be employed so as to assist in the reduction of the bending.

The writer believes that harm may be done by the routine administration of Phosphorus when this remedy is resorted to before the bent bones have been allowed to straighten by rest and manipulation, as they are liable to become hardened in their bent position under the action of the drug.

Bandaging the limbs to suitable splints, selected as sound common sense and surgical or mechanical knowledge may dictate, will bring the deformity back to the normal standard when rest and massage fail. A double-padded splint may be placed between the legs, extending from near the perineum to some inches beyond the soles of the feet. To this splint both legs should be evenly bandaged. It is a good practice to resort to splints, even in mild cases, since their use enables the child to be safely carried or driven out in the open air without the risk of his leaning his weight upon the limbs. Standing should be rendered impossible by the adjustment of the splints. Massage and douching may be performed at night and in the morning. In severe cases attempts may be made to straighten the limb under chloroform, and in confirmed, long-standing cases osteoclasia or fracture of the bone or osteotomy is the only available procedure.

When this deformity persists in spite of these remedies Jones performs the operation of osteoclasia, using his own osteoclast for the purpose. After breaking the bones at the seat of maximum deformity, the limb is put in splints for a fortnight, and at the end of this time, after manipulation into the best possible position, in plaster of Paris.

GLANDERS.

The most scrupulous cleansing and disinfection is essential owing to the infectious nature of the acute disease and of its chronic type (farcy),

and no groom suffering from abrasions should be permitted to tend upon any suspected animal. This is equally imperative in the case of nurses or attendants coming into contact with glanders occurring in the human subject, and the patient should always be rigidly isolated.

The treatment of the acute disease is very unsatisfactory, the great majority of the cases ending fatally; little can be done save to treat the symptoms of fever, prostration and joint pain by rest in bed, generous liquid diet and free stimulation. The site of the entrance of the bacillus, when recognised, should be freely excised or cauterised by the galvano-cautery. All swellings and local collections of pus should be incised early, and the cavities, after being syringed, may be well mopped out with Sublimate solution or Creosote and cotton-wool on a stout probe.

In chronic cases the same surgical measures must be promptly followed, and when the nose is affected a nasal antiseptic douche containing Carbolic Acid should be continually used and the throat sprayed with the same solution (1 in 100).

Drugs are of little use in the acute type of the disease, but in chronic cases Sulphocarbolates and Benzoate of Soda are valuable and may be given in doses of 30 grs. three times a day. Where there is much prostration, large doses of Ammonia are indicated. Quinine, 5 grs. every four hours, dissolved in 15 mins. of the Tincture of Perchloride of Iron, may be given. Arsenic, Iodides, Carbolic Acid, and Mercurial inunctions have been also employed, sometimes with advantage.

Mallein has been injected in doses of 10 to 15 mins. of the Lister Institute preparation, though some authorities maintain that it should never be used in human glanders or farcy.

Symptoms, as they arise, such as pain, diarrhœa, profuse perspirations, rigors, vomiting, &c., must be met by appropriate remedies. The air of the patient's room should be kept saturated with the vapour of Carbolic Acid, Terebene, or Turpentine.

Sir A. Wright injects a vaccine prepared from cultures made from the local lesions of the patient; this is to be administered in such doses and at such intervals as the opsonic indications direct, but notwithstanding most patient treatment by this method it sometimes fails.

GLANDULAR FEVER.

The treatment of this acute infectious disorder, which occurs as a rule only in children and is never fatal, should be carried out on the same lines as are indicated in a mild attack of measles or rötheln. A smart saline or a full dose of Calomel should be administered at the start. A mild diaphoretic mixture should be prescribed as long as the fever lasts, a milk diet administered and the patient isolated in a moderately warm, well-ventilated room. No friction or stimulating application should be made to the enlarged glands, which always spontaneously subside within a fortnight. A warm covering of cotton-wool may be provided for the jaw and cervical glands when these are markedly tender. 4 weeks'

isolation will be necessary before the patient is permitted to mix with healthy children.

GLAUCOMA.

The treatment of *Primary* glaucoma—*i.e.*, that form of increased tension in the globe not preceded by any intra-ocular disease—requires prompt measures when occurring in the acute form. *Myotics* and *Iridectomy* are the methods to be resorted to; the choice of these agents will depend upon the special indications present, but as a rule removal of a portion of the iris must be effected if a permanent result is to be obtained. Eserine should be instilled immediately as soon as the first symptoms of the disease exhibit themselves; the solution should not be stronger than 2 grs. to 1 oz. Posey recommends that as a strong solution of Eserine may cause spasm of the ciliary muscle Pilocarpine should be at first employed, but this is of more importance in chronic attacks, since time is of vital importance in the acute type of the affection in order to prevent total blindness from retinal destruction. The instillation should be repeated 3 or 4 times within the first hour, and at longer intervals afterwards. A strong Saline purgative should be administered, and the local tension may be lessened by leeching; but all these measures must be regarded as mere palliatives, and should only be resorted to as preliminary procedures to preserve the integrity of the eye while awaiting the necessary arrangements for the performance of an iridectomy. Even should the attack appear to pass off the operation should be carried out, as recurrence is almost certain to supervene and the vision may be completely destroyed before aid can be again obtained.

The incision should be made as far back in the cornea-sclerotic margin as possible, and Swanzy insists that at least one-fifth of the circumference of the iris should be removed as close to the root as possible, and that the aqueous humour be permitted to flow away very gradually in order to avoid intra-ocular hæmorrhage from the suddenly reduced pressure. If the operation should by any means fail to reduce the tension, posterior sclerotomy must be resorted to in order to restore the anterior chamber and permit the lens to resume its normal position. Henderson explains the efficacy of iridectomy upon the theory that the aqueous humour escapes into the stroma of the iris through the incised lips of the wound made in it, as no cicatrisation occurs in them. In rare intractable cases Lagrange's combined iridectomy and sclerotomy operation which establishes a subconjunctival fistula may be resorted to, and Herbert's modification of iridectomy is planned upon similar lines to secure continuous escape of a small quantity of the aqueous humour into the lymph spaces of the episcleral tissue.

Subacute or *chronic* primary glaucoma is to be treated upon similar lines. In many cases the tension may be kept normal by the continual use of Eserine, but the instillation must be kept up during the remainder of the patient's life, and often irritation of the conjunctiva becomes unbearable. The dietary and alimentary canal will require close supervision; every agent tending to produce increase in the general blood-

pressure must be neutralised. Maddox recommends periodical manipulation of the eyeball. As a rule it is wiser to perform iridectomy and thus forestall a severe acute attack, but the excellent effect as regards gain or restoration of sight which follows the operation for acute glaucoma is not to be expected in the chronic form, since in these cases the vision is always more or less permanently damaged.

In chronic gouty glaucoma success often follows the medical treatment of the primary disorder without resorting to operation.

The operation of removal of the superior ganglion of the sympathetic has been many times performed for chronic glaucoma, but not always with success. Many surgeons advocate a simple sclerotomy to evacuate the aqueous without removing any iris.

Congenital hydrophthalmos, or as it is also called cornea globosa and buphthalmos, when the tension becomes greatly increased in the distended globe is best treated by Eserine instillations; operative procedures are contra-indicated as a rule.

Secondary glaucoma—*i.e.*, that form which supervenes upon previous diseased conditions of the structures of the eye—will require treatment modified in each case by the old intra-ocular disorder. Thus when due to complete annular adhesions between the iris and the anterior capsule of the lens (posterior synechia) an iridectomy should be done. Injury, displacement or dislocation of the lens causing glaucoma will demand removal of the lens from the eye in order to restore or open up the angle of the anterior chamber. Dislocation of the lens into the vitreous will demand an iridectomy if the symptoms do not yield to eserine instillation. Deep corneal wounds and ulcers involving the iris in their cicatrices must be treated by removal of a large portion of the iris. When the exudation is extensive in an acute iritis which blocks the normal circulation of the intra-ocular fluids, though no adhesions exist, the contents of the anterior chamber must be removed by paracentesis.

Where the sight is totally lost and the glaucomatous eye is painful and tender, though iridectomy has been already performed, the only procedure is enucleation.

Hæmorrhagic glaucoma is always grave: a strong Saline purge should be given immediately, and small doses of nitroglycerin to reduce the general blood-pressure, and Eserine should be instilled. Paracentesis is the best routine procedure, the aqueous being removed as slowly as possible. Iridectomy must be avoided, as the sudden withdrawal of fluid is certain to increase the hæmorrhage, unless in cases of primary hæmorrhagic glaucoma after Eserine, Purgation and Leeching have gradually reduced the tension. Enucleation of the eyeball will often be necessary.

It should always be remembered that atropine must never be employed in the glaucomatous condition, owing to its dangerous power of increasing the intra-ocular tension. Its instillation with the view of breaking down adhesions in synechia may determine an attack of acute glaucoma in elderly subjects.

GLEET.

In very chronic cases of gonorrhœa the ordinary internal antigonorrhœal remedies are worthless; the condition is liable to become intractable, the patient becoming hypochondriacal or neurasthenic.

His physical condition should be improved in every way possible, and complications such as constipation, anæmia, dyspepsia and oxaluria should be corrected by appropriate remedies. Stimulants, excessive smoking, sexual intercourse, and over-eating should be forbidden. Excessive fatigue is as injurious as spending too much time in bed. Sea-bathing, when the season permits, or cold baths indoors, and moderate open-air exercise are beneficial in all cases.

Tonics, consisting of full doses of Tincture of Iron (15 mins.), with 3 grs. of Quinine or teaspoonful doses of Easton's Syrup, often do good.

The local treatment of gleet is by far the most important, and the number of remedies is almost endless. Every known astringent and antiseptic has been injected. Where the gonococcus is found in the discharge the organic Silver Salts afford the best treatment, but in the majority of chronic cases the examination of the slight mucoid discharge gives negative results. In all neglected cases it is well to begin with irrigation by a 1 in 2,000 Permanganate solution.

The best routine treatment to start with is the passage of a solid metallic bougie with a wide curve in order gently to stretch the urethral tissue. Thompson's old-fashioned tapering, solid, heavy bougies are, in the writer's opinion, the best instruments for general use. One of them, well lubricated, should be permitted to glide into the bladder by its own weight. The size selected should be of the full diameter of the urethra; it should be left *in situ* for a period of a few minutes at first, and this period should be gradually lengthened at subsequent sittings and a larger instrument employed each time till No. 15 (English) is reached. Any lubricant may be used; the writer uses the B.P. Glycerin of Borax. Many cases of gleet will be found to yield to this treatment if carried out for some weeks. Twice a week will be about the best rule for guidance as regards the frequency of the sittings.

The advantage of this treatment lies in its freedom from danger when contrasted with the injections of strong astringent solutions, and it effectually remedies any stricture or narrowing of the urethra which is found so frequently associated with gleet, and it will prevent a stricture forming afterwards.

Any antiseptic may be smeared upon the bougie if made into a stiff ointment. Special grooved instruments are made for the application of solid ointments, but these are unnecessary as, owing to the adhesive nature of lanoline, any substance incorporated with it will adhere to the curve of the bougie, and may be carried down and left in contact with the diseased area. Iodoform (30 grs.), mixed with 1 oz. ointment of Hazeline, is a valuable lubricant. Carbolic Acid, Resorcin, or Nitrate of Silver (5 grs. to 1 oz.) may be used in this way.

The drug may be incorporated with a firmer basis, and made into

bougies, which can be passed down the urethra and left to melt by the heat of the body. Unna's bougies contain (1 in 100) Nitrate of Silver, and are made with cacao butter and a little wax and Peruvian balsam. Antrophores are specially prepared bougies of Thallin Sulphate (2 to 6 per cent.).

The endoscope should be passed after cocainisation when the disease fails to respond to the use of these remedies, and the urethra examined for its entire extent. Any local lesion that is detected can then be directly treated by the application of a strong solution (5 per cent. Nitrate of Silver) to the affected spot.

Guyon's method of instillation of the posterior urethra is often highly efficacious; a soft rubber catheter being introduced as far as the apex of the prostate, a syringe is attached and 15 to 30 mins. of the fluid slowly injected into the prostatic portion of the urethra. The best solution is one of Nitrate of Silver, which at first should be employed in the strength of ½ per cent. This may gradually be increased to 2 per cent. as long as pain and smarting are not induced. Strong solutions at first only increase the mischief, but 5 per cent. Copper Sulphate, ¼ gr. Permanganate of Potash to each ounce may be employed when the silver salt is not well borne. The prostate should be massaged from the rectum in order to clear out the secretion from the follicles before instilling.

Otis first dilates gently the urethra to its full extent without using force, then a silk *coudé* catheter is introduced just beyond the compressor urethræ muscle, so that the eye lies in the neck of the bladder, then about 8 oz. of fluid injection is introduced into the bladder by a syringe. The catheter is then withdrawn, and the patient flushes out the urethra by emptying the bladder voluntarily.

He commences the treatment by using an injection consisting of 1 part each of Sulphate of Zinc, Alum and Carbolic Acid in 2,000 parts. Upon the second day the water is reduced to 1,500, and upon the third to 1,000, and upon the fourth day to 500 parts (1 gr. to 1 oz. nearly). Upon the fifth day solution of Permanganate of Potassium (1 in 2,000) is used, upon the sixth 1 in 1,500, upon the seventh 1 in 1,000. Afterwards the solution is changed to one of Nitrate of Silver (1 in 1,000) gradually increased to 1 in 100. Should the injections fail, a few drops of a 5 per cent. Nitrate of Silver solution are passed into the deep urethra by the drop-syringe, and when the disease still resists he performs internal urethrotomy.

Ionisation methods have their advocates; the urethra being filled with silver nitrate or zinc sulphate solution, the negative pole of a galvanic battery is applied to the spine and the positive to a metal instrument left in the urethra. A weak current is turned on for 15 to 25 minutes; the silver or zinc ions, being permitted to penetrate deeply into the diseased tissue, cause practically no pain.

Much benefit may often be obtained by periodical massage of the prostate through the rectum, and cure has followed the use of the X rays. Suction applied by means of the aspirator and of specially devised pumps has been used to empty the infected glands and ducts. Injection of the

prostate with Colloid Silver by a long needle thrust through the ischio-rectal space is practised by some surgeons.

Vaccine treatment has been successfully employed in many intractable cases, a vaccine being prepared by using several strains of gonococcus when the coccus cannot be obtained from the patient's discharge. Small doses (1 to 10 millions) frequently repeated are usually sufficient. Where the infection is of mixed nature Polyvalent Antistreptococcus serum has been used.

The different injections which may be employed as a routine in the late stages of gonorrhœa before the above-mentioned methods of treatment are resorted to for an established gleet will be found in the article on Gonorrhœa.

GLÉNARD'S DISEASE.

This condition is also known as "Splanchnoptosis," "Enteroptosis," and "Visceroptosis." When only one organ is obviously displaced, such terms as "hepatoptosis," "nephroptosis," "gastroptosis," are employed, but the term "Glénard's Disease" should in strictness only be applied to the condition in which all the organs in the upper zone of the abdomen are displaced.

The treatment is most difficult and often disappointing, a most inveterate neurosis becoming developed which renders the patient's life unbearable, and which may remain with all its neurotic symptoms unrelieved even after the displaced organs have been fastened in their normal position by surgical methods.

In *recent* cases the result of prolonged physical strain accompanied by acute emaciation such as may sometimes be noticed after the tedious nursing of a relative during a fatal illness, the condition may be remedied by a long period of absolute rest in bed with over-feeding and massage and such attention to the general nutrition as will restore the paddings of fat within the abdomen and improve the tone of the abdominal muscles.

Tight lacing and the wearing of heavy garments whose fixed point is at the compressed waist must in all cases be remedied. Skirts and petticoats should be suspended from the shoulders, and constipation, which causes dragging on the colon, should be guarded against by laxatives. The feeding should be liberal, but regulated by such short intervals as will effectually prevent the stomach being at any time so weighted with food as to facilitate its descent in the abdomen. The patient should sleep with the shoulders depressed and the foot of the bed raised so as to diminish the tendency towards displacement.

During the waking hours an abdominal belt, binder or corset should be worn with suitable padding to keep the viscera supported. The styles or patterns of these are endless. The best support is one which will distribute the pressure in an upward direction in such a manner as the patient instinctively adopts by placing both hands upon the lower part of the abdomen to relieve the dragging sensations experienced whilst standing in the upright posture. If such an appliance be adjusted in the Tren-

delenburg position an amelioration of all the symptoms may be often satisfactorily obtained in mild cases of the affection.

In serious examples of general ptosis, and even when only one organ, as the kidney, is displaced, the neurotic condition may require treatment by the Weir Mitchell method.

When the ptosis of any individual organ is seriously interfering with its functions recourse must be had to surgical procedures.

Hepatoptosis.—This in all its degrees of severity, from slight displacement downwards to the type known as movable and floating liver, may be the cause of gall-stones with repeated attacks of pain and jaundice, in which case the secondary troubles will require operative relief. Hepatopexy should also be performed after the removal of the calculi, and sometimes it is clearly indicated where there is no evidence of cholelithiasis when the dragging pain is not relievable by a binder. An incision is made along the lower costal margin on the right side, with the patient in the Trendelenburg position. The lower edge of the right lobe of the liver is then to be stitched with catgut sutures to the upper margin of the wound made in the parietal peritoneum after this has been folded over to the hepatic edge, the patient being kept in bed for 4 or 5 weeks with the shoulders depressed and the feet elevated slightly by tilting the foot of the bed.

Gastroptosis.—Where this fails to yield to a carefully adjusted binder signs of gastric dilatation soon show themselves from kinking at the pylorus, and operative procedure is to be weighed against the relief obtainable by resort to the stomach-tube and lavage at regular intervals. As a rule it is wiser to adhere to the employment of the rubber tube, as the neurotic symptoms are often permanent even when a gastro-enterostomy has been successfully performed. The operation of gastropexy may be carried out by elevating the stomach to its normal position through shortening the gastrohepatic omentum and the gastrophrenic ligament with sutures.

A series of tucks or reefs may be made in the anterior wall of the stomach by a row of interrupted sutures, the operation being known as "gastrorrhaphy" or "gastroplication."

Nephroptosis.—This is often a part of the so-called Glénard's disease, but though caused by the same factors it often exists alone or preponderates over the other displacements. The organ may only be found to slightly descend with the diaphragm on deep inspiration. Its entire bulk may be palpated below the costal arch on the patient taking a full breath, or it may be freely movable or even floating at all times. The symptoms, however, bear no proportion to the degree of motility.

An attempt should be made to keep the organ in its normal position by a properly adjusted binder or corset applied when the patient is in the lying position with the pelvis raised, a movable diamond-shaped pad or small air-cushion being inserted inside the support with the acute apices of the pad lying across the abdomen. Garland maintains that not more than 1 per cent. of the cases of displaced kidney require operation,

and he has devised a rational corset which seems to meet the requirements of the condition better than any hitherto employed.

Surgical methods if possible should be avoided in marked neurasthenic patients where the renal functions are not really interfered with, as the operation of fastening the kidney has been abundantly proved to fail in relieving the profound neurotic symptoms present before the operation. It appears almost equally clear that when operation is undertaken for the relief of kidney symptoms where the condition is part of a general ptosis of the organs in the upper zone of the abdomen, mere fixation of the kidney will prove a failure if the other organs are not at the same time stitched in their normal positions.

Operation is, on the other hand, clearly indicated after the failure of the abdominal support when the ureter or pedicle becomes twisted or kinked, causing Dietl's crisis and hydronephrosis or producing dragging upon the bile-ducts or duodenum.

Nephropexy, nephrorrhaphy, or fixation of the kidney may be effected by the posterior or extraperitoneal route through an oblique lumbar incision. The kidney being exposed, its fat is stripped off and the organ carefully examined for evidence of gross disease or calculi. Some surgeons, in order to be certain of its integrity, advise that it be slit open (nephrotomy), and sutured afterwards if found to be sound. The capsule is to be split by a crucial incision, and the segments reflected backwards to the hilum. These are then sutured to the posterior abdominal wall, the upper ones being stitched to the muscle attached to the last rib and the lower ones sutured to the aponeurosis of the posterior wall, so as to form a shelf upon which the organ may rest by utilising the parietal peritoneum and both layers of the perirenal fascia.

The operation has been modified in various ways. McLaurin produces the shelf by simply suturing Zuckerkandl's fascia and the peritoneum to the fascia on the front of the quadratus lumborum muscle, and closes the wound up without gauze packing or drainage.

Fullerton has ingeniously devised the simple operation of suspending the kidney by a piece of its capsule attached to the ligamentum arcuatum externum, and reports excellent results, and A. B. Mitchell also uses the posterior capsule, but in a slightly different way.

An anterior operation has been devised by Harlan and Bishop, and carried out by Cheyne in the following manner: The organ being reached from the front by an incision made below the edge of the ribs, the peritoneum on being pushed to the middle line exposes the posterior surface of the kidney with its surrounding tissue. This latter structure is divided and the fat removed, and the capsule is incised on its posterior surface and reflected backwards from the outer and lower areas. These flaps are finally attached to the muscles behind the organ, one wing supporting the lower end and the other the outer convex portion of the kidney. The anterior operation permits of greater freedom in fixing the displaced kidney in its normal position. The kidney, if found diseased, must be removed

(nephrectomy) should previous examination by the cystoscope have demonstrated the integrity of its fellow.

The attacks known as Dietl's crises caused by twisting of the renal pedicle may be often relieved by inverting the patient or raising the lower extremities and pelvis by elevating the foot of the bed to a considerable height. In a similar manner the gastric crises may often be temporarily relieved when the duodenum has become kinked.

Enteroptosis.—Employing this term for the moment only to those cases where the main and most obvious trouble is due to prolapse of the transverse colon, the V-shaped loop extending into the pelvis, much may be done by rest and the application of a corset and systematic purgation. The writer has observed that in such cases lavage of the stomach is sometimes followed by the emptying of an enormously distended colon which has resisted enemata, the lavage having excited a very pronounced contraction of the walls of the displaced colon.

For the chronic constipation in this type of ptosis, which may amount to intestinal obstruction, little may be expected from any attempt to keep the displaced colon in the normal position by suturing or stitching. Arbuthnot Lane has carried out successfully the heroic procedure of excising the entire colon. The first step in the operation is to perform ileosigmoidostomy by dividing the small intestine above the ileocæcal valve and making a lateral anastomosis by joining the proximal end of the small intestine to the lower part of the sigmoid, and leaving the colon in the abdomen with the distal end obliterated by sutures. Sometimes this preliminary is sufficient, but there is always the danger of some fæces finding their way upwards into the useless colon, in which case after several weeks a second operation is carried out which consists in the removal of the whole of the large intestine above the juncture at the sigmoid.

GLOSSITIS.

In acute inflammation of the tongue caused by streptococci finding their way into the parenchyma of the organ, great œdema threatening suffocation may rapidly supervene. The only safe course to pursue in such cases is to make one or more free and deep incisions on each side of the middle line, cutting from behind forwards. The patient should then continuously wash the mouth with Carbolic Acid (1 in 100), Boric Acid (4 per cent.), Chlorate of Potash (3 per cent.), or Permanganate of Potash (1 in 1,000). Relief may be obtained by hot poultices applied round the jaws and upper part of the neck, and the patient may hold his head over a basin of boiling water with a sheet thrown over him when there is any difficulty in swallowing or breathing. Croton Oil or a strong Saline purge should be administered.

Where pus has already formed, no time should be lost in making a free linear incision to evacuate the contents of the abscess.

The glossitis which follows mercurial or iodine salivation usually yields speedily to the withdrawal of the drug, and the use of an antiseptic lotion of Chlorate of Potash.

True syphilitic glossitis, when not showing itself as a gumma or a series of ulcers or fissures, is of the sclerotic type, and should be treated constitutionally by the administration of salvarsan or its substitutes, as well as locally by Heath's method of pickling the tongue in Mercurial Solution. He used ¼ gr. of the Bichloride dissolved in 1 oz. water, and made the patient hold this in his mouth for 10 minutes by the watch three times a day, breathing through his nose all the time.

GLYCOSURIA—see Diabetes.

GOITRE, OR BRONCHOCELE.

The treatment of endemic goitre is often satisfactorily carried out by the simple procedure of removing the patient from the goitrous district in the early stage of the disease, when the thyroid swelling will soon begin to diminish rapidly. The chief source of mischief is certainly contaminated drinking water, but it is not the only source; boiling and filtering the water minimises but does not always remove the condition, hence even a change of the water supply is deemed insufficient as long as the person resides in the infected district. In some places excess of lime salts in the drinking water is a causal factor, whilst in other districts absence of these salts is believed to be the cause. McCarrison states that the goitre so common in Gilgit in Kashmir is readily cured by removing the patient from the district to the sea level, but believing that the disease is due to infection of the alimentary canal by micro-organisms, he has successfully treated it by the administration of Thymol in cachets; 30 grs. are given at the start in the morning and followed up by a purge the same evening; 10 grs. night and morning are given for several days afterwards till the swelling disappears. Salol, β-Naphthol, Dilute Hydrofluoric Acid, and other intestinal antiseptics and Koumiss have been proved valuable.

Iodine is the most reliable agent in all forms of simple parenchymatous goitre. McCarrison gives 5 mins. of the weak tincture with 5 grs. Iodide of Potassium. Arsenic may be advantageously combined with it.

Thyroid Extract has a very decided curative action in many cases, and is now often administered as a routine by many surgeons, but it has no influence over fibrous goitres, though usually the parenchymatous variety of growth yields rapidly to a 2½ gr. tablet twice a day. (Should there be signs of Graves's disease present this remedy is very dangerous.) Kocher believes that the best internal remedy is free Phosphorus, and that not more than 10 per cent. of cases require surgical treatment.

Autogenous Vaccines prepared from types of the colon bacillus have been successfully employed in doses of 500 million. Local treatment may be tried in many forms, the most innocent of which is the daily application of a mixture of equal parts of the strong and weak Tincture of Iodine. If a decided counter-irritant action is desired, the strong tincture may be painted on, layer after layer, till vesication is produced.

Iodine ointment may be used instead of the liquid preparation. Some surgeons have found better results from the application of a weak solution applied with the view of effecting absorption of the iodine. In this case

half tincture and half glycerin or weak spirit may be employed, the object being not to injure or destroy the cuticle.

Biniodide of Mercury is most successful in India, but has been of little use in this country. The Indian practice is to rub in for ten minutes an ointment consisting of 3 drs. of the biniodide to 1 pound lard. The patient is afterwards to sit with his goitre exposed to the direct rays of the sun till he is unable to bear the smarting. After this some more ointment is gently applied, the patient is sent home, and the case seldom requires further treatment.

Morell Mackenzie injected Iodine in solid bronchoceles, but the practice has been abandoned owing to the danger of sudden death from the injection entering a vein, and the same remark applies to the injection of Iodoform, Osmic Acid, &c. In cystic cases this danger is less, but the injections are valueless. Electrolysis has proved valuable in the hands of Duncan in some cases.

Operative procedures are indicated when the tumour presses upon the trachea, and it is a well-recognised fact that the danger of suffocation bears no proportion to the size of the tumour, the most serious symptoms often being present in small goitres which extend downwards behind the sternal notch. Dysphagia is a clear indication for operation and should arouse suspicion of malignancy, and the same may be said where pain is a prominent symptom. In some cases operation is undertaken for the relief of the deformity occasioned by the size of the tumour, especially when it is steadily increasing in size in spite of medical treatment.

Various operations have been devised and carried out according to the local conditions present; the entire gland should never be removed except in malignant cases.

(1) Ligature of the superior and inferior thyroid arteries on one side may be undertaken as a preliminary to removal of half the gland, but it often so relieves symptoms that the patient is satisfied and refuses further operation.

(2) *Section of the Isthmus.*—This has been performed for the relief of urgent dyspnœa, a free incision or a resection of a portion of the isthmus on each side of the middle line permitting the relief of the lateral compression of the trachea. Sometimes the entire isthmus requires removal.

(3) *Thyroidectomy* usually means removal of one lateral half of the gland with or without the isthmus as instituted by Kocher. There is some danger in giving chloroform or ether in these cases, and many surgeons recommend that the operation be carried out under local anæsthesia, but this is sometimes impracticable, but the anæsthesia must be light. A transverse curved incision is made over the most prominent part of the tumour and prolonged over the sterno-mastoid. The muscles depressing the hyoid bone are cut across or retracted, and the capsule of the gland exposed and divided without injuring the underlying large veins; the lobe is next carefully enucleated by the finger and the internal jugular vein guarded. The superior and inferior thyroid arteries are ligatured, and the recurrent laryngeal nerve avoided by leaving behind a piece of the

lower end of the lobe under which the nerve runs close to the trachea, and finally the isthmus is divided; the capsule is eventually sutured and the wound treated in the ordinary way, a small drain being left in; this latter precaution is to prevent acute thyroidism, which is liable to supervene from the absorption of the internal secretion of the gland squeezed out during the enucleation process. The parathyroids which lie behind the lateral lobes close to the trachea with the inferior thyroid artery and recurrent nerve should be avoided, otherwise a fatal *tetany* may supervene soon after the operation. Where the tumour forming a goitre is encapsuled (this constitutes the majority of them) the capsule consists of a thinned-out layer of the gland substance, which should be divided and the enucleation effected from the inside of this. The parenchymatous or adeno-parenchymatous forms are not encapsuled, and Berry insists that these should be treated by *resection-extirpation*, the knife being boldly carried through the entire gland structure, leaving behind only the portion of the lobes where the recurrent nerves lie. Thyroidectomy has a mortality of less than 1 per cent. if performed before serious dyspnœa has supervened, and with some operators it has fallen to almost nil.

The treatment of cystic goitre by tapping, injecting irritants, &c., has given way to enucleation, which may be easily effected even in large cysts by freely incising the gland tissue down to the cyst wall, which is then divided so as to permit all its contents to escape, after which the cyst wall can be peeled off the surrounding gland substance; small cysts can usually be easily enucleated entire. Sometimes a free incision into the cyst wall where this could not be removed has proved successful when the margins of the wound have been sutured to the skin incision and the cavity plugged with antiseptic gauze. Should the entire gland require removal, as in malignant cases, myxœdema is certain to follow; this must be treated by thyroid feeding. Tetany has been successfully met by the injection of parathyroid emulsion.

GOITRE, EXOPHTHALMIC.

Rest in bed should be insisted upon in all cases where the disease has become established and where the pulse-rate is above 90. When this can be carried out in the open air so much the better. As soon as practicable X-ray or Radium therapy should be resorted to.

X-ray treatment has given excellent results, and should always be employed as the routine. Hector Mackenzie's case where this treatment changed the disease into a typical one of myxœdema is strong evidence of its curative value. The applications and dosage of the rays should be always confined to an operator who has specially studied their influence in goitrous affections. The sittings of 2 or 3 times a week must be continued over several months. It is not yet possible to measure the relative value of this agent with Radium, which possesses the advantage of being useful in much shorter periods with longer intervals of rest between the courses. Under the rays the pulse falls, bodyweight increases, tremor disappears, but the exophthalmus is usually very slowly influenced.

Relapses follow in a considerable percentage of cases, and the treatment must be resumed.

Ice or Leiter's tubes applied continuously over the pulsating gland may occasionally be found to reduce the heart's rapidity and other symptoms for several hours at a time.

Galvanism has been employed by the writer with advantage in mild cases and sometimes in severe ones by the use of the weak continuous current with one pole over the thyroid and the other over the spine; the sympathetic should also be galvanised, and a still weaker 5 cells (Léclanché) current sent through the brain by placing one electrode upon the closed eyelid over several layers of wetted lint and the other pole over the occiput. This treatment may be employed for 15 to 20 minutes daily at first and afterwards every 2 or 3 days for 30 minutes or more at a time; Charcot alternated the continuous with the Faradic current. There is generally a remarkable loss of cutaneous resistance, and the electrodes must be thickly padded with warm saline solution.

Drugs occasionally prove useful in the relief of the symptoms; thus 5 min. doses of Tincture of Strophanthus or 15 mins. of Tincture of Digitalis assist in reducing the pulse-rate, and Bromides allay restlessness and insomnia. Belladonna is a doubtful agent, and, like Thyroid Extract, may dangerously increase the symptoms. Serum Therapy by the injection or oral administration of serum from the blood of goats or sheep whose thyroid glands have been removed has proved of little or no value, and the same may be said of milk derived from such animals. The dose of Beebe's antithyroid serum should not exceed 1 c.c., and it is safer to begin with $\frac{1}{3}$ this dose, increasing it according to the nature of the local reaction, which is often severe.

Porter recommends the parenchymatous injections of Boiling water, 10-20 c.c., into the gland.

Operative Treatment.—After a few years of popularity the operative treatment of exophthalmic goitre has waned, chiefly owing to the success following the use of X rays. Operation is still sometimes used as a preliminary to X-ray treatment, and is practised with greater frequency on the Continent than at home, and the results in the hands of some surgeons are very satisfactory, whilst others are much less encouraging. The real value of operation still remains to be demonstrated, but it is probable that present methods have reduced the death-rate of the disease by one-half. The first point which still requires settlement is the serious one of anæsthesia; many operators urge that local anæsthesia must invariably be resorted to. Dunhill states that he has operated on 88 cases under local anæsthesia with 1 death, whilst he is cognisant of 54 deaths in patients operated upon under chloroform anæsthesia during 1909. C. H. Mayo states that he has operated on 405 cases of marked hyperthyroidism under ether preceded by atropine and morphia, with 19 deaths. In three-fourths of these one lobe was extirpated, and the great majority of them received 40 oz. Saline solution slowly by the rectum immediately after the operation. Crile believes that many deaths

are due to excitement, and he urges the necessity of the patient being anæsthetised without his knowing that an operation is about to be performed, the gland being, as he puts it, "stolen away."

With these very contradictory views and statistics it is obvious that there is little in the question of local *versus* general anæsthesia. The danger of the absorption of a large amount of the fluid thyroid secretion after this has been squeezed out of the gland during the operation seems to the writer a much more serious factor in the mortality than the mere question of the form of anæsthesia, hence the great importance of drainage and frequent mopping during the stages of the operation. A long rest previous to operation is also a most important matter. Spencer and Gask recommend as the safest operative procedure division or excision of the isthmus with ligature of both superior thyroid arteries, and after a temporary improvement has occurred a partial excision of the gland may be more safely accomplished. Most operators proceed at once to remove one lobe of the gland as in ordinary simple goitre. Crile's latest technique appears to be an admirable one; he ligatures the vessels at the four poles of the gland before cutting away the gland tissue and leaves a portion of each lobe behind, after which the cut surfaces are sponged with almost boiling water to destroy the oozing secretion and check bleeding.

The operation of excision of the cervical sympathetic ganglia has been practically abandoned since thyroidectomy has been so frequently successful. It must be remembered, though surgeons have brought down the mortality of the operation to a very low figure, in a still considerable percentage of cases the symptoms are only ameliorated, and in a few no improvement follows, though the majority remain permanently cured. The proportion of cases successfully treated by simple ligature of the arteries without removal of gland substance is a very small one.

GONORRHŒA.

Abortive treatment can only be considered as possible when the patient is seen within 48 hours after the appearance of the first symptoms of the disease—*i.e.*, within a week after the infective coitus, or earlier. At this stage there is slight scalding or itching about the meatus, and a faint sticky but not obviously purulent discharge. Several plans are recommended: the simplest is to inject into the urethra a weak Cocaine solution after grasping the penis in front of the scrotum in order to insure that the gonococci will not be washed backwards into the posterior urethra. In five minutes afterwards 4 drs. of a solution of 10 grs. to 1 oz. Nitrate of Silver, or a 15 per cent. Protargol solution, should be injected after firmly grasping the penis for 2 or 3 inches beyond the meatus, after which the patient should lie up in bed for a day or two, and the operation repeated once on the third day. Another plan which is less irritating and equally efficacious is to thoroughly irrigate the anterior urethra by a ½ gr. to 1 oz. *Hot* Permanganate of Potassium solution, repeating the operation several times at intervals of 12 hours, the urethra being blocked by an elastic ligature or by the pressure of the finger and thumb in front

of the scrotum. It is needless to say that these procedures must be carried out by the surgeon, and never entrusted to the patient. The plan of introducing the urethroscope and directly applying Protargol, Nitrate of Silver or Perchloride of Mercury solutions is painful and not more efficacious.

For the established disease with its profuse purulent discharge the patient should be advised to take to bed when possible. A smart Saline Purge should be administered and the testicles supported by a suspensory bandage. The diet should be as fluid as possible, diluent drinks being freely administered in order to thoroughly flush out the urethra by frequent micturitions. Milk diet answers this purpose admirably; tea, coffee and alcohol should be forbidden. If the patient is a smoker there is no objection to his mild indulgence in tobacco. A simple diuretic mixture should be given every 2 or 3 hours; Salicylate of Soda in Camphor water with Mindererus spirit is a good routine in all severe cases.

When there is much smarting in passing water Alkalies may be freely administered, or an effervescing mixture consisting of 1 dr. Bicarbonate of Potash in 2 oz. water may be prescribed, with ½ oz. fresh lemon-juice, and Barley water given between each dose in copious draughts.

Drugs intended to disinfect the urethra on their elimination by the urine should not be administered in the very acute stage; the proper period for their exhibition is when the profuse discharge begins to show signs of diminishing. Santal Oil, Copaiba and Cubebs are the most reliable; they are much less used than formerly, since the disease is now treated for the most part locally. Nevertheless these drugs are of great value in practice where the patient cannot be relied upon to use injections skilfully, and where irrigation of the urethra by the surgeon is not available; in intractable cases they afford a valuable addition to local treatment.

Oil of Sandal Wood is the least irritating of these, and as a rule its administration may be commenced earlier than that of copaiba; it should be given in 15-min. capsules 3 times a day. Santalol or Arhéol, which is the active ingredient of the oil, may be given in 5-min. capsules. A number of allied substances as Santyl, Camphosan, Thyresol and Allosan, are in use. Copaiba in 15-min. capsules is more reliable, but the stomach is very liable to be upset with it, and the eructations are most annoying after full doses.

For hospital patients this drug may be advantageously administered in combination with Cubebs as a confection—

℞ *Pulv. Cubebæ* ʒij.
Pulv. Potassii Nit. ʒij.
Pulv. Doveri ʒss.
Ol. Santal. ʒiij.
Bals. Copaibæ q.s. ut fiat electuarium durum.

Signa.—"*The size of a hazel-nut to be taken in wafer paper, three times a day, two hours after meals.*"

The following mixture is an old but rather disgusting combination—

℞. *Bals. Copaibæ* ℥vj.
Liquor. Potassæ ℥iij.
Mucilag. Gum. Acaciæ ℥j.
Spt. Ætheris Nit. ℥iij.
Aquæ Cinnamomi ad ℥viij. *Misce.*

Ft. mist. Capiat ℥ss. *ter in die, p.p.a., post cibos.*

Copaiba is apt to produce a profuse rash almost identical with measles; it declines rapidly on withdrawal of the drug. Cubeb powder may be given in wafer paper or in milk.

Local Treatment is of more importance than the constitutional, and is the sole routine employed by many surgeons. Two distinct methods are employed—*irrigation* and *hand syringing*. Irrigation of the *anterior* urethra is carried out by using a 3-pint reservoir with 8 feet of rubber tubing, to the end of which a suitable urethral nozzle is fitted. The fluid is permitted to flow into the urethra by elevating the reservoir about 5 feet. The meatus is compressed and allowed to relax in rapid rhythm, so as to balloon the urethra and overfill it, after which the fluid is permitted to flow out by the side of the nozzle. As a rule the force of the compressor urethræ muscle will prevent the fluid reaching the posterior urethra, and this may be assured by squeezing the penis in front of the scrotum. A few drops of a 1 per cent. Cocaine solution may be injected before commencing.

In irrigation of the *posterior* urethra a rubber catheter should be passed till the bladder is reached, after which the instrument is withdrawn gradually till urine ceases to flow; the fluid is then slowly injected into the prostatic urethra, and passes into the bladder, mixing with the urine; or the method of Janet without catheterisation may be employed as for anterior instillation by overcoming the resistance of the compressor muscle by raising the reservoir to 6 or 8 feet.

There are numerous irrigating fluids in use: the safest and most satisfactory is a solution of Permanganate of Potassium, commencing with the strength in an ordinary acute anterior case of ¼ gr. to each ounce (about 1 in 2,000), or 12 grs. to the full of the reservoir, the entire contents (3 pints) of which may be used at each operation twice a day; the liquid should be heated to 105° F. As the urethra becomes less sensitive the strength can be gradually increased to double the above proportions, or lessened when much pain is present in very acute cases. 10 days usually suffice to destroy the gonococcus by this method. The new Silver Salts—Argyrol, Protargol, Albargin, &c.—are used by some surgeons for irrigation, but the permanganate is on the whole preferable; these agents are more suitable for syringing. A good practice in many cases is to combine both methods, using the silver salts with a syringe and irrigating with the permanganate.

Syringing.—The chief objection to this method of treating gonorrhœa is the danger, especially when a syringe is employed with a blunt nozzle, of the gonococcus being forced backwards into the posterior urethra. With precautions, such as grasping the penis in front of the scrotum and using a fine nozzle, this danger is minimised or prevented. Permanganate may be selected if the case is seen early; the strength of the solution need not at first be more than ¼ gr. per oz., which can gradually be increased till double the amount is tolerated. Permanganate of Zinc is much used also, and it can be employed in the same strength. Even in the most acute cases the potassium salt can be injected every hour in warm solution if only 1 gr. in 5 or 10 oz. be employed till the acute irritation subsides.

Silver salts are preferred by some surgeons, especially when the case is not seen till the discharge is well established. In anterior urethritis 4 drs. of a recently prepared solution of ¼ per cent. Protargol, Albargin, Actol, Ichthargon, Argyrol, Collargol, or Argonin may be injected 3 or 4 times a day, the strength being gradually increased and the period during which they are retained in the urethra prolonged for 10 minutes or more. 1 per cent. solutions are soon tolerated. Some surgeons commence with irrigations by permanganate or weak Perchloride or Mercury solution (1 in 20,000) before employing these salts when the inflammation is very acute. Protargol is the best of the silver salts for ordinary use. At a later stage, when the discharge has been well checked, the period for the use of astringent solutions has arrived, in order to combat the inflammation which the gonococcus has left behind after its destruction has been effected by antiseptics. It is a mistake to start with pure astringent agents in the acute stage with profuse discharge. Zinc Sulphate 1 gr. to 1 oz. is the best routine, Acetate and Sulphocarbolate of Zinc, Acetate of Lead and Alum, may all be used of double this strength. Chloride of Zinc ¼ to 1 gr. and Nitrate of Silver ¼ to 1 gr. per oz. are also valuable antiseptics and astringents for use in the late stages.

Richard's injection consisted of 5 grs. Sulphate of Zinc and 5 grs. Acetate of Lead per oz. Berkley Hill employed an injection in the late stages, which consisted of a number of the above combined—zinc sulphate 35 grs., alum 35 grs., sulphate of iron 20 grs., sulphate of copper 2 grs. in 8 oz. water—but this should only be used when the disease is of several weeks' standing.

Ultzmann's injection as modified by Guiteras consists of 10 grs. each sulphate of zinc, alum and carbolic acid with 1 oz. glycerin and 7 oz. water. In the chronic stage of anterior urethritis passing into gleet all the above except Hill's injection may be safely employed in double the strength mentioned.

In gonorrhœa of the anterior portion of the urethra the patient should always be directed to flush out the canal by passing urine before injecting. The solution should be used warm. A convenient plan is to carry a small wide-mouthed bottleful of the injection in the trouser pocket, which soon reaches a comfortable temperature. It is much better to use a weak solution very often than a strong one less frequently. The liquid should

be retained each time by compressing the meatus for a few minutes, and for all purposes the permanganate of potassium solution is the safest and least irritating, but it must be always remembered that the irritation and a slight mucous discharge may remain after the disease is cured, being kept up by continual syringing.

The successful treatment of gonorrhœa by injections depends, upon the whole, much less upon the nature of the injection than upon skill in prescribing it. The writer, therefore, ventures to suggest to the young practitioner the advisability of selecting one drug and adhering to it persistently, varying its strength and altering the frequency of the injections according to the effect desired or produced. By these means he soon becomes master of the remedy, and he will be astonished to find how much he will be able to do with it, and how easily he can alter its effects to suit the constantly changing conditions of the diseased state. The endless varieties of injections tempt the physician to change from one to the other, to the detriment of the patient and to the deterioration of his own experience. This principle applies to every department of treatment, and is one of the secrets of the success of those physicians whose conservative prejudices have prevented them from trying most of the new and often worthless drugs daily written up in the current literature of medicine.

Little need be said of the method of treating gonorrhœa by antrophores or bougies made of Thallin, Iodoform, &c., incorporated with a firm, easily melted basis; they are more suitable for Gleet (which see). Klapp's suction bell is employed by some surgeons, and Thomson and Miles state that by applying it to the penis for 10 minutes and reapplying it after an interval of 5 minutes during an hour's duration daily for 10 to 14 days the disease may be satisfactorily dealt with in recent cases without resorting to other measures.

In *acute posterior urethritis* the urgent symptoms should be first met by a hot Sitz-bath and a saline purgative, followed by a suppository of Morphia ¼ gr. with 1 gr. Extract of Belladonna and Urotropin internally. (1) The irrigation method (Janet's) already described may be carried out by elevating the reservoir to the height of 6 or 8 feet to overcome the action of the compressor urethræ muscle. (2) Diday's plan of introducing a catheter to the prostatic portion of the urethra and injecting the liquid into this portion of the canal, from which it flows into the bladder, which should always contain urine, before commencing the operation. The Permanganate of Potassium solution is the most easily managed; it should be injected warm and at first not stronger than 1 in 5,000. Protargol may be used much stronger, commencing with ½ per cent., which may be doubled after a few irrigations. Nitrate of Silver is much more painful, and if used should not exceed 1 in 500 or 1 in 1,000. (3) There remains Guyon's method of instillation. This is carried out by injecting with an Ultzmann's syringe 15 mins. of a 1 per cent. Nitrate of Silver solution through a soft catheter, whose eye is lodged in the prostatic portion of the urethra. Every second day is sufficient for the instillations. which may be stopped when the urine collected at the end of micturition is found to

be clear. The best procedure is to *irrigate* first with permanganate and reserve *instillation* for cases where this fails. The instillation treatment of posterior urethritis practically becomes the treatment suitable for gleet or chronic posterior urethritis, since the acute stage is often allowed to pass off under palliatives—bathing, suppositories, &c.; under these circumstances stronger solutions may be employed, as described under Gleet. When the gleet stage is approached in case of chronic anterior urethritis, hand syringing with Silver Salts or the astringent agents mentioned upon a previous page are to be persevered with, the strength of the solution being increased to 2 or 3 times that usually employed for the treatment of the acute disease.

In the great majority of cases of gonorrhœa six to eight weeks should see the disease entirely subdued, and often under judicious treatment in half this time the patient is convalescent. If doubtful of the result of cure the surgeon may inject a 1 per cent. nitrate of silver solution into the urethra to provoke a mild urethritis, and examine carefully this discharge for gonococci, or if the convalescent patient returns to the use of alcohol (beer or wines especially), and notices that the discharge reappears, he must submit to further treatment. Chronic posterior urethritis will yield speedily to X-ray treatment. The highly infectious nature of the gonorrhœal discharge must be explained to every patient, and he must be warned of the danger of transferring the gonococcus to his eye by soiled fingers or towels. Marriage must be forbidden as long as any trace of discharge is present, and as the gonococcus may remain dormant in the urethral glands for many months, a two years' interval will be necessary as a safe precaution in all instances.

Magian's *rapid* method of cure is often effective. He commences by giving a 3-gallon irrigation of 1 in 5,000 Pot. Permang., sufficient elevation being used to drive the injection up to the neck of the bladder by a two-way irrigation tube. He then irrigates under high pressure by 3 gals. distilled water followed by the same amount of fluid containing 1 oz. Protargol. 30 grs. Chloride of Gold in 40 oz. water is next injected under pressure, using a single-way irrigator nozzle, and after an interval irrigation by distilled water follows this. The patient is then sent home to use a ½ per cent. injection of Protargol 8 to 10 times during the next 24 hours, and to take an Allosan (Allosan is the allophanic ester of santalol) tablet every 3 hours. At bed-time a 6 inch Neisser bougie containing 1 per cent. Protargol and 2 per cent. Antipyrine is tied in.

The above-mentioned irrigations are repeated in increasing strength on the second, third and fourth days. On the fifth day he uses 3 gals. weak Zinc Sulphate and on the sixth a similar amount of weak Silver Nitrate, after which the cure is almost invariably complete.

Vaccine treatment has many advocates; upon the whole evidence seems to be in favour of reserving this for cases with complications, and it does not seem to be certain that an autogenous vaccine is better than one containing meningococci or colon bacilli. A stock vaccine of 50 million gonococci and 150 million staphylococci may be employed in acute uncomplicated

cases. Recently Harrison and Thomson at Rochester Row Military Hospital have used detoxicated vaccines, and have given figures which seem to indicate that vaccines so used will be really useful in the local manifestations of the disease as opposed to the complications. The *complications* of gonorrhœa in the male are numerous, and as these will be dealt with under the headings of Conjunctivitis, Orchitis, Bladder Inflammation, Rheumatism, &c., only a brief reference is here necessary.

Pain in micturition may be relieved by immersing the penis in very warm water or by passing urine when sitting in the hot Sitz-bath. *Painful erections or Chordee* should be met by a full dose of Camphor Monobromate (10 grs.) in cachet or by a large warm-water enema, followed by a suppository as under, or Cocaine may be injected.

Sleep may be induced by large doses of Bromides (60 to 90 grs.), with 10 grs. Chloral, when morphia is contra-indicated.

℞. *Morph. Hydrochlor.* *gr.* ⅓.
Ext. Belladonnæ Vir. *gr.* j.
Pulv. Camphoræ *gr.* v.
Olei Theobrom. *ad gr.* xv. *Misce.*

Fiat suppositorium. i. *utendum h.s.*

Balanitis is liable to supervene when the foreskin is long. It should be met by freely syringing the prepuce with warm Boric Acid solution and absolute cleanliness.

Inflammation of Cowper's glands sometimes ends in suppuration. It is wiser not to wait for the chance of the pus finding its way into the urethra, but to make a free perineal incision to avoid the danger of a urinary fistula.

Peri-urethral abscess about the fossa navicularis may be left to open into the urethra, but when surrounding the penile portion of the canal it should be incised from without.

Buboes should be treated by absolute rest and warm fomentations or Boric Acid poultices, and incised as soon as matter forms. They are probably always due to a mixed infection.

Epididymitis is usually regarded as an indication for the suspension of all injections, but the writer finds that very warm and weak Permanganate injections cause no increase in the inflammation of the gland, and may even afford some relief. All other solutions should be prohibited. Absolute rest with the support of the testicles on a shelf or by a suspensory bandage and the application of Ichthyol, Belladonna, &c., are necessary. The further treatment by leeching, incisions, tapping, &c., will be discussed under Orchitis.

Gonorrhœal rheumatism is a serious sequela, and, like gleet, septicæmic or pyæmic conditions and many other sequelæ, is being now treated by Vaccination and Serum Therapy, as will be described under its own heading.

Gonorrhœa in the Female is a much more serious disease than is generally recognised, owing to the grave complications which may arise in the pelvis

even when the vaginal or urethral symptoms are latent. The routine of injecting the vagina is open to the danger of infecting the uterus, and it must be carried out with care. Bierhoff's method of abortive treatment is carried out by thoroughly disinfecting the urethra and vulva and irrigating the vagina with a 1 per cent. Protargol solution, after which the latter is thoroughly cleansed by mopping with cotton-wool, and if no gonococci are found in a scraping from the cervical canal the vagina is to be packed with gauze soaked in the solution and a 5 per cent. protargol bougie 1½ inches long is inserted into the urethra. The tampon is left *in situ* for 24 hours, and the bougie allowed to remain in the urethra by directing the patient not to pass water for 2 hours. The plugging is renewed after a Sitz-bath, and fresh irrigation performed upon removing the second tampon. Daily irrigation of the vagina is to be carried out by a 1 in 4,000 Perchloride of Mercury or a ½ per cent. Sulphocarbolate of Zinc solution. Where the vagina is found to be infected at the start a 5 per cent. Protargol irrigation is to be used before plugging the canal. A good and safe routine is to flush out the vagina with a strong Permanganate or weak Iodine lotion after swabbing with Peroxide of Hydrogen.

Where the cervix has become infected in chronic cases, curetting of the canal should be carried out before plugging it with 2 per cent. protargol. The urethra should be dilated by a Kelly's speculum, and the bladder swabbed or irrigated by Nitrate of Silver solution when cystitis is present, and Sandal-Wood Oil should be given. Abscesses arising from suppuration of Bartholin's gland should be opened early.

Vaccine treatment is of value in these complications. Pyosalpinx is to be treated by removal of the tubes with or without the ovaries, as detailed under its own heading.

GOUT.

Prevention is important, since the tendency to gout is known to be hereditary in a large proportion of cases; but prophylactic measures are often postponed till too late, owing to the association in the lay mind of gout with advanced age, so that no precautions are taken till after the first attack, which in hereditary cases commonly occurs at or before the thirty-fifth year of life.

Free open-air exercises, walking, riding, and games like cricket and golf should be insisted upon in the idle and well-to-do class born of gouty parents. In those who have to work for their living, an occupation should be selected which as far as possible will be incompatible with a sedentary life, and this must be supplemented by open-air games and brisk exercises.

Diet is of great importance, and is identical with the dietetic treatment of the established disease. Over-eating is a potent cause of gout in those whose history shows no hereditary taint, and therefore in those with a family predisposition moderation in diet is an essential. The old view that animal food was the main factor in the production of gout led to the rigid prohibition of red meats of all kinds, and the author, in his "Practice of Medicine," has pointed out that the revolt against the uric acid theory has tempted many physicians who regard the production of uric acid as

originating in the increase of the destruction of the nucleins in the leucocytes to err on the other side. Hence it is not uncommon to see foods recommended which are rich even in nucleins and purin bases such as pancreas, sweetbread, brains, roe, game and red meats. If such are permitted at all, they must be allowed in small quantities. Fish, poultry, fresh vegetables, vegetable soups, cheese, bread and farinaceous foods should constitute the staple dietary. Boiled meats are better than roasts. Sweet fruits like strawberries, apples and oranges, and recooked dishes, pastry, sweet puddings and sugar should be avoided. Cocoa should be the ordinary breakfast beverage.

The amount of the food is often of as much importance as is its chemical constitution, and it is not unusual to find that when animal food is prohibited the patient takes to enormous quantities of farinaceous compounds to make up the deficiency. Gourmandising must be avoided, no matter how mild and apparently unobjectionable the quality of the food may be, and many gouty patients are unable to digest farinaceous stuffs. Fats as cream and butter may be freely taken, and salads are beneficial. Mineral Waters (aerated) or hot water flavoured with a slice of lemon should be copiously employed to flush out the kidneys and promote elimination. Strong tea and coffee should be prohibited when an animal dietary is indulged in, though the vegetarian may partake of them.

Alcohol is always injurious, chiefly when indulged in as fermented beverages, like Champagne, Burgundy and Port, though it is now fashionable to prescribe these wines in small amounts as a protest against old-fashioned treatment. All wines are injurious, as are also cider, beer and porter. When for any reason alcohol is indicated, the beverage should consist of a little good whiskey or old brandy or gin freely diluted with soda, potash or Seltzer water. The least objectionable wine is a good Hock or Moselle drunk with Seltzer or Apollinaris water.

A holiday at a mineral water spring at which golf or other active open-air exercise can be procured is as beneficial to the overworked sedentary inheritor of a gouty tendency as it is to the victim of the established disease. Harrogate, Buxton, Bath, or Strathpeffer at home, Carlsbad, Aix-le-Bains, Contrexéville, and many others abroad are in repute. Roberts advises gouty patients to avoid all spas whose waters are charged with soda salts, and he recommends chloride of potassium instead of table salt, but many patients do well at Vichy. The imported waters of most mineral springs may be freely used at home, but as a rule, when this plan is followed, it is useless, as much more can be swallowed at the resort, where hours of recreation and meals are directed with the view of a free indulgence in the water, of which a gallon per diem is not an unusual quantum.

Treatment during an Acute Attack.—Rest in bed is imperative, and rest of mind and freedom from business worry is essential. The diet should consist of weak diluent drinks, as a thin vegetable soup, milk and Kali water, or barley water, toast and water, with a few plain arrowroot biscuits. Beef extracts are often given, but they should be avoided. Debilitated

subjects may be permitted to take freely of weak chicken soup thickened with barley or other farinaceous material. Alcohol is seldom indicated, and when very specially demanded a little whiskey with Kali water may be permitted.

The affected joint should be placed in a position of absolute rest, surrounded with a thick layer of dry absorbent wool covered up by thin mackintosh or oiled silk, evenly but lightly bandaged and elevated. When the patient is restless he may be allowed to sit in an armchair with his foot supported upon a chair, which is better than the fashionable gout-stool. The wool dressing should be changed every 12 or 24 hours, and a layer of warm wool reapplied.

When the pain is unbearable local sedatives must be applied. Leeching and blistering or other form of counter-irritation are always contra-indicated, and poulticing is objectionable. A hot stupe, fomentation or foot-bath often gives relief, but cold applications or lotions should *never* be employed. One of the best methods is to wring a flannel cloth out of a very hot decoction of poppy-heads or chamomile flowers, and apply it to the inflamed joint, or the flannel may be wrung out of hot water and lightly sprinkled with the Liniment of Chloroform, Aconite or Belladonna. For most cases it is best to sprinkle the woollen dressing with a little of any of these liniments, and then envelop the part with more wool and an impervious dressing, care being taken that the dressing be not saturated with chloroform liniment, which might blister. A mixture of two or three embrocations may be safely employed, but it should not cover the entire foot, or a large joint like the knee.

Hot alkaline lotions are recommended by Yeo and others. They possess no advantage over spirituous liniments, and are, moreover, liable to cool and so expose the part to variations of temperature, which is always to be avoided. Duckworth's application consists of 20 grs. Morphia Hydrochloride dissolved in 6 oz. Belladonna Liniment, but it is very doubtful if the morphia has any action when used in this way. If dissolved in chloroform liniment absorption would be liable to occur, and morphia is a most undesirable drug to be circulating in the blood during an attack of acute gout, hence relief of the local pain by morphia hypodermically is to be avoided when possible.

Colchicum is the one drug for administration when pain is severe. It relieves pain without increasing the secretion of the kidney, bowel or skin; therefore, its action cannot be said to be eliminatory. Its effects are, however, increased by combining its administration with purgatives; hence, if a full dose of a saline cathartic has not been already prescribed, the best procedure will be to administer the following ancient formula:

℞ *Vini Colchici* ʒiv.
Magnesii Sulphatis ℥iss.
Mag. Carb. Pond. ʒij.
Aquæ Menthæ Pip. *ad* ℥xij. *Misce.*

Ft. mist. *Cpt.* ℥ij. *statim and* ʒj. *quartis horis, p.p.a.*

It will be observed that the first dose of the wine of colchicum in the above mixture will be 40 mins.—a dose which never should be exceeded or repeated, but which is quite safe when given with a brisk cathartic. It is an excellent plan to direct the gouty patient to take a 5-gr. Blue Pill as soon as he feels the first approach of an attack 8 hours before commencing the colchicum treatment. The above mixture after 24 or 36 hours should be given in ½-oz. doses three or four times a day.

Salicylate of Sodium, or Potassium, is the next best routine when from cardiac weakness or idiosyncrasy the colchicum cannot be given. It also has some depressant action upon the heart, but less so than colchicum. 30 grs. may be given at once, and half this amount every 3 or 4 hours. The salicylate of potassium may be given in effervescence with Lemon-juice and Bicarbonate of Potassium with advantage, as this increases its diuretic action. Luff advises drinks of Cream of Tartar (20 grs.) dissolved in 10 oz. *hot* water frequently throughout the day. The fever is reduced and all the excretory organs—bowels, skin and kidneys—are kept in an active state by these agents.

Insomnia is best met by Hyoscine, Trional or Paraldehyde. The latter is the writer's routine hypnotic in gout, and he never prescribes Morphia or Opium.

The purging should be stopped and the colchicum diminished or suspended as the attack passes off, and the patient gradually returns to a white fish and chicken and farinaceous diet.

Between the attacks the treatment by diet, exercise in the open air, an occasional natural purgative water, &c., is to be maintained. A host of drugs are recommended at this stage. Alkalies have been employed as a routine by most physicians on the theory that they form soluble salts with uric acid, which is thereby easily eliminated by the kidney; but they no longer hold their own, and Roberts maintained that they were worthless. Lithium, the most prized of the group, has fallen into comparative disuse, and all authorities are agreed that soda salts should be avoided, some going so far as to insist upon a salt-free diet. There cannot, however, be a doubt about the value of such alkaline waters as Carlsbad and Contrexéville when drunk at the spas. They probably act by their large volume, possibly independently of their mineral constituents, and a sojourn at any of the places previously mentioned is a good routine after one or more acute attacks.

Radium drinking water and emanations have their advocates. Salicylates are prescribed by many in the intervals between the attacks, though their best effects are to be witnessed during the seizure or immediately afterwards. Haig claims special virtues for *pure* Phosphate of Soda, and others employ the Phosphate or Chloride of Ammonia.

Urotropin, Piperazin, Lysidine, Atophan, Chinotropin, Uricedin, Urosin, Benzoates and Diuretin compounds are but a few of the innumerable gout remedies which have been extolled and, like Lithium, for the most part found valueless. The latest member of this group of so-called specifics is Thyminic Acid, which is Nucleotin-phosphoric Acid with the

trade name of "Solurol." It is undoubtedly a good laboratory solvent of uric acid, and being a product of the metabolism of the food nucleins, it is believed to have a strong affinity for uric acid, whose precipitation is thereby prevented. The drug is given in tablets of 4 grs. each, two being taken thrice daily after meals.

Chronic gout must be treated upon the lines suitable for acute and subacute attacks. The dietary will require continual changing or modification, especially as most of the patients are well on in years and often seriously debilitated by the wearing pains of chronic joint deformities and asthmatic, renal or cardiac complications. As a rule a more liberal supply of animal food must be given when it is craved for or when farinaceous stuffs cannot be digested. In addition to white fish and poultry plain boiled mutton and eggs with ordinary clear or thick soup may be allowed in moderate amount if not fortified by beef extracts, but the foods rich in purins as sweetbreads, brain, liver, pancreas, roe, &c., must be rigidly excluded. Game may, however, be permitted in the form of roast pheasant, and oysters occasionally.

Alcohol will be more frequently indicated than for younger patients, and distilled liquors in small amount and well diluted are always to be preferred to fermented beverages; Still Hock or Moselle with Apollinaris water or a little dry Sherry may, however, be allowed when spirits are objected to.

Exercise is a great difficulty, as locomotion is often seriously impeded, and its place must be taken by general massage, hydropathy, warm douching, and the hot-air or radiant heat (electric) bath, all of which remedial agents are now procurable at every alkaline spa, where the waters may be freely indulged in for a couple of months in each year with great advantage.

The bowels must be more than merely kept free from constipation. A smart saline should be administered at least twice a week, and an occasional Blue Pill is always beneficial.

Colchicum is only to be administered when an acute or subacute exacerbation of the arthritic troubles supervenes. It is a well-recognised fact that aged patients bear this drug badly, and the dose of the wine should not as a rule exceed 15 or at most 20 mins. thrice daily. Salicylate of Colchicine is often better borne in doses of $\frac{1}{60}$ gr., or two capsules which each contain $\frac{1}{250}$ gr. of this salt dissolved in methyl salicylate may be given three or four times a day.

Salicylates are often beneficial in short courses by relieving the wearying joint pains, and Guaiacum has long enjoyed a reputation of a similar nature. Even the old-fashioned and despised "Chelsea Pensioner," which contains guaiacum, sulphur, and other drugs, sometimes proves a valuable routine preparation, and it keeps the bowels free. Guaiacum resin may be administered as a 5-gr. tablet three times daily.

Iodide of potassium is upon the whole the most reliable drug in chronic gout. It may be given in 5 to 10 gr. doses in courses of 6 or 8 weeks' duration, alone or in combination with minute doses of Arsenic (1 min.,

Fowler), or 5 min. doses of Colchicum wine. Radium emanations and radium drinking water are always beneficial.

The treatment of the chronic joint inflammations and deformities must be cautiously carried out. Pain may be relieved by the applications which soothe the acute arthritic manifestations—viz., an anodyne liniment containing Belladonna, Aconite and Chloroform—care being exercised that the belladonna constituent be not of such strength as to cause danger from its absorption. A safer application is the green extract rubbed up with glycerin. If friction be employed it must be of the gentlest.

A warm alkaline lotion of 1 of Bicarbonate of Potash in 40 of water applied under the oiled silk may be tried, but the tendency to gouty dermatitis or eczema may be brought into intense activity by wet applications; a dry heat is always best.

Stiffness and indurations may be often removed by skilful and gentle massage, with passive movements so conducted as not to set up pain or fresh arthritis. Counter-irritation should be avoided, but mild Iodine preparations may be found useful.

Gout-stones should not be actively dealt with when not causing pain or great discomfort. Their removal is impossible by drugs administered with the intention of dissolving the deposited urate of soda, since they are already extravascular. Alkaline hot lotions may be applied when the skin has ulcerated, and under very exceptional circumstances, as when stones seriously impede the movements of an essential joint, the skin may be incised and the concretion turned out. The use of electrical currents, X rays, Radium, electrical endosmosis, cataphoresis, &c., generally prove futile and sometimes mischievous.

Retrocedent gout shows itself when the gouty inflammation flies to some internal organ from the inflamed joint during an acute attack, and the metastasis may prove fatal if not promptly dealt with. Very hot mustard fomentation should be applied to the joint from which the pain, heat, redness and swelling have suddenly departed, with the view of re-establishing the original arthritic disturbances. Colchicum should not be given, and if the patient has been already under its influence the drug should be promptly suspended. A smart purge and a hot mustard pack to powerfully stimulate the bowels and skin to eliminate the poison is the only safe resource.

Symptoms must be treated when they arise. When the metastasis is cardiac a hot mustard fomentation should be applied over the heart region, and strychnine given hypodermically. When brain symptoms with delirium or coma are present, the ice-cap is a doubtful agent to resort to. 2 drops of Croton Oil may be placed upon the tongue, and a warm sinapism applied to the nape of the neck. Gouty patients bear bloodletting badly, and leeching would be useless under such circumstances, but when death is threatening a vein must be opened. This should not be done till a warm saline solution is prepared, which should be immediately injected into the opened vein in twice the amount of the blood let out. This need not exceed 15 to 20 oz. The serum may be hypodermically

injected in heart cases without blood-letting when the patient has been placed in the hot pack.

When the stomach is affected the best procedure will be to speedily inflame the skin with a very hot mustard fomentation, and give warm water copiously by the mouth, and assist elimination by the hot pack, and hypodermic or rectal injection of warm saline to dilute the poison in the blood.

The different diseased conditions which complicate gout, as eczema, neuritis, cystitis, renal cirrhosis, asthma, dyspepsia, glycosuria, &c., will require treatment on the lines recognised as suitable in each affection, the underlying gouty condition being always attended to by diet and drugs, as above detailed.

GUNSHOT WOUNDS—see under **Wounds and Abdomen.**

HÆMATEMESIS.

This has been dealt with under Gastric Ulcer; only a brief résumé is necessary here.

Absolute rest in the horizontal position, and physiological rest to the stomach, as far as possible, should be maintained. Ice sucked in the mouth or swallowed in small pieces should be the only substance permitted to enter the stomach, but often much harm is done by permitting the patient to distend his stomach with water in this manner, as the temperature of the liquefied ice is soon raised to that of the body, and no hæmostatic action is procured. Stimulants, food and even medicines must be administered by the bowel.

Iced compresses in thin subjects, and dry cups and smart sinapisms, where the abdominal walls are thick, may be employed externally in severe cases. If iced compresses are used, they should not be kept on longer than 30 minutes at a time, as congestion of the gastric membrane will occur. Hot mustard foot-baths tend to diminish hæmorrhage by acting as revulsants.

Morphia, given as a suppository or by hypodermic injection, arrests peristaltic action in the stomach, allays nervous excitement and calms the circulation, putting the patient into the most favourable conditions for recovery.

Chloride of Calcium should be given as a routine in all cases; by rapidly increasing the coagulability of the blood it tends to seal up the open mouth of the bleeding vessel. It should be administered in 1 dose of 60 grs. dissolved in 3 to 5 oz. water injected slowly into the rectum. Suprarenal Gland in the form of Adrenalin Solution may be given by the mouth (30 mins.) mixed with 1 dr. water. If given hypodermically, it may increase the hæmorrhage by raising the general blood-pressure. It may be given by the mouth when the lime salt has been injected into the bowel.

In desperate cases, where neither of these remedies is retained, the only resource left to the physician is to inject normal Saline solution into a vein or into the subcutaneous cellular tissue at different parts of the body, using 20 to 60 oz. With the hypodermic injection the Chloride

of Calcium may be combined. Intravenous injection in these cases may be very difficult, owing to the empty condition of the superficial veins, and the hypodermic route answers all requirements.

Gelatin hypodermically in 2 per cent. solution or even up to 10 per cent. has been injected deeply into the gluteal region; it must be most carefully sterilised, as death from tetanus has several times followed these injections. It is now procurable in sterilised glass tubes; the contents of each when mixed with 5 oz. boiled water make a 2 per cent. solution for injection. The drug may be combined with the saline injection, or in mild recurring gastric hæmorrhage it may be given by the mouth.

When vomiting is severe and the hæmorrhage moderate in amount, the writer has obtained good results by administering a 3 min. Creosote capsule after the stomach has been emptied by spontaneous emesis.

When the hæmatemesis is not due to ulcer or cancer, its source is probably a ruptured varicose vein at the lower end of the gullet. The underlying hepatic congestion will require prompt treatment; 5 to 10 grs. Calomel may be placed on the tongue and washed down with a teaspoonful of water, or a saline purge may be given. Nitrite of Amyl may be tried, but all agents which increase the blood-pressure are to be avoided. Adrenalin by the mouth may be useful from its local action. In purpuric cases Chloride of Calcium by the rectum is the best routine.

The *surgical* treatment of hæmatemesis has been already discussed under Gastric Ulcer, and the necessity has been emphasised of the importance of operating in recurring hæmorrrhagic cases during the intervals of bleeding in order to prevent the occurrence of a fatal hæmorrhage. Gastro-enterostomy meets all the requirements of these cases, as the hæmorrhage usually is promptly arrested by making a new route by anastomosis of the stomach with the jejunum, and the same practice holds good in gastric cancer accompanied by hæmorrhage.

HÆMATIDROSIS.

Bloody sweating, when not caused by the malingerer, is nearly always a manifestation of the hysterical condition, and requires no treatment; the authentic cases reported as being of a true vicarious nature recovered spontaneously. Such should not be interfered with, except by an attempt to restore some normal flux which has been checked, as in amenorrhœa. Saline purgatives or revulsive treatment by very hot foot-baths or sinapisms can do no harm in this rare condition.

HÆMATOCELE.

The treatment of a hæmorrhage into the cavity of the tunica vaginalis testis or cord consists in rest in bed, with the patient lying upon his back and a small board placed across the upper part of the thighs, so that the swollen organ may rest upon this as on a shelf. Iced lotions or a small ice-cap may be applied to the scrotum in recent cases in order to prevent further extravasation. A cradle is necessary to keep off the weight of the bedclothes, and the bowels should be moved by a smart Saline purgative.

Hydro-hæmatocele.—Where extravasation of blood occurs into a previously existing hydrocele the blood may remain fluid, and a simple tapping operation may be tried, a moderately sized trochar and canula being employed, but should the fluid accumulate again a repetition of the tapping will most likely prove a failure for the cure of the original hydrocele. The tumour of a hæmatocele is tense or solid, and if treated on purely expectant lines, the blood is seldom absorbed; suppuration may result, or the walls of the sac may become thickened or even calcified.

The best routine treatment is to open freely the tunica as in the modern operation for the radical cure of hydrocele. The clot should be turned out, the sac with the testis withdrawn from the scrotum, and the sac being turned inside out, the edges of the incision in the walls of the tunica vaginalis are sutured behind the epididymis and the testicle returned to the scrotum, drainage being provided.

When the operation has been delayed, it will usually be necessary to dissect out the thickened wall, and it may even be necessary to remove the atrophied testicle, or the entire mass including the testicle may be completely excised.

If suppuration of the contents has occurred when first seen by the surgeon, the sac should be freely incised, swabbed out with Perchloride of Mercury Solution, and free drainage established. When a hæmatocele supervenes upon malignant disease of the testicle, castration should be effected without delay, and the cord must be also removed high up. Hæmatoceles of the cord and of the epididymis occur when blood is extravasated into encysted hydroceles in connection with these organs. The treatment in the first instance should consist in tapping, and if the fluid returns the radical operation of the removal or excision of the cyst wall should be carried out.

Pelvic Hematocele.—This condition is almost invariably due to tubal pregnancy, and the treatment consists in immediate operation as described under Extra-uterine Pregnancy on p. 288. The following remarks apply to the treatment of those rare cases formerly regarded as extra-peritoneal hæmatoceles, which are now known to be examples of *Hæmatoma of the broad ligament* and which can be safely treated by the expectant method.

The patient should be rapidly undressed and placed on her back upon a hair mattress, with the pelvis slightly raised by a hard counterpane folded neatly and placed under the buttocks. Collapse may be met with stimulants such as Ether, Alcohol, or Sal Volatile. Opium is the only reliable hæmostatic and restorative in such cases, and in the presence of great pain it may be given fearlessly. Small doses are useless; 45 minims of laudanum by the mouth or anus, or ½ grain of Morphia by hypodermic injection, should be administered as soon as possible, and the effect kept up by smaller doses repeated every hour according to the urgency or severity of the symptoms. In the intervals between the doses of opium, Brandy and Ice may be freely given; afterwards Brandy or Whiskey in *small* quantity, diluted with iced milk, will con-

stitute the best feeding during the early days following the seizure. As soon as possible alcohol should be stopped altogether. Local treatment should consist of cold compresses or crushed ice, folded in gutta-percha tissue or oiled silk, and laid over the lower parts of the abdomen. The vagina may be packed with ice in desperate cases. At this stage some recommend brisk purging with Calomel, Croton Oil, or strong Salines. The writer has never had the courage to try these heroic remedies. Nor has he ventured to recommend tight abdominal bandaging.

Cases with the gravest aspect generally recover if kept absolutely at rest and under the influence of opium; and meddling by making repeated examinations and explorations is to be condemned. Many remedies may be tried with the view of arresting the internal hæmorrhage; of these, Ergot is the one most useful; it may be given hypodermically, or by the mouth in full doses. Chloride of Calcium, 20 grs. every two hours, is sometimes very efficient. Suprarenal Gland substance, in doses of 5 to 15 grs., will sometimes give striking results. Gallic or Tannic Acid, Digitalis, Turpentine, Acetate of Lead, Iron, &c., may possibly only tend to divert the physician's mind from the administration of opium, which, after all, is the remedy upon which the patient's safety depends.

In the face of a rapidly increasing internal hæmorrhage, the operation of opening the abdomen and securing the bleeding vessels may be weighed. If extra-uterine gestation or an ovarian varix is diagnosed this will be justified, but the hope of securing the vessels, from which an ordinary pelvic hæmatoma is fed, is indeed visionary, and the vast majority of cases so treated would probably have their chances of recovery sadly minimised by such an attempt.

The subsequent treatment will be that of peritonitis, pelvic cellulitis, or pelvic abscess. When the shock and collapse have passed away, the resulting peritoneal mischief will call for sedative measures constitutionally and locally. Opium should be still our mainstay, and until all danger of further hæmorrhage has passed away cold compresses are to be preferred to hot poultices. These local anodynes are invaluable at a later stage when pelvic cellulitis is established. Iodide of Potassium, or mild Mercurials, may be given with the view of causing absorption.

In the great majority of cases, the effused blood will either become absorbed, or an abscess will form, which, if left alone, will find its way into the bladder, bowel, vagina, uterus, or through the skin. The practice of puncturing the tumour through the rectum or vagina is followed by some surgeons; there cannot be a doubt that such a routine practice is a serious mistake. When there is evidence that suppuration is already established, and the symptoms and signs lead one to believe that there is danger of the sac bursting into the peritoneal cavity, if a bulging soft point is felt in the vagina or rectum, to wait for spontaneous rupture might be a fatal blunder. The aspirator should be discarded, and a large trochar and canula, such as is used for puncturing the bladder, may be selected, and the canula should be driven well home after the withdrawal of the trochar. Should the contents of the cavity consist of coagula,

as well as puriform fluid, the opening should be freely enlarged, and the sac well washed out with warmed solutions of Corrosive Sublimate or Condy's fluid, injected from time to time through the ordinary enema apparatus, to which a large, soft catheter may be attached. Vaginal puncture is preferred to anal.

HÆMATOMA.

Hæmatoma of the *Auricle* usually resolves more or less completely if left to itself, but since the effused blood is bound firmly down by the unyielding perichondrium, deformity through shrinkage of the cartilage is liable to ensue. If the extravasation is small and seen early the application of an ice-bag may meet all requirements. In more extensive hæmorrhages puncture is seldom justifiable, since the blood has usually coagulated already. The best procedure is to make under aseptic precautions a free incision through which the clot is to be turned out and the cavity carefully packed by antiseptic gauze so inserted as not to interfere with the configuration of the auricle, a firm padding of cotton-wool being placed behind the ear. A woven bandage should be applied with sufficient firmness to secure a moderate degree of pressure.

Hæmatoma of the *Labium* should be treated when seen early by the application of the ice-bag to check further extravasation, and if let alone small tumours will usually resolve spontaneously, but a large hæmatoma in this region is liable to suppurate, and should be freely incised, the clot turned out, the cavity swabbed with Perchloride of Mercury solution, and any bleeding vessels tied, after which measures the cavity should be firmly packed with Iodoform or Cyanide gauze.

In neglected cases, where suppuration has already set in, the pus should be evacuated by a free incision and the cavity thoroughly flushed out by a warm antiseptic solution and thorough drainage provided.

In cases of long standing the walls become thickened by organised layers of clot, as when the hæmatoma supervenes upon a varicocele of the labium, in which case the entire mass will require excision.

Hæmatoma of the Scalp.—When the extravasation occurs into the space beneath the aponeurosis, the diffusion of the tumour may be prevented by the application of an ice-bag and gentle uniform elastic pressure. Its resolution at a later stage may be expedited by careful massage.

The *Cephalhæmatomata* observed in newly born children usually result from extravasated blood between the bone and the pericranium, and generally yield to the application of evaporating lotions, the ice-bag, and at a later stage, should these not prove effectual, to the mild elastic pressure exercised by a woven bandage over a Spirit lotion applied under oiled silk. Poulticing, aspiration, leeching or puncturing should never be resorted to. Should suppuration occur, a free incision should be made into the centre of the boggy swelling, the pus evacuated and the cavity washed out by a warm antiseptic solution, after which it may be loosely packed with gauze or drained.

Hæmatoma of the *Scrotum* must be differentiated from hæmatocele; it always yields to rest in bed, with the testicles supported on a suitable splint or shelf and the application of cold lotions, followed at a later stage by the use of Spirit lotion under oiled silk and a suspensory bandage. For *Pelvic Hæmatoma*, see p. 358.

HÆMATURIA.

This is but a symptom or sign common to various diseases affecting the genito-urinary tract or to certain general blood conditions, the treatment of which will be found detailed under its own appropriate heading. The first step before any treatment can be thought of must consist in a careful search for the discovery of the source of the hæmorrhage. Though the trained eye will in the great majority of cases easily detect even a small percentage of blood in the urine, nevertheless many instances occur in which pigments such as indican, hæmatoporphyrin, bile, rhubarb, rosaniline, or bodies formed by the decomposition in the system of carbolates, salicylates, sulphonal, &c., on elimination by the kidney give to the urine the appearance of a hæmaturia which cannot be diagnosed without the microscope. The presence of free red blood cells must therefore be demonstrated in all doubtful cases, and only in this way can hæmoglobinuria be excluded. The endoscope or urethroscope and cystoscope should be employed when the microscope fails to demonstrate the source of the bleeding.

Urethral hæmorrhage comes before the stream of urine reaches the meatus, and it may flow between the acts of micturition. If due to a gonorrhœal condition the injection of the Silver Salts may be resorted to, but if the blood should appear during the chronic gleety stage the endoscope should be introduced and the bleeding spot swabbed with a strong solution of Nitrate of Silver. If the hæmorrhage be the result of a ruptured urethra an attempt must be made to pass a soft rubber catheter into the bladder, and should this prove successful the instrument may be kept in for 8 to 12 days. Where the bladder cannot be entered in this manner, Cock's operation or an external urethrotomy should be performed at once to prevent extravasation, and most surgeons prefer to deal with the wound from without after a grooved staff has been passed along the urethra, as extravasation may take place even though a soft rubber instrument is tied in the bladder.

If the bleeding be caused by a urethral calculus the stone should be extracted by forceps introduced through the meatus. It may be pushed back into the bladder and crushed by a lithotrite or removed by an external incision in the penile portion of the urethra or in the perineal region. Should the hæmorrhage only appear after the stone has been spontaneously passed the bleeding may be controlled by passing a full-sized catheter or sound into the bladder, leaving it *in situ*, and should blood still continue to flow by the side of the instrument, pressure from without will arrest it when a bandage or strapping is applied.

Bladder hæmorrhage must be dealt with by a removal of the cause

when this is possible. Thus calculus, enlarged prostate, cystitis, cancer, parasites, villous growths, tuberculosis, diseases affecting the posterior urethra with back-flow of the blood into the bladder, and injuries, including those produced by catheterism, must be met by the use of the drugs or operative procedures suitable in each case, as will be found detailed under the heading of each primary disease causing the hæmorrhage.

Sometimes the bleeding will require to be controlled when the primary disease is beyond reach, or it may be necessary to treat the hæmorrhage as a symptom till the patient's strength is restored so as to enable him to undergo a radical operation for the removal of the primary cause. Under such circumstances absolute rest in the horizontal position, with the application of iced compresses or Leiter's tubes to the perineum, rectum, vagina, or hypogastric region may be tried. Drugs by the mouth are of little value. Chloride of Calcium is, however, always clearly indicated, and may be safely given in 30-gr. doses every 4 hours in purpuric cases. It may be combined with Tincture of Jaborandi, which seems to exert some feeble influence over hæmorrhages from the urinary tract, and many surgeons believe that Hazeline by the mouth acts in a similar manner.

Injections of hæmostatic solutions directly into the bladder are often markedly efficacious. The most reliable of these is Adrenalin Solution, but all such injections are practically valueless unless the bladder has been first emptied of clots. The largest-sized soft rubber instrument, with a wide opening at its distal extremity, should be introduced, and by attaching its proximal end to a Clover's suction apparatus the organ should be thoroughly washed out or irrigated by a stream of iced water till all clots have been extracted, after which about 4 oz. of Adrenalin Chloride solution (1 in 4,000) may be left in the bladder.

Alum solution (saturated), Nitrate of Silver (2 to 5 grs. per oz.), Hazeline (1 in 2), Perchloride of Iron (1 in 200), or other local astringents may be employed for irrigation, and a few ounces afterwards left in the bladder.

In the bleeding occurring in enlarged prostate, Harrison ties in a soft catheter and applies pressure from without, as in the treatment of post-partum hæmorrhage.

Should the bleeding resist all palliative treatment the best procedure is to open the bladder above the pubes and remove the primary cause. This is the only satisfactory routine in villous growths. In the female equally brilliant results may be obtained by widely dilating the short urethra, which permits exposure of the growth or ulcerated spot, which can then be curetted and its base cauterised.

Hæmaturia of *renal* origin must be dealt with by removal of the primary cause. In acute Bright's disease the diagnosis is usually clear, and the danger from hæmorrhage alone may usually be discarded. The loins may be dry cupped; hot sinapisms or the mustard pack, brisk saline purgatives and Chloride of Calcium internally meet all requirements.

In the renal hæmaturia of such blood conditions as scurvy, purpura

and rickets the internal administration of the lime salt, with a diet of fresh vegetables and fresh meat, answers all requirements.

Hæmaturia produced by the administration or absorption of such irritating diuretics as cantharides, turpentine or copaiba is checked by the withdrawal of the drugs aided by dry cupping of the loins, hot packs, and copious diluents like barley water.

Where the nature of the cause is less obvious the cystoscope should be used, and the urine from the ureters collected by catheterising each separately. The faulty organ is then to be dealt with when the diagnosis has been cleared up by X rays. Calculus, floating kidney, tuberculous growths, sarcomatous or cancerous tumours, hydatids, Bilharzia, &c., will require either nephrotomy, nephro-lithotomy, nephrostomy, nephrectomy, decapsulation, nephropexy or nephrorrhaphy, as indicated in each case.

Renal Hæmophilia, Essential Hæmaturia, or *Renal Epistaxis* are the names given to the rare condition in which a profuse hæmorrhage is found to proceed from one kidney in which no lesion may be discoverable even after the exposure or removal of the organ. The calcium treatment can do no harm in such cases; when the condition has been diagnosed by the eliminatory method the kidney should be cut down upon and the organ exposed and freely incised for exploratory purposes (nephrotomy), after which the local hæmorrhagic condition may be expected to disappear even when the organ is apparently healthy.

HÆMOGLOBINURIA, OR HÆMATINURIA.

The treatment of this condition, in which blood pigment or hæmoglobin appears in the urine, should be that of the primary hæmolysis causing the destruction of the red blood discs, and the problem is simplified by recognising that the origin of the disease is independent of any kidney lesion, the albumin present in the urine being always in the form of serum-globulin. All forms of hæmoglobinuria are toxic, and the recognition of the poison is obviously the first step in the treatment. In the non-paroxysmal type of the disorder, one or other of the following poisons may be demonstrated to be the cause—viz., potassium or sodium chlorate, sulphuretted or arseniuretted hydrogen, carbolic or pyrogallic acid, naphthol, carbon monoxide, phosphorus, quinine, or toluylendiamin; the symptoms may be expected to subside rapidly on the withdrawal of the drug.

The hæmoglobinuria which supervenes after transfusion of the blood of the sheep, goat or the horse is of a similar nature, and is usually very transitory, requiring no treatment.

When the affection arises during the course of other diseases, as blackwater fever, malaria, typhus, scarlet and typhoid fevers, the primary disease will require prompt treatment.

Paroxysmal hæmoglobinuria usually appears in the winter months, and follows an exposure to cold and damp. The patient should be ordered to bed at once, and should be kept warm and have a dose of

Nitrite of Amyl, which sometimes, if given early, aborts the paroxysm. As the attack will pass off without endangering life, the less done by drugging the better, especially as the host of astringent substances formerly recommended possess no power over the paroxysm. Chloride of Calcium, so beneficial in ordinary hæmaturia, is useless. Quinine is still employed in malarial hæmoglobinuria, and the question of its value is discussed under Blackwater Fever.

Arsenic is of little value during the attack, but, like Iron, its beneficial effects are obvious and unmistakable in the anæmic state which follows severe paroxysms. The hæmoglobinuria of Raynaud's disease is of the same nature as the ordinary paroxysmal type, and as it is usually brought on by exposure to chills and over-fatigue, warmth and rest in bed are the best palliatives. Dry cupping or hot poultices to the loins are still recommended, but as the condition is not in any way due to renal congestion, this treatment is apparently irrational except in blackwater fever. Preventive treatment will in all paroxysmal cases consist in removal to a warm equable climate during the winter months, when the patient's circumstances permit.

Eason has discovered a toxin in the blood which in the presence of cold attacks the red discs, but hæmolysis does not occur till the blood has become warmed again by circulating through the internal organs. As the disease is believed by many to be of syphilitic origin, Iodides may be administered between the attacks, but Mercury is seldom indicated unless signs of active syphilis should be present.

HÆMOPHILIA.

Preventive treatment in this congenital and hereditary disease is of vital importance. It consists in the avoidance of injuries, wounds, contusions, and abrasions all through life. No surgical cutting operation must be attempted in a subject suffering under this condition. Even vaccination must be performed with extreme care, as death has resulted when the scarifications were permitted to involve the deep layer of the true skin, and a fatal issue has many times been reported after the skilful extraction of a diseased tooth. The general health of the so-called "bleeder" must be maintained at the highest standard, and as all athletic games in which any accident or rough play is likely to occur are to be avoided, the patient must make up for their absence by an open-air life, with walking exercises, swimming, and boating.

The condition is practically never seen in females, but is handed down always through the female line; hence the daughter of a bleeder, though immune herself, will be very liable to transmit the diathesis to her male children, and marriage under such circumstances is always to be discountenanced. The victim of the condition should be warned of his congenital weakness as soon as he comes to years of discretion in order that he may avoid as far as possible all danger.

When epistaxis or any breach of surface has occurred, or when blood has been poured out into a joint, Chloride or Lactate of Calcium should

be given freely by the mouth, and absolute rest in bed enjoined. The lime salt cannot be continuously employed as a preventive, because after saturation of the blood has been produced for any considerable time by a lime salt the coagulation time of the blood is delayed instead of being hastened. Inhalation of Oxygen and Thyroid feeding have proved useful in some cases, and the practitioners of a former generation believed in the efficacy of a combination of Perchloride of Iron and Chlorate of Potash internally. All astringents of the tannin group, ergot, lead, &c., are worthless. Yeast and Nucleinic Acid are recommended on theoretical grounds.

Epistaxis, which causes the greatest number of deaths in bleeders, must be promptly treated by gentle plugging with lint soaked in Adrenalin solution. It is inadvisable to give internally adrenalin or any other drug which raises the systemic pressure. A jet of CO_2 may be played into the nostril.

When the bleeding proceeds from the cavity of a recently extracted tooth it should be plugged with a pledget of lint moistened with Adrenalin solution and pressure continuously applied by bandaging the jaws over a pad of lint placed above the gap in the dental arch, or a suitable temporary plate may be adjusted and worn till all danger has passed away.

At the earliest appearance of such hæmorrhages, precautions should be taken to make up for the loss of blood which has already occurred and is likely to continue. A large enema of Saline solution should be slowly injected into the rectum when the head of the patient has been lowered and the pelvis raised. 1 dr. of the lime salt may be advantageously combined with the saline, or Gelatin (20 per cent.) added to it.

In desperate cases the saline must be given hypodermically, but never, if avoidable, by the veins. By resorting early to the saline enema when this is retained the danger of hæmorrhage from the hypodermic puncture is avoided. If puncture be necessary, Gelatin should be injected along with the saline, and the gelatin may be also given by the mouth. In some cases a full dose (6 drs.) of Antidiphtheritic Serum given hypodermically has proved valuable.

Wounds must be treated by Adrenalin solution, ligatures being inadmissible. Corrosive styptics and the cautery likewise should not be employed, as the bleeding after the separation of sloughs or eschars may prove more serious even than the original hæmorrhage. Pressure is the main remedy to be relied upon when the bleeding does not stop after the application of adrenalin, and it should always be employed in conjunction with it.

Only in the presence of impending death can blood transfusion be considered as justifiable. It would seem a rational procedure to add 5 per cent. Gum Acacia to saline solution for injection into a vein in order to increase the viscosity of the blood.

When hæmorrhage occurs into a joint, the limb must be rendered quite immovable by splints, and ice or evaporating lotions applied and the absorption of the effused blood encouraged by pressure. Puncture

of the joint should, when possible, be avoided, and a free incision never is justifiable.

HÆMOPTYSIS.

Absolute rest in bed is essential in all but trivial cases, and the patient should lie upon the affected side when this is already known to the physician by a previous examination. By this plan regurgitation of the blood into the bronchi of the sound lung is prevented. The shoulders may be raised, and most patients find this posture more comfortable than lying flat because it diminishes the tendency to cough. All avoidable mental excitement must be prevented. A calm assurance that the danger of suffocation is but a trifling one will do much to allay the feeling of apprehension which often keeps the heart action tumultuous and aggravates the hæmorrhagic process. A small hypodermic dose of Morphia often works wonders by acting in the same manner.

Speaking or using the voice in any way above a necessary whisper is to be prohibited. The room should be cool and well ventilated, and the bedclothes as light as the season will permit. Ice may be freely allowed in small quantities. It assuages thirst, which is always present, and it prevents the tickling cough when nothing is coming up; unnecessary cough is to be checked, as it raises temporarily the intrathoracic pressure, and thereby does harm, but if the cough centre is paralysed by a large dose of morphia asphyxia may result.

The diet should consist of liquid nourishment administered in small quantities at a time and quite cold; Alcohol is as a rule contra-indicated. Gelatin in the form of a flavoured jelly is an ideal article of diet, and may be given freely.

The ice-bag or wetted towels containing pieces of ice between their folds may be placed in contact with the thoracic wall. The continuous application of cold to the chest-wall will, after the expiration of less than 1 hour, cause a hyperæmia of the bronchial surface to replace the anæmic condition which soon follows after the ice has been first applied. This change increases the hæmorrhage, and if ice be used its application should be intermittent. Every ½ hour the bag or towel should be removed in fat subjects, and every 20 minutes in thin ones, and the cold reapplied after the lapse of a similar period. An excellent routine, which the writer has carried out for many years, is to saturate the atmosphere of the sick-room with the vapour of Oil of Turpentine. Owing to the volatility of the drug this can rapidly be accomplished without appreciably elevating the temperature of the chamber by pouring the drug into a small basin partially filled with hot water, or the oil may be freely sprinkled upon pine sawdust or shavings. Its local hæmostatic action is especially useful in cases where the hæmorrhage is capillary, but it may be used in all forms of hæmoptysis, and can do no harm even when the bleeding is proceeding from a ruptured miliary aneurism in the wall of a phthisical cavity, since it usually also acts as a respiratory sedative and allays cough; moreover, its antiseptic action must not be lost sight of in a condition which

threatens sometimes to infect a large portion of the entire pulmonary tract.

Internal remedies are to be used with caution. Mention has been made of the value of a small hypodermic dose of Morphia to allay mental excitement. This also prevents unnecessary coughing, but the dose should not be repeated. Better results can be obtained by small doses of Heroin when the cough is incessant.

Chloride or Lactate of Calcium is the only reliable internal hæmostatic, and 60 to 100 grs. should be at once given by the rectum or 30 grs. by the mouth every 2 hours. Drugs which increase the systemic pressure, as digitalis and adrenalin, only tend to increase the escape of the blood from the ruptured vessels, and should not be administered. In heart failure, when a cardiac tonic is indicated, Strychnine hypodermically may be given.

When the hæmorrhage is profuse and blood is being coughed up at very frequent intervals, the physician may allay the mental excitement of the patient by so arranging that a small dose of the internal hæmostatic may be given every 15 or 30 minutes, as the sufferer feels that death may occur before the next dose of his remedy may become due when this is prescribed to be taken at long intervals.

Under such circumstances the following combination may be employed with advantage:

℞. *Calcii Chloridi* ʒiiss.
Heroin. Hydrochlor. *gr.* ¼.
Tinct. Aconiti ♏viij.
Acid. Hydrocyanici Dil. ♏xvj.
Aquæ Chloroformi ʒviij. *Misce.*

Ft. mist. Signa.—"*A tablespoonful to be given every* 15 *minutes whilst the hæmorrhage is severe.*"

In former times blood-letting was practised to lower the arterial pressure. This effect can be more safely achieved by causing the patient to inhale Nitrite of Amyl, and it should have a trial in every case where the systemic pressure is above normal; Nitroglycerin may be given by the mouth.

A smart saline purgative will produce the same result, the only objection to its use being that it will compel the patient to alter his position as soon as it begins to purge, but this is usually a trivial contra-indication. Temporary ligatures may be applied to the limbs in order to prevent the return of their venous blood to the heart. Revulsant measures as a brisk counter-irritation of some part of the skin or the use of a hot mustard-bath to the lower extremities often prove useful, and many practitioners resort to dry cupping of the chest.

The results of the loss of blood must be combated, as the acute anæmia may result in a fatal syncope. A large enema of normal Saline with which

Chloride of Calcium may be combined should be slowly injected, and failing its retention, or even when it is retained, the saline may be injected in several places hypodermically. Gelatin solution 5 to 10 per cent. may be safely combined with it, and in desperate cases the injection may be made into a vein. These agents afford all the benefits obtainable from blood transfusion.

Threatening asphyxia from regurgitation of blood into the main bronchus of the sound lung should be treated promptly by artificial respiration; little is to be expected from Oxygen inhalation when the cyanosis is due to such blocking.

The secondary anæmia is afterwards to be treated by Iron, prolonged rest and judicious feeding.

HÆMORRHAGE.

The treatment of all *internal* hæmorrhages may be carried out on the lines laid down in the preceding article on Hæmoptysis. When the bleeding is due to rupture of a vessel in the stomach, the agents mentioned under Hæmatemesis are admissible; the question of surgical interference is discussed under Gastric Ulcer. Intestinal hæmorrhage is usually due to duodenal ulcer, and its treatment will be found detailed under its own subheading. Tuberculous ulceration of the bowel when causing severe hæmorrhage must be met by internal hæmostatics when laparotomy is contra-indicated. The hæmorrhage occurring during typhoid fever will be dealt with under the name of the primary disease. Hæmorrhage from the urinary tract has its treatment discussed in the article on Hæmaturia. Under Hæmophilia, Epistaxis, Synovitis, Hæmatocele, &c., the treatment of other forms of bleeding will be found. Hæmorrhage into the peritoneal cavity can only be treated by laparotomy and the surgical procedures indicated in each case.

The treatment of *external* hæmorrhage when this is severe will include the use of all the internal or constitutional remedies indicated in internal bleeding—viz., saline solution, gelatin solution, lime salts given by the rectum, veins, or by hypodermic injection—together with such agents as temporary ligatures to the limbs, blood transfusion and remedies to combat shock.

Accidental external hæmorrhage must be promptly arrested by occlusion of the severed vessels, but as this is not always possible at the moment pressure applied by the fingers over a pad of lint is often sufficient to stop it for the time, and when long continued the mouth of the divided vessel may become sealed up by a clot, so that further interference may be unnecessary when the artery is a small one or where the severed vessel is a vein; the elevation of the part materially assists in the control of the hæmorrhage.

In bleeding from a large vessel a tourniquet should be extemporised, whilst digital pressure is maintained over the trunk of the main vessel on its proximal side; a bandage being loosely applied in the neighbourhood of the finger-tips, this may be tightly twisted by inserting a piece of stick

so as to ligature the limb, a firm pad of lint being placed over the vessel as the fingers are withdrawn. Afterwards, as soon as instrumental aids are procurable, the wound should be opened up, thoroughly cleansed, and the vessel ligatured with silk or catgut, or its lumen may be closed by torsion. Should the artery or vein be only partially divided without being severed, it must be cut across and the vessel ligatured. When an artery has been severed in the middle of a wound, it will be necessary to ligature both its distal and proximal ends.

Where the vessel cannot be easily isolated for ligaturing, acupressure may be employed by compressing it between the tissues and a hare-lip pin with a figure-of-eight ligature. Hæmorrhage from wounds of the scalp or mesentery may be controlled by simply involving the bleeding vessel in a stout suture which, when tied, will stop the flow of blood above the cut extremity.

The cautery at a dull red heat may be passed over the bleeding surface when several small vessels are spouting which cannot be seized by forceps, but such a procedure prevents primary union.

Normal horse serum may be used as a local application in, for example, epistaxis where it can be used on the bleeding-point, or it may be injected subcutaneously or intramuscularly where this is not possible, as in gastric hæmorrhage.

Styptics are only to be used under similar circumstances, and Adrenalin solution is the one generally employed. Water at a temperature of 112° is a very efficient hæmostatic when directly applied to oozing surfaces. Puff Ball is also most efficacious, but it cannot be easily sterilised. A corrosive liquid like Perchloride of Iron should never be employed as a styptic to aseptic wounds, as it destroys the tissues and produces a superficial slough or eschar; it may, however, be advantageously used to plug the cavity from which a tooth has been extracted. As routine styptics for minor fresh wounds Friar's Balsam and rectified Oil of Turpentine are most convenient and reliable, being antiseptic in their action.

The prevention of primary hæmorrhage in surgical operations may be carried out by digital compression, by a tourniquet, Esmarch's bloodless method, or in some cases by the application of a ligature to the main vessel supplying the part, as to the subclavian or external iliac arteries when amputation is to be performed at the shoulder or hip joint. This ligature may be a permanent or temporary one, or a clamp or steel skewer may be employed to compress the vessel. It is possible in thin subjects completely to control the hæmorrhage in the lower extremities by powerfully curving the spine anteriorly with a firm object placed behind the vertebral spines, the patient's thighs being permitted to hang over the edge of the operating table as firm pressure is made on the abdominal aorta by the clenched hand of a reliable assistant, the artery being powerfully compressed against the prominent bodies of the lumbar vertebræ below the umbilical region. Minor operations may be rendered bloodless by the use of the infiltration anæsthesia method, or by combining infiltration with a weak solution of adrenalin.

In secondary hæmorrhage, the cause being almost invariably due to some septic change interfering with the reparative process in the occluded or ligatured vessels, the best routine procedure is to open up the wound, thoroughly cleanse it with a *hot* solution of an unirritating antiseptic solution, and plug it firmly with iodoform gauze. Should a large vessel be suspected to be leaking, the main vessel should be ligatured through a wound made under strict aseptic precautions at some distance above the site of the primary operation.

The treatment of the resulting acute anæmia following hæmorrhage will be found in the article on Anæmia.

HÆMORRHAGE, POST-PARTUM—see Puerperal Hæmorrhages.

HÆMORRHOIDS.

The treatment may be either palliative or operative for both external and internal piles. In most instances palliative measures are preferable where the presence of the hæmorrhoids is causing little discomfort or loss of blood, and often such treatment by removing the primary cause permits the varicosity to shrivel or wither up.

Constipation must be sedulously guarded against; the bowels may require occasionally a brisk saline purge to unload the liver, but the physician should aim at the rational method of curing the constipation by securing a semi-solid or soft motion at least once daily. This can only be satisfactorily accomplished by small doses of laxatives as Aloes, or Cascara in combination with Nux Vomica as in the ordinary dinner pill. Large doses of aloes are injurious. When a *purgative* action is required, this drug should not be selected, but small doses are invaluable; they exercise a certain degree of stimulating or tonic action upon the muscular coat of the atonic veins which is highly beneficial. It should, therefore, never be administered even in small doses when the piles are inflamed. Confection of Senna, Sulphur or Compound Liquorice Powder, Stewed Prunes and pure Olive Oil are also excellent laxatives. The diet should be such as will not tend to cause portal congestion; high living, alcohol, and sedentary occupations or such as entail prolonged standing must be avoided, and cold or damp to the feet should be prevented by suitable clothing and foot-wear. The administration by the mouth of Ward's Paste (Confection of Pepper) is still a valued agent, and many retain a belief in the efficacy of Tar Pills. Local measures consist in extreme cleanliness; only the softest tissue paper should be gently used after defecation; the anal region should be sponged freely with cold water afterwards, and again before retiring to rest. A small enema of cold water is in many cases very beneficial, especially when a severe aching pain follows defecation where internal piles are present, which tend to prolapse; these should always be gently pushed up beyond the grasp of the sphincter. Any unirritating astringent ointment may be applied at the same time with the finger or an ointment introducer. The best routine application is the following:

℞. *Ungt. Conii* ℥iss.
Ext. Hamamel. Liq. ℥j.
Liq. Carbonis Deterg. ♏xxx. *Misce.*

This relieves any pruritus which may be present, and its astringent effect can be intensified by the addition of 10 grs. Persulphate of Iron, if hæmorrhage is troublesome. Gall and Opium Ointment alone or with the addition of Belladonna Extract, Hazeline or Calomel and Dilute Citrine Ointment, with 1 per cent. Cocaine are also good local applications.

Inflamed piles or what is commonly known as "an attack of piles" due to thrombosis of the vein may be either external or internal. Their prevention will consist in the observance of the above-mentioned measures, especially by the exercise of a gentle pressure applied after defecation so as to prevent the mass of internal piles being strangulated by the sphincter. When this latter result has already occurred all attempts at reduction are painful and generally futile. Inflamed external piles can never be pushed within the sphincter. Where the pain is very severe the pile may be incised under antiseptic precautions and the clot squeezed out. This is followed by immediate relief, and allows the patient to continue at work. If more than one pile be affected the patient should be ordered to bed and a large enema of warm water slowly administered so as to thoroughly wash out the colon. The agonising pain is best relieved by hot fomentations or poultices smeared over with the Green Extract of Belladonna and sometimes by iced applications or a piece of smooth ice introduced within the sphincter.

Leeches to the margin of the anus always afford a considerable degree of relief, but anodyne suppositories or ointments are generally of little value owing to the tension of the parts. By such palliative measures the patient may be tided over his few days of suffering, after which it may be found that the piles have become obliterated through the formation of firm thrombi in their interior, or the strangulation caused by the pressure of the sphincter may have been sufficient to effect their permanent destruction.

It is as a rule unwise to operate upon internal piles when in the state of acute inflammation.

Many attacks of external piles are due to extravasation of blood caused by rupture of the dilated vein during defecation, the thrombus so distending the tissues as to cause intense agonising pain. Here the surgeon can give instant relief by freely incising the skin over the inflamed vein and turning out the clot. Such cases, if left alone, spontaneously resolve themselves and the hæmorrhoid disappears, but several days of severe suffering can be immediately cut short by one prompt incision.

Severe hæmorrhage from internal piles is a clear indication for their removal, but in emergency the loss of blood must be stopped. Packing the rectum with ice or Puff Ball is advocated. Hæmostatic injections as Hazeline, Perchloride of Iron, Tannin, Hydrastis, Alum, &c., have given way to Adrenalin Chloride, a small quantity of which diluted with

4 times as much water should be injected beyond the sphincter. The speculum may be introduced and the cleansed bleeding-point swabbed over with the undiluted solution, or the actual or electro-cautery at a dull red heat may be passed over its surface lightly in a linear manner; this latter procedure often effects a cure by forming an eschar under which the withered pile shrivels up.

Unna's plan of treating all hæmorrhoids is to employ a 1 in 20 ointment of Chrysarobin, and others report favourably of a 1 gr. suppository of the same with Belladonna and Iodoform.

Surgical Treatment.—The removal of the hæmorrhoidal mass must be determined upon when palliative treatment has failed to relieve pain, prolapse and repeated hæmorrhages. The method of injecting into each internal and protruded pile a few minims of a 20 per cent. solution of pure Carbolic Acid in glycerin and water is maintaining its reputation, and should be resorted to when for any special reason the usual cutting or ligaturing operation is contra-indicated; it effectually relieves pruritus. There is little to be said in favour of merely applying the cautery to the hæmorrhagic mass with the view of destroying it—a procedure which is associated with much pain in the case of external hæmorrhoids, and which is of little use in large internal piles. Electrolysis is practised by a few who employ an ionisation of a zinc solution by the unipolar method, but at best the results are only palliative.

External piles should be removed only by the scissors, a ligature never being resorted to save when necessary to tie a spouting vessel, but the skin around the pile must not be ligatured. A drop or two of Cocaine solution may be injected into the base of each after thorough disinfection of the anal region, after which the piles are to be separately snipped off and the raw surface treated by Iodoform under a pad of dry lint to which pressure is applied by a suitable bandage. Care should be taken not to remove any skin unnecessarily, lest the anal opening might become contracted in calibre, but all tags and redundant folds of skin containing remnants of former hæmorrhoids should be removed.

Internal piles may be removed by ligaturing, by excision, by the use of the clamp and cautery, or by crushing.

The patient should have a free purge given two days before—either castor oil or a saline, which should be repeated upon the day previous to the morning of the operation. Some surgeons give castor oil for the first purge, and follow it up by a saline, no solid food being administered after. Early on the morning of the operation the colon must be emptied by one or two large enemas. When the patient has been fully anæsthetised the surgeon inserts both his thumbs well inside the anus, and slowly dilates the sphincter without tearing it. The hæmorrhoidal mass is then brought into view and within easy reach.

If the operation by *ligature*, which is the simplest and most easily performed, is selected the surgeon proceeds to seize each hæmorrhoid separately with a pile forceps, and having snipped through with blunt-nosed scissors the mucous membrane around its base, a stout silk ligature

is tightly applied so as to thoroughly strangulate the mass, care being taken that the silk is buried in the sulcus or groove made by the scissors in order to prevent slipping. The pile is then cut off, but not too close to the ligature. Large hæmorrhoids should be transfixed through the base by a sharp needle carrying a strong ligature in its eye, and the pedicle tied as tightly as possible before cutting off the distal portion of the pile. Small hæmorrhoids may be ligatured without cutting away any tissue, but the mucous membrane must always be snipped through before the ligature is applied, otherwise the latter is certain to slip. Each pile having been separately treated in the above manner, and any external ones removed by the scissors, a Morphia Suppository may be slipped through the relaxed sphincter, and a dry antiseptic dressing applied under a T-bandage before the patient is carried to bed.

Upon the third morning he may have an oil enema or a dose of castor oil, which is to be repeated each day to prevent scybalæ forming, as these are liable to interfere with the ligatures. The greatest care should be taken to keep the skin in the neighbourhood of the anus as clean as possible by douching with carbolic lotion, and dredging with Boracic Powder, or lubricating with Boracic Ointment. The ligatures may be expected to come away in about 10 days, after which the patient may be permitted to sit up. Should there be much swelling of the parts or retention of urine, a hot sitz-bath may be administered, which will often prevent the necessity of catheterisation.

The operation of *excision* is carried out by seizing each pile separately with the forceps and cutting it off close to the mucous membrane, the lips of the incision in which are then to be sutured with catgut. The best operation is that devised by A. B. Mitchell, the description of which, written by himself for a former edition of the present work, is here reproduced. The mucous membrane is washed with a 1 in 1,000 Perchloride of Mercury solution: the sphincter is dilated. One of the piles is caught in a pair of forceps and pulled well down. A long narrow-bladed forceps (Kocher's artery forceps answers admirably) is then applied to the base of the pile, so as to include a vertical fold of mucous membrane 1 to 2 inches long. The pile having been pulled well into the grip of the forceps, the blades are clamped and the projecting pile removed with scissors. A needle threaded with catgut is passed through the fold of mucous membrane just above the forceps, and the end of the catgut is firmly tied so as to include the artery running into the pile. The upper end being thus fixed a continuous suture is applied loosely *around* the blades of the forceps. The blades are then removed, and the suture rapidly tightened and secured at the lower end. Each pile is treated similarly, and when the operation, which takes from about 15 to 20 minutes, is completed, 4 to 6 vertical lines of sutures remain within the rectum. The operation is bloodless. No attempt is made to insure subsequent inaction of the bowels. The patient is up and about at the end of a week.

The *clamp and cautery* method is carried out after the same prelimi-

naries have been gone through as for the ligature operation. Each pile or separate hæmorrhoidal mass is seized with forceps and a clamp is applied to its base or pedicle; the pile is then cut off, and the cautery at a dull red heat is laid on the wounded surface, which is to be thoroughly seared before withdrawing the clamp. The after-treatment is identical with that following ligature.

A *crushing* clamp is employed by some surgeons to do away with the necessity of the cautery. The base of the pile is squeezed or crushed in the clamp, and when this is forcibly screwed tight the pile is excised, and after a few minutes of this severe pressure the crusher is unfastened and no hæmorrhage follows.

Ball's method of operating combines several of the details of the ligature, excision and crushing operations. He transfixes the crushed pedicle with a stout ligature and ties each half tightly, bringing the ends of the ligature round so as to strangulate the entire pedicle, including the half already tied, after having secured for the ligature a subcutaneous hold on the revoluted skin of the anal canal by a previous dissection.

Whitehead's operation consists in excision of the entire pile area by removing a ring of mucous membrane, including the hæmorrnoids, the border of the excised wound being brought down and sutured to the anal margin. The danger of the operation when performed by unskilled hands lies in the liability to contraction of the anal aperture and to injury of the sphincter in the dissection process.

In the above operative procedures a complete relaxation of the sphincter is of primary importance, and Porter has shown that by the injection of Barker's Eucaine and Adrenalin solution previous to general anæsthesia the greatest degree of patency may be obtained without permitting the chloroform or ether narcosis to be pushed to a high degree of insensibility. Some surgeons have operated under spinal anæsthesia successfully.

Boas has introduced an operative method based upon the principles which often effect a natural cure in spontaneously prolapsed piles. The patient is made to strain forcibly, so as to cause prolapse of the hæmorrhoidal masses, after which a Bier's suction apparatus is applied till a sufficient degree of œdema of the anal skin and tissues is produced as will prevent reduction. The prolapsed and strangulated mass is then allowed to shrivel, which process is usually completed in about a fortnight.

HÆMOTHORAX.

In medical cases the treatment is mainly symptomatic, since the primary cause of the bleeding is usually beyond the reach of surgery. The patient should be placed in bed, and have ice freely applied to the affected side; he should lie upon this side unless where this interferes with the repeated applications of the ice. Food should only be given in quantities just capable of maintaining life, and the utmost quiet and freedom from excitement must be maintained. A moderate dose of Opium or a small hypodermic of Morphia may be administered with advantage, as in cases of hæmoptysis.

Internal Hæmostatics.—Chloride or Lactate of Calcium should be given by the mouth or rectum, and the reduction of the general blood-pressure effected by inhalations of Nitrite of Amyl or by Nitroglycerin, followed up by a brisk saline purge. The practitioners of a former generation under such circumstances did not hesitate to open a vein freely in order to relieve the tension in the internal bleeding vessel—a practice which is seldom or never ventured upon at the present time, but when the heart is embarrassed in traumatic cases life can only be saved by opening a large vein.

Where a large amount of blood has already been poured out, and a condition of acute anæmia has supervened, this must be met by saline injections hypodermically by the rectum or by the veins. At the same time the sudden compression of the lung and displacement of the heart will require prompt relief. A puncture by the exploring needle will reveal whether the effused blood remains still liquid, in which case the aspirator may be cautiously employed or a trochar and canula used, but should clots exist there may be no other course open but to make a free incision as in empyema, and provide for suitable drainage.

Hæmothorax due to injuries is usually the result of a fractured rib perforating the lung or wounding an intercostal artery. When the internal hæmorrhage is caused by a penetrating chest-wound the bleeding comes from the internal mammary or an intercostal artery, and the vessel must be ligatured. The ligature of an intercostal artery is often a difficult procedure requiring free enlargement of the wound and even resection of a portion of a rib. Where such an operation is inadmissible owing to the state of collapse often following such injuries, three alternatives are available: A curved needle bearing a stout ligature may be passed round the rib, so as to include the bone and intercostal artery in its embrace; after tightly tying the silk or catgut the hæmorrhage may be controlled, pressure forceps may be employed as a temporary clamp and left *in situ*, or Desault's expedient may be resorted to. This is carried out after sterilisation of the wound by laying a piece of stout gauze or lint over it and pushing the centre of the lint inwards till a culde-sac is formed, which is next packed firmly with gauze; when the lint is pulled outwards the plug exerts its pressure upon the wounded artery, which is compressed against the bone or interior of the chest wall. The lint is finally fixed by a pad, and kept stretched by fastening it to the thoracic wall with strips of plaster.

Should the hæmorrhage proceed from the internal mammary, this vessel may be tied without much difficulty in the second or third intercostal space.

Where the hæmorrhage is coming from a ruptured lung, one or more ribs will require resection to expose the bleeding viscus, which should be sutured with its visceral layer of pleura.

Blood effusions are to be distinguished from true hæmothorax, and should be treated by the methods described under Pleuritis. Where hæmothorax is the result of tuberculous ulceration near the surface of

the lung, air and pleuritic fluid will usually accompany the effusion of blood, and the treatment should be that of Pneumothorax or Empyema.

The vast experience in chest surgery supplied by the war has established certain broad principles:—

1. That differential pressure boxes are unnecessary for operations on the chest.

2. That "sucking wounds" of the chest, with or without hæmothorax, must be closed at all costs.

3. That the chest is no more to be excluded from the surgeon than the abdomen, but that large crushing wounds with extensive fracture of ribs and hæmothorax give good results when the injuries to the chest wall and lungs have been dealt with radically.

HAIR, Diseases of.

The treatment of the various diseases affecting the growth and nutrition of the hair follicles and hair shafts will be found under their respective headings as Baldness, Dandriff, Tinea, Sycosis, Trichorrexis Nodosa, &c.

Greyness or whiteness of the hair (canities) is in the great majority of cases a senile change, but it may appear at a comparatively early age after sudden grief, terror, nerve exhaustion, or the influence of neuralgia, especially when there is a strong hereditary predisposition. In these premature forms there may be a hope that under treatment which removes the primary cause the deposition of pigment may recur in newly formed hairs. This has been known in some instances to be assisted by nerve tonics like strychnine and arsenic when combined with hypodermic injections of Pilocarpine or Jaborandi by the mouth.

For the senile form nothing is of use save the last refuge—a suitable hair due applied under the hands of a skilful hairdresser, which remedy the physician will be wise to discountenance.

For the rare condition known as *monilethrix* or beaded hair, when of congenital or hereditary origin, nothing can be done. In the acquired form the best routine will be nerve tonics and the application of Cantharidine preparations and electrical stimulation to increase the amount of blood going to the hair follicles.

Tinea Nodosa and Leptothrix, the former affecting the hairs of the beard and the latter involving those of the scrotum and axilla, are apparently of parasitic origin, and differ from trichorrexis nodosa. They are best treated by cutting the hair close and applying any mild antiparasitic ointment or lotion, as Ungt. Hyd. Ammon. or a 1 in 500 Perchloride of Mercury solution.

Hirsuties.—The removal of superfluous hairs is best conducted by the use of electrolysis guided by a skilled and patient operator. An almost immediate effect may be produced by careful management of the X rays, but the hairs invariably grow again. Depilatories may cause serious blemishing, and mere epilation is followed usually by a more vigorous growth, and the same holds true of shaving, which, however, may be the only possible method of palliating the unsightly thick growth of dark

hair which sometimes flourishes on the upper lip of females who suffer from menstrual irregularities. The deformity may be considerably lessened when the dark hairs are of a slender or downy kind by continually bleaching them with Peroxide of Hydrogen.

When the hairs are sparse and thick, each may be pulled out, and a fine needle thrust into the follicle through the minute opening left after epilation. The needle, if of steel, is to be connected with the negative pole of a suitable galvanic battery, whilst the positive is placed upon the skin of the cheek or held in the hand. Graham Little has pointed out that staining may result from ionisation of the iron when the steel needle is attached to the positive pole. A needle of gold or platinum is preferable, as it may be attached to either pole. When the current is turned on, the hair bulb is destroyed. Some operators prefer to insert the needle alongside the shaft of the hair without epilating, but this latter insures the freer entry of the needle into the follicle. The point need not be inserted further than $\frac{1}{16}$ inch.

A return of the growth only occurs where the root has escaped destruction, when the operation will require repetition. If skilfully performed, the electrolysis leaves a mark so trifling as to be almost invisible, and there is not much pain; but the treatment is most tedious, as not more than at the most sixty hairs can be removed at a single sitting of 1 hour's duration. Pirie suggests that the use of needles be discarded, and that a piece of fine wire, such as is used for clearing the hollow needle used for hypodermic purposes, should be employed, which can be easily insulated to within $\frac{1}{16}$ inch from its point by shellac.

HANGING—see Asphyxia.

HARE LIP.

The operation for this deformity may be best undertaken about the fourth to sixth week of the infant's life (see Cleft Palate), according to Berry and Legg. It should be done earlier when associated with cleft palate than when the alveolus shows no deformity, but when suction is rendered impossible it may be necessary to operate on hare lip within the first ten days after birth. When cleft palate complicates the deformity, the lip should be first operated on. The child should be nourished by careful spoon feeding, so as to be placed in the most favourable condition of health to withstand the strain of the operation and the subsequent restraint necessary to secure success.

The arms of the infant may be comfortably secured to its sides after chloroform anæsthesia by winding a towel round the thorax as the patient lies on the operating table with the head raised on a firm pillow or sand-bag.

The lip must be thoroughly separated from its bony attachments by cutting and gently tearing through the reflected mucous membrane in the neighbourhood of the cleft and beyond it well up into the nostril and cheek before any attempt is made at paring the edges of the cleft. After the soft parts are found to glide freely over the alveoli and the margins can be

brought together without undue tension a fine, sharp scalpel is used to pare off and completely detach the edge of one side of the cleft, starting at its apex, till the red margin of the lip is reached, when the incision is prolonged clean through the blunt angle and for a short distance along the free margin of the lip by turning the cutting edge of the blade outwards. The remaining edge of the cleft is similarly pared till the lower angle of the cleft is reached, when the knife is again turned outwards to continue the incision along the red margin of the lip without detaching the dissected paring, which is then stitched to the opposite blunt angle so as to fill in the notch which would otherwise be left in the free margin of the lip. This Λ-shaped incision, when the parts are brought together in a mild degree of hare-lip deformity, becomes a diamond, and when sutured in its vertical axis leaves a straight line.

The margins of the wound are sutured with two fine horsehair or silkworm-gut stitches passed deeply, but not made to include the mucous membrane, the intervening portions of the wound being stitched with horsehair sutures passed superficially. Lane inserts his deep sutures from the mucous surface, but does not include the skin in them. This plan permits these stitches to remain *in situ* for several days, whilst the deep sutures applied from the cutaneous surface must be removed after 2 or 3 days in order to avoid permanent marking. The horsehair ones may be left for a week or 10 days before removal. A small pad of gauze is applied over the lip and covered with Iodised Collodion. This latter is kept in position by a firm band of rubber plaster applied after the cheeks are pressed together in order to avoid traction on the margins of the wound when the child cries. The plaster should be renewed at intervals during the first 2 or 3 weeks after the removal of the sutures to prevent stretching of the cicatrix. The mouth should be kept aseptic by the use of Glycerin of Borax, and the child fed by a spoon for the first few days.

The operation of simple double hare lip is carried out on the same lines, and if there be no bone displacement both clefts can be dealt with at the same time.

Should there be much projection of the premaxillary process forwards, this a few days before the operation may be pressed forcibly backwards by forceps or by the thumb to the extent of causing its detachment from the bony septum, which is preferable to the plan of cutting out a V-shaped piece of the latter at the operation, whereby the blood-supply to the premaxillary bone may be destroyed. The prolabium should be pared and the skin left on its central part, the flaps being utilised in closing the cleft and forming a columna.

HAY FEVER, OR HAY ASTHMA.

Much interest is attached to this condition owing to the study of the phenomenon of anaphylaxis. The hypersensitive individual reacts to the pollen of certain grasses in the summer or to ragweed pollen in the autumn, as other sensitives do to a foreign protein, as egg albumin, cheese, &c. (see p. 69).

Dunbar's Pollantin is a serum obtained by immunising horses by increasing doses of various pollen; it is dropped into the eye, painted over the nasal mucosa or utilised in a dry form as snuff. At best its effects are evanescent.

Freeman recommends *active* immunisation by injecting into the tissues Pollen Toxin; this method is employed as a prophylactic and also as a therapeutic agent after the attack has commenced. The degree of sensitiveness of the individual can be ascertained by an ophthalmic test beginning with an instillation of 5 units of Allen and Hanbury's Toxin, and the dose is then proportioned to the degree of reaction produced: thus if redness follows, a dose of 2-4 units is injected, which is gradually increased at intervals of ten days, commencing two months before the usual seasonal attacks. The susceptibility of an individual to any particular kind of pollen can be determined by rubbing in the suspected pollen after a slight scarification of the skin, when a wheal arises in a few minutes. One single large dose of the serum from the blood of a rabbit injected for several months with pollen extract has been employed by other experimentalists to produce *passive* immunisation. Though many successes are constantly reported, the results often fall short of expectation, and a considerable minority of cases are in no way benefited.

The underlying sensitiveness has been treated as in asthma and by improving the general health, administering nervine tonics like Arsenic, Valerianates, Zinc Salts and Strychnine, &c., but as a rule without result. Chloride or Lactate of Calcium in doses of 20 grs. thrice daily often affords marked relief, and should always be tried as a routine.

The treatment of the hypersensitive area gives sometimes reliable results. As hypertrophic rhinitis or a chronic congestive state of the nasal mucosa is often present, a radical attempt to remedy the local condition is often successful. The erectile tissue should be so cauterised as to form an adherent cicatrix which will permanently bind down the mucosa to the periosteum, and at the same time insure the complete destruction of the hypersensitive areas existing in the nasal membrane. By cocaine solution the thickened mucous lining is rendered insensible, after which, with a fine blade or platinum point, a deep groove is burned with the galvano-cautery along the entire length of the inferior turbinated bone. In severe cases there should be no hesitation in removing both inferior turbinate bones. Sometimes the condition is completely removed by applying the cautery to the most sensitive part of the nasal septum (the tubercle), as in cauterisation for asthma. The prospects of a cure are hopeful when the affection is treated in this manner early in its career before repeated seasonal attacks have produced the markedly recurring tendency to attacks supervening upon the slightest irritation.

Yonge advocated resection of both nasal nerves when the cautery fails. A host of remedial agents have been employed to produce the same result without resorting to the cautery, but their effects are very temporary or evanescent. Foremost amongst these are Cocaine and Adrenalin. A 2 per cent. solution of the former or a 1 in 3,000 solution of adrenalin may

be sprayed into the nostrils, or a liquid of double these strengths may be painted over the mucous membrane with a brush, one or other or both of these drugs being used. Menthol dissolved in 10 parts of pure paraffin is also useful, and the addition of Camphor increases its efficacy, but these applications should never be persisted in for more than a brief period. The more severe method of treatment employed by the late Sir Andrew Clarke may be tried; this consists in swabbing the interior of the nose and the naso-pharynx by a mixture consisting of 1 gr. Corrosive Sublimate and 120 grs. Hydrochloride of Quinine dissolved in 2 oz. Glycerin of Carbolic Acid. The application should be made through the nostrils with a large camel's-hair brush.

A 1 in 50 solution of Nitrate of Silver, 1 in 1,000 Perchloride of Mercury, 5 to 10 per cent. Protargol, 5 to 20 per cent. Argyrol and Resorcin 5 to 10 per cent. have all been advocated.

Preventive measures consist in the avoidance when possible of localities where pollen of grasses is abundant in the early summer or where ragweed luxuriates later on. City indoor life, a sea voyage, or residence in a high altitude, or a sojourn at a seaside spot, destitute of much vegetation, may enable the victim of hay fever to stave off the attacks. Respirators, goggles, veils and plugs of cotton-wool in the nostrils may mitigate the amount of coryza and sneezing by preventing the admission of pollen, but, as a rule, their use causes acute discomfort, and as preventive remedies they are generally unsuccessful, and the same may be said of inhalations.

The nasal douche is of value both as a preventive and palliative, and an adjunct to other treatment. By regular flushing out of the nasal cavity and the naso-pharynx the pollen grains are washed away and the irritative effect of their toxin prevented or minimised. Before the season when the grasses are flowering the douche when carefully used will relieve the chronic congestive condition of the nasal mucosa, which is such a strong factor in many cases. The best form for routine use is to prescribe a powder of equal parts of Sodium Bicarbonate, Sodium Chloride and Borax, a saltspoonful of which dissolved in a wineglassful of tepid water may be used to cleanse the membrane. The writer in these cases abandons the usual nasal douche apparatus and directs the patient to fill the hollow of his hand with the liquid, which is strongly sniffed up through the nostrils and brought out by the mouth and expectorated, 2 or 3 oz. being used on each occasion 3 or 4 times a day.

Cocaine produces in the long-run an abnormally sensitive and relaxed condition of the mucosa, which perpetuates the mischief indefinitely, though in emergencies it may be safely used for a short period, as a whiff of Chloroform may be employed in the emergency of an acute attack. Some authorities employ a 1 in 5,000 Perchloride of Mercury solution for cleansing the nostrils, and Carbolic Acid 1 in 100 is decidedly valuable when used as above directed. Dry snuffs as those containing gum, bismuth, &c., are always not only valueless, but hurtful, as they cake upon the mucous membrane and act like crusts. Astringent powders like alum and tannin are still more objectionable.

HEADACHE.

The first step must be to find out the cause of the cephalalgia and treat this cause. If, as is usual, the headache be but a symptom of a primary disease as a specific fever, kidney affection, meningitis, migraine, &c., the treatment of the headache will be found detailed under the name of the disorder which gives rise to it. Nevertheless, a brief résumé may be here given of the general principles which should guide the physician in the treatment of a case where headache is a prominent symptom calling for relief.

The classification of headaches given by the author in his "Practice and Theory of Medicine," vol. i., p. 548, is a convenient one, though any attempt at a rigid classification breaks down because any two or more factors may be operating in the same patient at the same time—a fact which cannot be forgotten in the treatment.

Headache due to *organic* disease of the brain and its membranes, of the cranial bones or of the scalp, as a general rule cannot be freely treated by the most reliable of all pain-relievers—Opium. This drug is contra-indicated in acute inflammatory conditions such as exist in the various types of meningitis, cerebral abscesses, sinus thrombosis and cerebritis. The headache of these affections calls for large doses of Bromides with Antipyrine, Phenacetin, or Aspirin, and the application of the ice-cap to the forehead and hairy scalp. Agents which relieve the increased intracranial pressure, as purgatives, counter-irritation to the nucha, leeching of the temples, spinal puncture, &c., may be also useful, and in some cases trephining will be indicated. Non-febrile cases, as cerebral syphilis and tumours, should be treated upon the above-mentioned lines.

In syphilitic cases, whether of the nature of tumour, arteritis or meningeal involvement, Iodides should be given, boldly commencing with at least a dose of 20 grs., which should be increased to double or treble this amount three or four times a day combined with Bromides. If the syphilis be of comparatively recent origin, Mercury should be also given.

The headache caused by non-syphilitic tumours is often markedly relieved by the bromide and iodide combination, but Morphia hypodermically may be cautiously tried when the pain becomes unbearable. To render the life of the patient tolerable, trephining with the removal of a large disc of bone is clearly indicated, even when there is no hope of the operation permitting of the excision of the growth. Exostoses, depressed spiculæ of bone and enlarged Pacchionian bodies causing intense headache must be treated by operative procedures.

Rheumatic fibrositis of the scalp or pericranium causing diffuse headache will be best relieved by 15-gr. doses of Aspirin or 30 grs. Salicylate of Sodium combined with Iodides in full doses. *Muscular* headache is described by Rose, and is closely allied, if not identical, with the last-named variety; it is due to muscular hypertonus, which affects the circulation in the jugular veins, and he recommends massage as the only reliable agent, each muscle being dealt with separately.

Functional headaches so called are those which do not depend upon organic brain or cranial trouble, the most important types of which are the *Toxæmic, Congestive, Anæmic, Neurasthenic, Reflex, Gastric* and *Hæmic* or *Lymphatic*.

Toxæmia is the most common cause, as in Bright's disease, all fevers, gout, lithæmia, lead poisoning, excessive tea drinking and the absorption of nitro-compounds by handling high explosives; probably migraine has a toxic origin. The treatment for this form of cephalalgia should be eliminatory; the bowels, skin and kidneys require stimulation in order to hasten the excretion of the poison, and as this is also a clear indication for the relief of the primary disease, the use of saline purgatives, diuretics and diaphoretics is resorted to. Palliatives for the symptomatic headache must also be employed. Thus in fever Morphia may be safely employed to relieve the pain in the head which keeps the patient awake, and during the day small doses of any of the new analgesics may be given at short intervals. The best example of this type of headache is seen in influenza, where a few grains of Antipyrine every 2 or 3 hours completely relieve the intense cephalalgia, especially when combined with Caffeine, which effectually neutralises any depressant action of the drug on the heart; the cold pack, by reducing the temperature, tends to counteract the influence of the toxin on the brain centres when any tendency towards hyperpyrexia is present. If throbbing of the temporal arteries is noticeable, the ice-cap may be employed, as in the congestive type, and a sinapism often does good when applied to the cervical spines. Compression of the temporal arteries also occasionally affords some degree of relief.

The *congestive* headache is often also of toxic origin; brisk purgatives must be administered to reduce the systemic pressure, and vaso-dilators like Amyl and Glonoin may be administered. Cold applications or leeches to the head and revulsants to the extremities as a hot mustard foot-bath and a sinapism to the nucha are clearly indicated. When the result of plethora dietetic measures with massage and exercises and mercurials followed by a brisk saline purge 2 or 3 times a week should be resorted to. In cirrhotic kidney the headache may be entirely congestive; oftener it is both toxic and due to increased blood-pressure, and will yield to purgation and vaso-dilators.

Anæmic headache yields to the opposite treatment, and the blood-pressure may be too low. Dietetic methods which improve the quality and increase the quantity of the blood should be employed. Iron stands first amongst drugs, and it may be regarded as a food in this condition. Often the anæmic headache is distinctly of a neuralgic nature, and excellent results may be obtained by combining Arsenic and Phosphorus or Glycerophosphates with the iron.

Neurasthenic headache is often most severe and intractable, and can only be relieved by a prolonged rest from all mental strain and excessive muscular exertion. Like hysterical cephalalgia, it will yield to Weir Mitchell treatment, but as a rule in these types as well as in the anæmic

form the coal-tar derivatives—antipyrine, phenacetin—should not be used except in emergencies.

Reflex headaches can only be diagnosed after patient and exhaustive investigation, and their treatment cannot be undertaken with any prospect of success except by the use of remedial agents which remove the exciting cause.

Eye-strain due to ocular troubles, the chief of which is hypermetropic astigmatism, affords the most typical example of this type of cephalalgia; it usually disappears promptly when the errors of refraction are skilfully corrected by appropriate glasses. Weakness of the ciliary muscle and of the globe rotators, iritis and glaucoma also cause headache, which can only be relieved by removing the primary cause. The reflex cephalalgia of the cyclist or motorist and the "academy" headache are of the same nature, and must be treated on the same principle—*i.e.*, by the removal of the strain.

Nasal diseases and affections of the sinuses of the frontal, ethmoidal, sphenoidal or maxillary bones or disease of the turbinates and the presence of adenoids all may produce severe reflex headache, which yields speedily on removal of these exciting causes. As a carious tooth may be the origin of true aching inside the cranium without itself being the seat of pain or even of tenderness, so all the above conditions may likewise remain quiescent. Oral sepsis may act reflexly or as a toxæmic agent.

Vansant recommends the flushing of the nasal accessory sinuses with a stream of hot dry air in all cases of frontal headache. In frontal sinus headache the nostril should be swabbed with Cocaine solution and flushed out with Boric solution, and finally insufflated with Ferrier's snuff.

Gastric headache is either reflex or toxic, being most frequently of the latter type, in which case the brain is irritated by poisonous products formed during retarded digestion in the stomach or intestine. The treatment should obviously be that of the primary dyspepsia, and should be carried out on the lines suitable for the management of various neuroses or structural stomach diseases. In most cases an emetic or lavage will afford speedy relief.

Hæmic, or so-called lymphatic headache, has been long overlooked, having been supposed to be of neurasthenic or hysterical origin. This type is found to be commonly associated with chilblains and an erythematous or urticarial condition of the skin, accompanied by slight œdema of the legs. The headache is most persistent and often very severe. It is due to deficiency of lime salts in the blood, and yields steadily to the free administration of Chloride or Lactate of Calcium, which should be persevered with in interrupted courses of 14 days' duration.

Under the heading of Megrim will be found discussed the list of analgesic drugs and other remedial agents, such as electricity and setons, employed for the relief of headache, most of which are suitable for the palliation of every form of cephalalgia when the primary cause is undiscoverable or irremovable.

HEAD INJURIES.

As the most serious results may follow injuries of the skull or brain which at first show no signs of grave significance, the surgeon will be wise in considering every case as potentially a grave one even when no external mark is left by the injury. It is better to regard every case as if a fracture of the vault or base were present than to treat these injuries as trivial because no symptoms immediately follow.

A point of vital importance as regards diagnosis and treatment is to investigate the nature and intensity of the force which has caused the injury. Serious middle meningeal artery hæmorrhage may follow localised blows sometimes; the diffused force of a heavy object falling upon the skull is, however, almost certain to cause serious concussion or laceration of the brain substance even when no scalp wound or a trifling abrasion is only visible.

When symptoms of concussion are present the case must be treated by the most absolute rest possible, as detailed in the articles on Concussion of the Brain and Collapse. The patient should be placed upon his back in a silent and darkened room, with his head slightly raised and a cold lotion applied to the scalp. As soon as symptoms and signs of reaction appear the ice-cap should be employed and any violence of reaction controlled by leeching the temples, or by venesection. An active purgative—1 min. Croton Oil with 5 grs. Calomel—should be placed upon the base of the tongue.

The pathology of concussion must be differentiated from that of shock or collapse, in which latter the chief condition is one of exhaustion (not paralysis) of the vaso-motor centres. To treat cerebral concussion as shock or collapse by the injection of saline solution and strychnine, adrenalin, &c., would be to increase the danger of intracranial hæmorrhage. The temptation "to do something" must be resisted by the surgeon when the best practice is obviously one of waiting and watching. Rest, quiet and freedom from all excitement must be maintained till after the disappearance of every sign and symptom of reaction, and for a week or two more should any evidence of cerebral irritation supervene. The diet should consist at first of a few spoonfuls of diluted milk, which may afterwards be more freely permitted, but animal food, even beef tea, must be prohibited, and alcohol should never be allowed. Restlessness should not be relieved by opium, but Bromides may be given in combination with small doses of Antipyrine should headache be troublesome.

When simple fracture of the vault complicates the case the less surgical interference the better—at all events, till deformity is established by X-ray examination; compound fracture should be thoroughly disinfected and the scalp wound enlarged if necessary. Depressed fractures should be treated by elevation or removal of loose spiculæ, and even when no symptoms of compression are present the consensus of opinion is in favour of trephining with the view of forestalling the advent of meningitis, epilepsy, mental weakness, &c., even in most cases where there is no scalp wound, but where the depression is marked. In children opera-

tive procedures may be more safely postponed, as in them spontaneous elevation of frontal depressed fractures is common. In punctured fractures the routine use of the trephine is a good practice. Fractures of the base of the skull are best treated by absolute and prolonged rest. Should signs of compression supervene, trephining may be resorted to in the temporal region to permit of the evacuation of the serous or blood-stained effusion. Spinal puncture has been advocated. It gives little help in diagnosis, but by relieving tension is a most valuable therapeutic agent. When rupture of the tympanum is present care should be taken to prevent sepsis by syringing gently with an antiseptic solution, after which the meatus should be loosely drained with antiseptic gauze. Similar precautions are necessary when the nasal and pharyngeal mucous surfaces are lacerated, in which cases antiseptic sprays must be constantly employed to disinfect the naso-pharynx and nasal cavities.

Warren advises trephining in basal fractures with the view of providing drainage; he drills the cribriform plate and trephines above the auditory meatus or over the occiput, in order to drain the anterior, middle, or posterior fossa, according to the indications present regarding the seat of injury.

Hæmorrhage from the middle meningeal artery, which may not show itself till after the lapse of some hours, must be promptly met by trephining over the anterior inferior angle of the parietal or behind the external ear. If the case comes under observation when the compression of the brain is first showing itself, Murphy advocates ligature of the external carotid artery, in order to avoid trephining. This will immediately control the internal maxillary, from which the middle meningeal vessel springs, and avoid the great difficulty of ligaturing the branches of the middle meningeal vessel in the cranium.

In cases of head injury caused by a fall or by a blow from a large heavy object the general brain contusion or laceration may cause a fatal collapse. Surgical measures are seldom indicated in these cases, but should the patient survive the initial concussion or shock, and compression or encephalitis supervene, trephining may be indicated for the evacuation of pus or clots, or for sinus injury.

For the condition known as Cerebral Irritation, liable to supervene when there has been severe contusion or laceration of the frontal region, there is nothing but prolonged rest of body and mind in a dully lighted room. The greatest difficulty sometimes will be found to be in the feeding. After large doses of Bromides the rubber tube may be tried, but this should be avoided when possible.

HEART, Atrophy of.

This is a natural sequence to wasting diseases of a chronic type, and the treatment of the primary affection when this is within the range of possibility is clearly the only resource left to the physician. The condition of atrophy characterised by pigmentary degeneration and known as brown atrophy is usually evidence of senile changes which are for the

most part beyond the reach of drugs. Rest is theoretically indicated in proportion to the dyspnœa and other urgent symptoms, but prolonged rest will eventually tend to hasten the degenerative process. The best routine will therefore be to prescribe a moderate degree of rest combined with general massage, and a diet as far as practicable free from farinaceous material, which should be replaced by a liberal amount of red meat, symptoms being treated as they arise.

The atrophy of the left ventricle which follows mitral stenosis does not call for active interference; the wasted muscle always responds when by skilful management the disturbed circulation is improved and natural hypertrophy of the auricle sets in, which increases the amount of blood sent into the wasted left ventricle.

HEART, Dilatation of.

This in the majority of instances is the result of failing compensation when hypertrophy has been gradually giving way to increase in the capacity of the chambers of the heart as nutrition fails. Its treatment, therefore, is identical with the management of the last stages of valvular disease.

Some cases, however, are characterised by a sudden onset with alarming symptoms of embarrassed circulation occurring in subjects whose valvular affection has been undetected, or has remained quiescent till some severe muscular exertion has demonstrated that the reserve force of the heart was unequal to meet the sudden demand made upon it. Such cases should be treated as instances of the following:

Heart Strain.—This is liable to follow prolonged muscular exertion in a patient during the convalescent stage after recovery from any serious wasting disease or fever, and is frequently met with after influenza and typhus fever, in which affections the muscular fibres of the ventricles are weakened by the action of the toxins of these diseases. Under the strain of some exertion, the muscle being unable to contract efficiently, blood accumulates in the ventricle and the condition of *acute* dilatation supervenes. This occurs in otherwise healthy individuals who, not being in training, undertake a muscular feat formerly accomplished with comparative ease, as a mountain climb or a long cycle run at the commencement of the spring season.

The indications for treatment are clear; absolute rest in the horizontal position is imperative in order to reduce the tax upon the ventricles to a minimum. In very acute cases with great pulmonary embarrassment the volume of the venous blood in the body calls for reduction which can only be promptly effected by freely opening a large vein in order to relieve the engorgement of the right side of the heart. In less urgent cases a strong saline purgative preceded by a dose of Blue Pill will effect the same result and deplete the portal system.

The careful exhibition of Cardiac Tonics is also clearly indicated both in the sudden dilatation occurring in healthy hearts (that is, if dilatation ever occurs in a perfectly healthy heart), and in those where old valvular

impediments have previously existed. Strychnine can alone be depended upon to meet requirements which are urgent, and to obtain its best results the drug must be administered hypodermically in a dose of $\frac{1}{20}$ to $\frac{1}{10}$ gr.

The following is a good routine combination of remedies for use when the most urgent symptoms have been relieved:

℞. *Tinct. Strophanthi* ℥iss.
Tinct. Nucis Vomicæ ℥vj.
Spt. Amm. Aromat. ℥j.
Aquæ Chloroformi ad ℥viij. *Misce.*

Ft. mist. *Cpt.* ℥ss. *ex aqua ter die.*

At a later stage Schott-Nauheim treatment by baths and resisted movements is invaluable.

HEART, Fatty and Fibroid Degeneration of.

The acute form of fatty degeneration which supervenes in typhus fever, pneumonia, diphtheria, influenza, acute rheumatism, and phosphorus poisoning as a rule calls for little special treatment save what is clearly indicated for the management of the primary affection. The degenerative change passes away in young subjects under prolonged rest, which latter is essential in order to prevent the occurrence of acute dilatation of the heart, so liable to occur on any exertion.

The present article deals with the treatment of the form of degeneration which supervenes in elderly subjects usually as part of a general senile arterial change, the type of which, though mainly fatty, is also nearly always more or less associated with the replacement of the muscular fibres by fibrous tissue. The term "cardio-sclerosis" defines this affection more correctly than the usual names of either fatty, fibroid or chronic myocarditis, since the degenerative process is of a compound or mixed nature.

This being also often the final result of or sequel to old and repeated rheumatic inflammation, the preventive treatment resolves itself into the judicious management of the valvular lesions which often accompany it. By judicious rest and dietetic treatment the stage of failing compensation may be long postponed and the tendency towards cicatricial and fatty degeneration minimised.

When the symptoms of cardiac degeneration have obviously manifested themselves, the probability is that the coronary arteries are already diseased and there is no hope of acting upon the altered muscular fibres, but life may be prolonged and the symptoms palliated by such measures as will increase the reserve force of the fibres which have still escaped attack. Everything which interferes with normal metabolism and all undue strain upon the weakened muscular tissue must be avoided.

The diet should be rich in nitrogenous material, starchy, fatty and saccharine materials being used sparingly. Alcohol, save when specially indicated for the relief of symptoms, and tobacco and strong tea or coffee should be avoided. Almost as important as the nature of the food is its quantity and the distribution of the meals. Whilst gluttony is to be forbidden, the number of the meals should be increased, at least four being administered at intervals of not more than four hours each in the day. In this way the late heavy dinner or supper is done away with and a short rest after each meal instituted. As much time as possible should be spent in the open air; walking upon the level is the ideal form of muscular exercise, rising ground being avoided when possible, and negotiated with slowness when unavoidable.

Many patients suffering from cardio-sclerosis succumb finally to some sudden and unguarded act of exertion, as in a brief rush to catch a train or keep an appointment. The ascent of steep stairs when unavoidable should be always made by placing both feet upon each step before the ascent of the next one is attempted, and when this habit becomes acquired such exercise becomes beneficial, as it is impossible for the patient to hasten or tax his heart much more than in level walking. Golf may be permitted in most cases.

Business pressure, worry, creative mental work and all emotional strain must be given up, the even, quiet, uneventful life suitable for the victims of angina pectoris being substituted for the previous busy existence.

Sleep is of vital importance, as insisted upon by Mackenzie, who recommends Bromides, when restlessness is present, and Chloral when the nights are disturbed by attacks of distressful breathing; Paraldehyde is, however, a drug always to be preferred to any other narcotic in cardiac degeneration when an hypnotic is indicated. A short walk immediately before lying down is the best of all sleep producers for patients who are still able to move about all day. Constipation should never be permitted; the bearing down associated with the passage of a constipated motion is not a trivial danger.

General massage is clearly indicated in patients whose embarrassed breathing prevents muscular exercise, and though Nauheim treatment may be valuable in the early stages, it is dangerous once the breathing becomes difficult. The excessive indulgence in douches, spongings, towelling and baths which the life of leisure tends to foster in invalids and which is often urged by the physician not infrequently does more harm than good. The hot and the Turkish bath should be forbidden, and the writer considers the cold plunge bath even more objectionable.

As cardiac dilatation, anginal symptoms or palpitation are liable to arise at any time, the patient should have a few Trinitrin tablets or Amyl capsules in his pocket, and the following carminative may be left in his hands for use in emergencies, or the mixture on p. 393 can be employed:

℞. *Tinct. Strophanthi* ℥j.
Tinct. Zingiber. Fort. ℥v.
Tinct. Belladonnæ ℥j.
Spt. Ammon. Aromat. ℥iij.
Spt. Ætheris Nitrosi ad ℥ij. *Misce.*

Ft. mist. *Cpt.* ℥j. *ex* ℥j. *aquæ dyspnœa urgente.*

Severe attacks of syncope or dyspnœa will require more active treatment; the patient should be immediately placed in the horizontal position, Ammonia or Nitrite of Amyl applied to the nostrils, and if unconsciousness has occurred a dash of water may be thrown upon the face.

Strychnine hypodermically is the only available cardiac stimulant in such cases, and it should be given in full doses ($\frac{1}{20}$ to $\frac{1}{10}$ gr.). Many physicians believe in $\frac{1}{100}$ gr. Atropine given in the same manner; both drugs may be given together. Where dyspnœa and cyanosis are prominent Oxygen inhalations may be employed.

Cardiac tonics have a very narrow range of usefulness in fatty degeneration; they possess no influence on the degenerated fibres, and digitalis, owing to its powerful action on the walls of the small vessels, may so increase the peripheral resistance as to rupture the left ventricle or cause a fatal dilatation of the chambers of the heart. It should, therefore, never be given in this condition unless in cases where valvular disease is also present with dropsy and much previous hypertrophic changes, and then its use must be carefully watched and corrected by vaso dilators. Strophanthus is less objectionable.

Strychnine, however, may always safely be given as a routine to assist the tone in the unaffected muscular fibres, and one of the best possible combinations is to give the drug with Iron and Quinine as in drachm-doses of Easton's Syrup. Short courses of Sodium Iodide appear to be the only method by which the degenerative process itself can be in any way checked or modified by drugs; its action is inscrutable, but its beneficial effects are unmistakable, especially in those cases of mixed fibroid and fatty degeneration which are associated with general arterial sclerosis and cardiac pain. Phosphorus and Arsenic are recommended, but since both these drugs will undoubtedly produce fatty degeneration of the cardiac muscular fibre when given for long periods or in full doses, it is therefore wiser to regard them as agents which may be productive of evil. Organic phosphorus and Glycerophosphates are less objectionable.

The treatment of the attacks of paroxysmal bradycardia (Stokes-Adams Syndrome) which are liable to occur in cardio-sclerosis owing to involvement of the *a-v* bundle causing *heart block* can only be carried out as for syncope. Digitalis is especially dangerous in this condition; Mackenzie has shown that it may bring about an attack of heart block.

Cheyne-Stokes respiration is not a rare phenomenon, and it may be

associated with heart block; it is believed to be due to exhaustion of the respiratory centre. Though many agents have been suggested and tried for the removal of this symptom, none have any specific action. Morphia should be given when the apnœic stage is causing great restlessness and air hunger; the combination of a small dose of Strychnine with the hypodermic dose of Morphia is advantageous from several points of view; a little relief may be obtained from Oxygen inhalation.

Fatty infiltration must be differentiated from fatty degeneration; its early recognition and treatment will prevent the accumulation of adipose tissue in such quantities as will cause pressure and subsequent degeneration of the muscular fibres. The treatment is that of the *obesity* of which it is but a local manifestation. A carefully regulated dietary, with Oertel's methods, open-air life, &c., and in some cases Thyroid feeding, should be prescribed (see under Obesity). At a later stage the general lines of treatment should follow those of fatty degeneration, care being always maintained that exercises should never be pushed to the extent of possibly causing acute dilatation of the heart.

HEART, Functional Affections of.

The departure from the normal cardiac action in hearts in which no organic lesion exists may show itself in the form of any of the following cardiac motor neuroses: Arrhythmia, Bradycardia or Tachycardia. The purely sensory neuroses are Pseudo-angina and Cardialgia and various degrees of sensation of oppression, hyperæsthesia and discomfort. The most common type of functional disturbance is Palpitation, in which neurosis both the motor and sensory mechanisms are disturbed.

The symptoms of each of the above abnormal conditions may be frequently due also to organic heart disease, and no step in their treatment can be considered as a safe one till the diagnosis is made clear by the exclusion of all structural lesions. Balfour lays stress upon the importance of observing the effect of exertion; if this does not increase the palpitation or other disturbance the case may safely be regarded as a functional one, and the calm assurance of this decision goes a long way in the successful treatment of the neurosis.

The treatment of *arrhythmia*, which term includes all functional forms of irregularity of rhythm and intermittence, consists mainly if not entirely of the removal of the primary exciting cause. This may be tobacco, excessive tea-drinking, sexual excesses, the unskilful administration of drugs like aconite and digitalis, emotional activity, dyspepsia, &c. Rest is not usually necessary in the absence of organic disease, but the disturbances of rhythm which occur in neurasthenia and after toxic doses of digitalis and aconite, and following influenza demand absolute rest till after all symptoms of cardiac weakness have disappeared. When of long standing or if due to individual peculiarity, intermittence may be left untreated by drugs. Where the arrhythmia or intermittence appears to be part of a general neurosis, as in young hysterical or neurasthenic patients, the underlying neurotic condition will require treatment,

and in some cases a Weir Mitchell course may be indicated. The arrhythmia which characterises the *irritable heart* of *young persons* is always accompanied by palpitation and yields to rest.

The condition of the digestive tract should be investigated, and any tendency towards the accumulation of flatus corrected by a suitable diet in which the amount of carbohydrates will require to be diminished. Constipation must be avoided; by keeping the bowels regular and the liver unloaded intestinal flatus may be reduced. Carminatives such as a dose of Ol. Menthæ Pip., Ginger or Sal Volatile occasionally are beneficial (see the formula on p. 393).

Heart tonics are only indicated when any symptoms of cardiac asthenia are present, and the dose of these should always be a small one. Strychnine in every case save in markedly hysterical patients is beneficial, and the best routine combination is 30 to 60 mins. of Easton's syrup, which may be conveniently administered in the tabloid form in combination with $\frac{1}{8}$ gr. Ext. of Strophanthus.

Bradycardia.—When abnormal slowness of the pulse is not due to individual idiosyncrasy, it is usually either the result of toxic influences or organic heart disease of the degenerative type. The treatment will consist in the removal of the cause, and as discussed in the article on Bradycardia, the main reliance is to be placed upon eliminatory measures employed with the view of hastening the excretion of the poison from the blood. Strictly speaking, bradycardia is seldom if ever of the nature of a true cardiac neurosis, the slowing of the pulse being nearly always the direct result of the depressing action of some toxin produced in the body, as in gout, uræmia, jaundice, and diphtheria, or of a poison like tobacco, muscarine, lead, digitalis, &c., which irritates the vagus or depresses the accelerators of the heart. When due to organic disease of the heart more or less arrhythmia is present, or the affection recognised as paroxysmal bradycardia or Stokes-Adams syndrome demonstrates itself, which condition must be treated on the same lines as syncope, by absolute rest in the horizontal position.

Tachycardia.—Mackenzie regards all cases of rapid heart in which the normal rhythm is maintained as examples of palpitation, and restricts the term "paroxysmal tachycardia" to those due to nodal rhythm, in which condition the ventricle starts the contraction, the auricle contracting during the ventricular systole. The pathology of this neurosis is not, however, fully understood, hence it would be idle to state that the cause should be sought out and removed, but owing to the general resemblance between the quick pulse of Graves's disease and that of the ordinary paroxysmal tachycardia, the suspicion is justified that some toxin (probably manufactured in the body is the causal agent. This view, if accepted, gives an indication for treatment which should in the first place be directed to keeping the gastric and intestinal tracts in the healthiest possible condition. Laxatives or occasional purgatives and a wisely selected dietary are undoubtedly valuable preventives of an attack.

As in a migrainous subject any strong mental emotion or worry may precipitate a severe attack of cephalalgia, so in the tachycardiac neurosis a mental effort of unusual severity may be followed by a severe paroxysm of rapid heart, and the writer has witnessed this result most frequently in subjects who have submitted themselves to severe restraint during acute annoyances. In the same manner the constantly rapid heart of chronic alcoholism may be induced to become paroxysmally intensified by emotional disturbances. Every subject liable to attacks of tachycardia which are believed to arise independent of organic disease should endeavour to avoid all mental or emotional disturbances. His occupation, if it necessarily exposes him to such, should be changed, and he should endeavour to lead the quiet life sketched under the heading of Angina Pectoris.

During the attack, rest in the horizontal position is clearly indicated; the administration of heart tonics in order to slow the pulse is futile. Many devices have been followed by patients who have discovered for themselves some means of calming the heart's action, such as compression of the chest, powerfully exercised by the pressure of the arms, compression of the abdomen, holding the breath after a deep inspiration, cold douching of the thoracic surface, &c.

A powerful carminative is useful, as a teaspoonful of Essence of Ginger or 5 to 10 mins. Ol. Menthæ Pip.; the writer has never seen alcohol do any good. The best routine is a full dose of Bromide of Sodium (45 grs.), repeated in 2 or 3 hours should the attack not have passed away. This is the best routine preventive treatment when the attacks show a tendency to return at short intervals; some patients appear to be almost immune whilst under the influence of the bromide.

Where there appears to be undue peripheral resistance 1 min. Nitroglycerin solution may be tried every 15 to 30 minutes, or Amyl Nitrite may be inhaled. Sansom treated all cases of tachycardia by the continuous current applied with one pole over the sterno-mastoid muscle and the other over the heart, and the writer has obtained excellent results from this agent by employing the current from 5 to 10 Leclanché elements for 15 minutes morning and evening.

Palpitation.—Using this term as including those cases of functional heart affection in which the patient is sensible of the increased rapidity of the cardiac action with more or less pain, discomfort or oppression, the cause should, if possible, be found out, and, if possible, removed. Dyspepsia is a common cause; the accumulated flatus pressing upon the diaphragm sets up a rapid action of the heart, but how far the production of some toxic substance operating on the nervous mechanism is also a factor becomes a difficult problem. The same remark applies to intestinal dyspepsia still more forcibly. Carminatives are often most valuable, the expulsion of gastric flatus usually being followed by considerable or total relief. A combination of antispasmodics like the following may be tried:

℞. *Tinct. Zingiber. Fort.* ℥iv.
Olei Menthæ Pip. ℥j.
Æther. Sulphuric. ℥ij.
Spirit. Camphoræ ℥iij.
Tinct. Card. Co. ad ℥iij. *Misce.*

Ft. mistura. Cpt. ℥j. *ex* ℥j. *aquæ omni semihora.*

In very severe attacks an emetic may be necessary in order to speedily empty the stomach of its toxic contents.

A whiff of Chloroform acts very rapidly, but this agent should never be resorted to unless in severe emergencies and when the physician is certain that the palpitation is not due to organic cardiac disease, in which condition it must be regarded as evidence of serious weakness of the muscular walls struggling against some suddenly increased peripheral resistance. If the suspicion of this latter condition exists, Nitrite of Amyl or Nitroglycerin may be tried, but sedatives or cardiac depressants like aconite, veratrum viride and chloral must be avoided, though a hypodermic dose of Morphia may be administered in conjunction with Alcohol by the mouth.

Attacks of palpitation, the result of the abuse of tobacco, tea, alcohol and coffee, soon cease to reappear after stopping the exciting cause; the same is true of the seizures following sexual excesses and emotional disturbances.

Severe attacks of palpitation may be caused by wind-sucking, as described under Dyspepsia. As soon as the physician convinces such a patient of the mechanical cause of his flatulence the flatulence and palpitation usually disappear rapidly and completely.

As the tumultuous action of the heart in all cases of palpitation becomes much intensified by the dread of the patient, the calm assurance by the physician of the absence of any danger often acts more promptly than any other remedial agent.

In the intervals between the attacks, as in all other forms of cardiac neurosis, the treatment must be directed to the alimentary canal and to the general hygiene. Diet must be so regulated as to prevent gastric disturbances upon the lines laid down under Dyspepsia, not only as regards the nature and amount of food, but also due attention must be paid to the regularity of the times of meals, mastication and the necessary after-rest. Constipation is to be prevented and an occasional purgative administered. Exercise and mental work must be fairly proportioned; all worry, brain-fag, emotional and sexual excitement should be guarded against and a life free from high pressure maintained.

Of drugs, the less these are employed the better: much discrimination should be exercised regarding cardiac tonics. Small doses of Digitalis or Strophanthus are often most valuable in steadying the action of the heart and improving its tone, but the amounts of these drugs necessary in the failing compensation of valvular disease generally do harm in

purely functional affections. The best routine is a combination of Digitalis, Strychnine and Bromides or Iodides, as in the following:

℞. *Strychninæ Hydrobrom.* *gr.* j.
Acid. Hydrobromic. Dil. ℥ij.
Tinct. Digitalis ʒij.
Tinct. Belladonnæ ʒij.
Infus. Aurantii ad ʒviij. *Misce.*

Fiat mistura. *Capiat* ʒij. *bis in die ex aqua.*

Strychnine should be avoided in the palpitation of hysterical subjects, and the necessary moral and educational methods carried out. Weir Mitchell and isolation treatment may be necessary in aggravated instances where the underlying neurosis continues to act as a disturbing factor in the cardiac mechanism.

The treatment of the *sensory* cardiac neuroses, including Pseudo-angina, is to be carried out on the same lines as those indicated for palpitation. Cardialgia may be further relieved by local sedatives, the best of which is a Belladonna Plaster worn over the cardiac region. Immediate relief may sometimes be obtained during the attack by applying a large sinapism. Where this fails, blistering a small area near to the apex or in the aortic region may prove useful, especially in hysterical subjects. Iodide of Sodium in 10-gr. doses combined with double this amount of Bromide is often a most valuable agent in subduing cardiac pain, both of functional and organic origin.

Soldier's Heart.—The strain of the late war has shown itself in the large number of soldiers incapacitated by cardiac distress of various types. When the victims of old valvular lesions are excluded from the list there remains a large group of cases labelled "Soldier's Heart." There is a difficulty in deciding whether these should be considered as purely functional—due to psychic causes—or whether they should be regarded as the result of a breakdown in the nutrition of the cardiac muscle such as shows itself in the mild acute dilatation caused by severe exercise in untrained youths. Either factor or both may be present in any given case.

The principles of treatment are clear: the patient should be removed as far as possible from the front, and should have absolute rest in bed for a few weeks in a ward where no severely wounded soldiers are being treated. Restlessness and insomnia should be relieved by Bromides, but cardiac tonics as digitalis are worse than useless, and Strychnine should be withheld unless there be evidence of myocardial breakdown.

As soon as possible a system of Graduated Exercises should be instituted and kept up as long as the condition of the pulse shows no evidence of cardiac weakness. All military medical authorities agree that psychotherapy is of vital importance; the calm assurance that complete recovery is a certainty if the graduated exercises be continued is a powerful factor in restoration to health.

HEART, Hypertrophy of.

The intrinsic hypertrophy of the heart caused by valvular disease or adherent pericardium is a natural conservative process, and should not be interfered with. When the causes which lead to cardiac enlargement are extrinsic and removable the indications for treatment are obvious. The cause should be removed if possible or its effect upon the heart minimised by judicious treatment. In cirrhotic kidney, for example, much may be done by a careful attention to dieting and to the functions of the skin and bowels, whereby the toxic products retained in the blood may be lessened by vicarious elimination. It is doubtful if any permanent good can be expected from attempts to reduce the general blood-pressure by the continuous employment of vaso-dilator drugs. Unquestionably the use of these agents is most valuable for the relief of attacks of distress which are caused by some suddenly increased tension such as is due to mental strain, emotion, excessive muscular action, chills, constipation, &c., which are liable from time to time to arise in patients suffering from cardiac hypertrophy the result of continuous high blood-pressure. In such cases Belladonna in small doses is recommended, but the writer has never seen much benefit from it.

When the hypertrophy is the direct result of such pulmonary embarrassment as exists in emphysema, fibroid phthisis, &c., the treatment of secondary bronchitis or attacks of asthma by suitable measures is clearly indicated to prevent all undue demands upon the heart's action.

Hypertrophy caused by excessive muscular strain, whether the result of athletic exercises or laborious occupation, will gradually yield to moderate rest and a change in the individual's habits. The same result may be expected when the cardiac enlargement is due to Graves's disease or to increased peripheral resistance caused by the contamination of the blood by poisons like lead, tobacco, or gout as soon as the cause has been removed.

Though the treatment of hypertrophy as a symptom or sign by itself is unscientific and irrational, a further word may be said about the obvious error of prescribing cardiac sedatives like aconite, tartar emetic, &c., in compensatory hypertrophy when the cardiac action becomes tumultuous, irregular or painful. These symptoms should be regarded as evidence of threatening failure and not as proof of unnecessary force of ventricular contraction, and must be met by prompt rest and the judicious administration of heart tonics. In such cases Iodides are more clearly indicated than large doses of digitalis, as the systemic pressure is already high, and Strychnine with Strophanthus in moderate amount may be safely combined with them.

HEART, Inflammatory Affections of.

The treatment of the acute diseases of inflammatory nature (Carditis) which involve the cardiac muscle, the endocardium and the pericardium will be found under their appropriate headings—Endocarditis and Pericarditis. In the article on Rheumatism the management of these

complications will be also incidentally dealt with, and the sequelæ which result from acute inflammation involving the delicate covering of the heart valves are discussed in the article on valvular diseases.

HEART, Syphilis of.

This may show itself as change in the muscular fibres starting round the small bloodvessels during the secondary stage, or as an aortitis in the very late stages of the disease, and sometimes accompanied by involvement of the valves. The treatment must be that of the primary disease in conjunction with rest, and the measures discussed in the article following. Salvarsan is advocated even in the types of the affection appearing in the post-tertiary stage, though spirochætes have seldom been found in the aortic walls. Mercury and Iodides are clearly indicated in all cases in conjunction with occasional injections of salvarsan.

HEART, Valvular Diseases of.

Though these lesions are permanent, nevertheless the physician who possesses a sound knowledge of the dynamics of the circulation and of the pharmacological action of digitalis can approach the treatment of these grave affections with confidence that life may often be prolonged with comfort for years, even in patients whose urgent symptoms when first coming under observation only give promise of a short career of suffering.

Exclusive of the degenerative type of aortic disease, the valvular deformity may be regarded as generally the result of an endocarditis which has arisen during an attack of acute rheumatism. Under Endocarditis the vital importance of *preventive* treatment has been already emphasised. Probably in every case of acute rheumatism some degree of endocardial mischief is always present, but only a comparatively small proportion of the sufferers develop signs of permanent valvular mischief. The majority of these are found in patients who have resumed active movement or returned to their ordinary avocation as soon as the arthritic symptoms of the disease have passed away. The value of prolonged and complete rest is now appreciated by every physician as the only reliable method of preventing the supervention of permanent valvular deformity. During this rest treatment there are very good reasons for believing that Iodides assist materially in the absorption of proliferation caused by the inflammatory action in the delicate reticulum of the endocardial membrane reflected over the cardiac valves.

It is unnecessary to dwell upon the importance of other obvious precautions necessary to maintain a condition of ideal health whilst the convalescing patient is gradually recovering from the effects of the endocardial inflammation. Dietetic and eliminatory measures, with abundance of fresh air and freedom from all mental worry or intellectual strain and of every factor liable to unduly raise the general blood-pressure, must be considered. These precautions are even more necessary in cases where the injury to the valve structure has been already so severe

as to offer a mechanical obstruction to the circulation, in which case they will materially assist nature in establishing the compensatory hypertrophy whereby the circulatory balance must be effected.

Seldom are cardiac tonics like digitalis indicated at this early stage; their routine administration is fraught with danger; by increasing blood-pressure they are very liable to cause strain upon the recently damaged valves. Should there be evidence of diminished tone in the cardiac muscle there is little objection to moderate doses of Strychnine combined with Iodides. A prolonged rest cure in these severe cases of valvular damage will not interfere with the rapidity with which compensation will become established; it probably hastens the process. This is proved by the amelioration of all the symptoms of cardiac pain, breathlessness and palpitation which sometimes supervene suddenly after a first severe attack of acute rheumatism in a patient who has resumed active exercises soon after his supposed recovery, rest in bed rapidly hastening compensatory changes.

Long-standing valvular disease may first come under the notice of the physician whilst making a routine examination of a patient suffering from some other independent affection. The detection of an organic murmur with signs of hypertrophy of the walls of the heart is no indication for administering cardiac tonics or for prescribing prolonged rest. The situation is one, however, requiring tact and sound judgment on the part of the physician as bearing upon the advice to be given to such a patient when the absence of all symptoms of failing compensation prove that nature has adjusted the balance perfectly. The question at once arises, Should the individual be informed of his condition? The answer must depend upon the knowledge which the physician possesses of the individual characteristics of the patient and of his own power of allaying any alarm which the revelation may create. Some neurotic and timid individuals may receive such knowledge if imparted abruptly as a death warrant, their future life being haunted by the presence of an imminent danger which is certain to react injuriously upon the state of compensation. As a rule, the calm assurance by the physician of the absence of any immediate danger meets the first requirement of the situation. The nature of the case may be explained fully, and general directions laid down for the regulation of the patient's life, habits, occupation, diet, exercise and general hygiene, exactly as these should be sketched out to every patient after recovery from an attack of severe rheumatic endocarditis in which the valves have been implicated. He should be informed that moderation in all things is essential to a prolonged career under such circumstances. Excess in alcohol and tobacco, sexual excitement, severe business high pressure, mental overstrain and worry, and prolonged severe muscular exertion should be avoided. A fair amount of muscular exercise is not only unobjectionable, but it is really essential, in order to keep the cardiac muscle in a healthy condition. The physician is more liable to err in limiting than in encouraging the necessary amount of exercise. Walking may safely be indulged in to

any reasonable extent, especially upon level ground. Even mild gymnastic exercises are productive of good under ordinary restrictions. Short spurts of running, rowing, swimming, lifting heavy weights and violent quick movements which tax the reserve force of the heart severely must be avoided, since this reserve force, in perfect compensation, though sufficient to meet all ordinary requirements, is nevertheless always below the normal standard for such severe and sudden demands.

All measures likely to maintain a high standard of health should be advised, and a good liberal mixed diet prescribed, such as experience has proved to the patient to be most acceptable and sustaining. The writing out of a diet table for the subject of a valvular lesion in which compensation has taken place is a mistake. As far as possible the patient should be guided by his own instincts and experience in eating, avoiding much tea and indigestible substances likely to induce dyspeptic troubles.

Symptoms of failure in the cardiac muscular power must be carefully watched for; these are palpitation, cardialgia, breathlessness or cough on exertion and slight œdema of the ankles.

Rest.—The presence of the above symptoms is an imperative indication for absolute rest in the horizontal position in bed. This first step in the treatment of failing compensation is, in the great majority of cases when taken early, sufficient to dispel all discomfort, as the heart is usually enabled by the change of position alone to perform its functions without obvious embarrassment. Rest of mind is equally important; worry always increases the cardiac irritability and robs the ventricles of their repose by quickening the pulse-rate.

Diet.—The patient during the period of enforced bodily and mental repose obviously cannot be permitted to indulge in the same dietary as if he were actively moving about, hence some restrictions are necessary, but the diet should be as highly nutritious and nourishing as possible. Liquid foods as concentrated meat extracts, strong beef soups and milk are admissible in such quantities as can be negotiated by his digestive organs. As more or less passive congestion of his gastric mucosa and liver is probably present, solids and farinaceous material must at first be restricted, the chief place being given to easily digested liquid proteids with slight amount of fats. After a few days, fish, chicken and game may be freely permitted, and as the patient ultimately begins to move about he should gradually return to his ordinary diet, which, as before stated, is better not to be a stereotyped one, the chief point not being lost sight of—*i.e.*, that farinaceous materials should be as a rule restricted and a rich nitrogenous regimen freely permitted. Cases of acute failure of compensation may require rectal feeding as the gastric functions are always more or less disturbed, and this affords a good reason for never placing these patients upon a cut-and-dry written-out diet table, which invariably tends to aggravate the dyspepsia. In order to give the congested stomach rest Leube's nutrient enema may be resorted to for several days. This is readily prepared by beating up in a mortar 1½ oz.

minced muscular fibre with ½ oz. chopped pancreas freed from fat, adding enough tepid water to make the mixture of the consistence of thin cream; this amount may be injected every six hours. Sansom successfully employed an enema consisting of 1 oz. Cod-Liver Oil shaken up in a bottle with 2 oz. warmed milk. 5 oz. of a mixture of thick oatmeal gruel and warm milk may be fully peptonised by the addition of 1 dr. liquor pancreaticus and a pinch of bicarbonate of soda, and injected every 4 to 6 hours. Where there is any rectal irritability nutrient suppositories may be employed to supplement the stomach feeding. In no case should feeding by the stomach be given up entirely during the rectal alimentation unless in the presence of continual vomiting.

A dry diet has been advocated, especially in mitral stenosis, and it was an important part of the Oertel treatment for failing compensation when combined with mountain climbing. Mackenzie emphasises the importance of oral digestion in failing heart power; he states that the guiding principle should be the selection of tempting food which requires mastication, with little fluid, and that chiefly milk given in small quantity and at fairly frequent intervals, the kind of food being that which the patient likes as long as it does not disagree with him. He warns the physician not to prescribe a dietary suitable to himself and to bear in mind that what disagrees with him may agree with his patient. The quantity of food which the patient can chew is often a good guide to the amount required, and he enters a protest against the pouring in of beef tea and other easily eliminated fluids, and against predigested foods.

The Karell milk cure has its advocates. This begins with ½ to 1 pint of skimmed milk swallowed slowly in small amounts during the 24 hours, and gradually increased till large quantities are taken. Potter adds cream and lactose to unskimmed milk, and after a short time adds well boiled oatmeal without salt.

Sleep.—Mackenzie's dictum must be regarded as a truism: "If the patient does not get sufficient sleep he will never get well." When sleep does not follow upon the removal of body discomfort and the cessation of all mental activity or worry, hypnotics must be resorted to. Under Insomnia the relative merits of these agents will be discussed; the writer considers that in the condition under present consideration the safest sleep producer is Alcohol in one fairly large dose at bed-time. Unfortunately in those accustomed to its daily use it soon loses its hypnotic power. Next in value and the safest of all the hypnotics is Paraldehyde in 60 to 90 min. doses with a little alcohol. Opium is mainly objectionable from its influence upon the stomach and bowels, and constipation in every form of cardiac weakness is a complication to be avoided.

Drugs.—Digitalis stands easily first in the long list of drugs employed in the treatment of failing compensation, and its administration should be commenced as soon as the first symptoms of cardiac failure have sent the patient to bed. It is a common experience that the drug often fails to act beneficially till the horizontal position is maintained, hence the difficulty in appraising the virtues of the different factors in the treatment,

and the question at once arises in the mind of the reflective observer how much of the beneficial result is due to rest and how much to the action of the drug? Probably in mild cases the influence of rest is the more important factor in the beneficial result, but there cannot be a doubt about the almost magical effect of the action of the drug in the failing compensation of old rheumatic hearts in which signs of dilatation have already appeared.

Mackenzie, whose clinical researches on the action of the drug have cleared up several difficult problems in connection with its physiological and therapeutic action, has demonstrated that the best results are only to be expected when obvious dilatation of the ventricles is present. This is in harmony with the experience of every physician who has been disappointed with its failure in the treatment of mitral stenosis, in which condition the left ventricle is not only not dilated but often atrophied.

The old view that the primary indication for the exhibition of digitalis was *irregularity of the pulse* has received remarkable confirmation from the researches just referred to; thus Mackenzie has shown that the continuous irregularity characteristic of the failing compensation of old rheumatic valvular disease is due to nodal rhythm, the ventricular contraction preceding or synchronising with the auricular instead of succeeding it. In these cases the heart's contraction originates at the auriculo-ventricular node, and the jugular pulse is always of the ventricular type, and for the relief of this form of irregularity digitalis is a *specific*. There is a consensus of opinion amongst all authorities that digitalis is the one drug suitable in all cases of *auricular fibrillation;* under its administration the number of extra beats heard over the apex is rapidly diminished, and made to correspond with the number felt at the wrist. When the symptoms of auricular fibrillation are acute, there is not time for the action of digitalis, and Hay recommends in such an urgency the intravenous injection of 1 mgm. of Strophanthin.

Difference of opinion still exists regarding the best preparation of digitalis and the proper dose of the drug. The writer does not hesitate to always employ the B.P. *Tincture;* but Nativelle's granules of Crystallised Digitaline are very reliable. 7½ mins. tincture 3 or 4 times a day answer most of the requirements in failing heart from valvular lesion; when extensive dropsy is present this dose may safely be doubled. The continuously irregular heart slows steadily under its action, and coupled beats become clearly marked in the tracing taken from the jugular vein; when these appear the dose should be lessened. With the slowing of the pulse, the area of cardiac dulness diminishes, the edge of the enlarged liver ascends in the abdomen till it may no longer be palpated, and the anasarca yields. These results, however, are only obtainable in old rheumatic hearts, and are not to be expected in the nodal rhythm occurring in the failing compensation following the degenerative type as in arterio-sclerosis. When digitalis is prescribed for a patient with regular pulse, should the latter become irregular this is owing to a degree of heart block being induced.

The cardinal indications, therefore, for the administration of digitalis in valvular disease are irregularity of the pulse and dilatation of the previously hypertrophied heart with loss of tonicity. In carefully selected cases the results are little short of the miraculous, and as the action of the drug can be maintained for several months the patient may be thus kept alive in comfort till compensation has been entirely restored.

The risks of accumulation supervening during a course of digitalis treatment are much exaggerated; nevertheless precautions should always be exercised when the drug is being administered in full doses. The total amount of urine secreted during the 24 hours should be measured, and as soon as any marked diminution in this occurs the drug must be withheld or the dose considerably lessened, and the patient warned to strictly maintain the horizontal posture in bed.

Anæmia being a common accompaniment of chronic valvular disease Iron is often indicated, and the incompatibility may be overcome by the addition of Phosphoric Acid as in the accompanying formula—

℞ *Tinct. Digitalis* ℥iij.
Tinct. Ferri Perchlor. ℥iij.
Acid. Phosph. Dil. ℥ij.
Aquæ Chlorof. ad ℥viij. *Misce.*

Fiat mistura. Sumat ℥ij. *ex* ℥ij. *aquæ quater in die post cibos.*

Digitalis acts in a somewhat different manner according to the site of the valvular lesion; its best effects are witnessed in *mitral regurgitation*, where by lengthening the diastole it gives a longer period for the ventricle's repose, during which time the muscular fibres are being supplied by their natural nourishment through the blood-stream. By increasing the tonicity and contractibility of the muscle the size of the mitral orifice is diminished (as loss of tonicity causes the ring of muscular substance which supports the valve to dilate during diastole), the ventricle is more perfectly emptied during systole, and thus dilatation of its cavity is minimised. By its similar tonic action upon the right ventricle, it enables it to overcome the increased resistance to the pulmonary circulation, and lung congestion disappears. The increased ventricular power thus gained, together with its tonic effect upon the vessels, reduces the pressure in the venous system, and dissipates the general congestion of organs and dropsy. The arterial pressure rises, and the pulse slows whilst it gains in force and regularity, though it has been demonstrated that, contrary to the generally accepted view, all the beneficial action of the drug is usually obtained without any marked increase in the general blood-pressure.

In *mitral obstruction* digitalis is often most disappointing; this is what should be expected from a study of the action of the drug and of the pathology of the lesion. In mitral stenosis the amount of muscular

substance in the auricle being small dilatation always predominates over hypertrophy, and when compensation breaks down there is but a small amount of muscle for the digitalis to act upon. By lengthening diastole, however, it sometimes occurs that a fuller supply of blood is sent into the ventricle through the narrowed slit, and by increasing the tone and contractile power of the right ventricle when the secondary hypertrophy of this chamber has commenced to fail it may also effect much. The small amount of work required of the left ventricle in this disease leads to its wasting, and hence when the final breakdown occurs digitalis has little power in increasing the force of this chamber. Moreover, for some reason not clearly known digitalis very frequently cannot be tolerated in uncomplicated mitral stenosis; the writer suspects that the explanation of this may be that the progressive cicatricial change in the valve has already directly invaded the auriculo-ventricular bundle.

Aortic obstruction seldom calls for treatment unless when complicated with regurgitation, as in all other valvular lesions digitalis should never be given till symptoms of failing compensation begin to show themselves, but more mischief results from its premature administration in aortic disease than in mitral affections. In aortic obstruction the presence of some passing emotional strain may set up violent palpitation because of the enormous hypertrophy, and such symptoms if mistaken for those of heart failure and treated by digitalis are gravely increased. (Aconite or cardiac sedatives are then indicated in small doses.) Whilst in the failing compensation of mitral regurgitation digitalis may be safely given even long after compensation has been perfectly restored, the case is different in aortic obstruction; the drug should be given only whilst the cardiac failure is obvious, since owing to the great mass of muscle in the hypertrophied left ventricle there is danger of rupture of peripheral vessels should the ventricle be pushed by full doses of digitalis to put forth all its power.

In simple aortic regurgitation it is commonly held that digitalis may do serious mischief by prolonging the diastolic period, since during the pause the arterial system is open at both ends, the blood flowing onwards into the vessels and backwards through the imperfectly closed semilunar valves. There is, therefore, a great liability to syncope, and when the patient is under the full action of the drug he should maintain the horizontal position and use a urinal in bed.

Digitalis is unquestionably liable to do harm in this condition if given before any symptoms of heart failure manifest themselves, but in advanced cases, when the mitral valve is no longer able to bridge over the orifice of the greatly enlarged ventricle, relative insufficiency of this valve occurs and digitalis may be cautiously administered. Aortic regurgitation complicated with mitral valve disease likewise calls for treatment by digitalis as soon as symptoms of heart failure show themselves.

The value of digitalis in increasing the *tone* of the left ventricle is insisted upon by Allbutt independent of its power of increasing the *contractility*. The tonicity of the muscle is the effective safeguard against

dilatation—*i.e.*, the power or virtue by which it preserves the mean diameter of its cavity—hence in aortic regurgitation, where the left ventricle is too capacious and its apex beat diffuse, provided the muscle is sound, digitalis will be very valuable. He gives one dose of the tincture (10 mins.) every second day, and watches the effect on the flow of urine and the rate and rhythm of the pulse. If no harm results he continues the drug, but he thinks it never is indicated in this condition if the pulse keeps under 75. Later, when the right side of the heart becomes secondarily involved, the drug is always beneficial.

Though Seymour Taylor still insists that no case of aortic regurgitation should ever be treated by digitalis, Fürbringer states he does not know of a single anatomical contra-indication to the use of the drug.

The cardiac tonics which have been of late years employed as substitutes or aids to Digitalis are—Strophanthus, Strychnine, Caffeine, Casca, Convallaria, Adonis Vernalis, Squill, Sparteine, Chloride of Barium, Senega and Cactus or Cereus Grandiflorus. As regards the value of these drugs compared with that of digitalis there is still difference of opinion. Mackenzie states that as regards strophanthus and squill he always found that when digitalis failed to act they always also failed, and that this conclusion was in striking agreement with the experience of his patients.

One may safely say that given a case of failing compensation from valvular disease of rheumatic origin the first cardiac tonic to be selected should invariably be digitalis. The serious and pressing nature of the malady does not justify one in experimenting with the different members of the cardiac tonic group whose actions have not been worked out either in the laboratory or at the bedside as fully as has been done with digitalis.

The action of strophanthus, however, has been very fully investigated by Fraser, who has shown that its diuretic action is not so effective as that of digitalis because it influences the cardiac muscle more powerfully and does not contract the peripheral vessels to the same extent, the rise in arterial pressure being mainly due to its cardiac effects. He has shown that strophanthin in minimum lethal doses increases the strength and the duration of the systole and produces ultimate systolic standstill, the contraction passing into *rigor mortis*, but he points out that this increased duration of contraction, with lessening of the dilatation and capacity of the chambers, is not the action likely to be serviceable in weak conditions of the organ or in the existence of disabling lesions. By giving smaller doses he demonstrated *great* prolongation of the diastolic pause, though the interrupting systolic contractions were strong, and completely emptied the ventricles of their large accumulation of blood.

Strophanthus possesses the advantage over digitalis that it has little, if any, cumulative action; but it sometimes causes gastric and intestinal disturbances. It can, however, be given to great advantage in the intervals during which digitalis is suspended, and the writer finds it an excellent plan to give digitalis for two months, and after three days'

pause to give strophanthus in smaller doses, combined with Easton's Syrup for one month, when the digitalis may be again commenced. There appears to be no justification for the haphazard combination of both drugs administered at the same time as practised by some physicians.

The practitioner should remember that the present B.P. tincture is *three times the strength of the former one, the maximum dose being only* 5 *mins.*

Caffeine has little to commend itself in cardiac failure, except that its diuretic action is sometimes more prompt than that of digitalis. When the evening or night dose is omitted there is little risk of insomnia, and it can be advantageously combined with digitalis or strophanthus. D.-Beaumetz pointed out that it is given in doses which are of little value, and he insisted that with the daily dose of half a drachm marvellous effects may be procured.

Convallaria may be regarded as a weak digitalis preparation, and like strophanthus may be given in mitral stenosis when digitalis is badly borne.

Sparteine is unreliable as a cardiac tonic, but its prompt diuretic action is often of value in extensive dropsy from mitral regurgitation, since 1 gr. of the sulphate may be given hypodermically and can be readily combined with strychnine.

Barium Chloride has fallen into disuse, but a sojourn at Llangammarch during the convalescent stage of cardiac compensation is recommended by some authorities; this spa contains $\frac{3}{4}$ gr. in each pint—the dose of the chloride should not exceed $\frac{1}{4}$ gr.

Cactina enjoys a very doubtful reputation, many observers denying it any cardiac tonic action whatever, but the pellets prepared from *C. mexicana*, containing $\frac{1}{50}$ gr., are apparently of some value.

Squill undoubtedly is a powerful cardiac tonic, but owing to its irritating action upon the stomach it is seldom employed alone. Its proper place in the therapeutics of heart failure is in combination with digitalis and mercury, as in Baly's or Guy's Pill, so effective in dropsy.

Strychnine is a drug of undoubted value; it may be placed next to digitalis because of its wide range of usefulness and of the rapidity of its action, though so high an authority as Mackenzie states that he carefully has sought for its special effect upon the heart and found none; the evidence, he says, is "all clinical, and the evidence that can show a drug to possess the property of exciting the sluggish and of soothing the excited, of raising the low pressure and relieving the high speaks more for increasing faith in the drug than for the beneficial properties of the drug itself." Undoubtedly too much is claimed for strychnine, but there can hardly be a doubt about its value if properly administered.

Discrepancies in the clinical reports upon the results of strychnine in heart failure are probably to be explained by the fact that it seems to be of very little value when given by the mouth in a mixture or pill. Patients receiving this latter treatment may often be found to remain without improvement for days when one hypodermic dose will change

the whole clinical aspect of the case. Where it is not practicable for the visiting physician to administer the drug twice a day by the skin the patient may resort to the sublingual method; an ordinary $\frac{1}{15}$-gr. hypodermic tablet when placed beside the frenum, below the tongue and behind the incisor teeth, is rapidly absorbed, and acts almost as well as if given by the needle, and it may be repeated every 8 hours. In every case of urgent heart failure $\frac{1}{10}$ gr. should be given hypodermically before waiting for the comparatively slow action of digitalis, and both drugs may safely be administered together by the mouth. Strychnine is probably valueless when given by either route in the ordinary doses of $\frac{1}{30}$ to $\frac{1}{32}$ gr., though the heart of a patient who is already swallowing the drug in small doses seems to respond more promptly to a full hypodermic dose.

One other drug may be mentioned which is not usually placed on the list of cardiac tonics—this is Iodide of Sodium or Potassium. Laboratory methods have as yet given no clear explanation of its soothing and strengthening action upon a failing irritable heart, especially when this is secondary to aortic valve disease. Moreover, the drug relieves cardiac pain in a remarkable manner.

The influence of Mercurials in chronic valvular lesions also cannot be demonstrated by laboratory methods, but clinical experience proves that a short course, even when dropsy is absent, often produces strikingly good results.

It may safely be said that the great majority of all cases of failing compensation require no drugs except Digitalis, Strychnine and Iodides, with an occasional dose of Mercury and a short course from time to time of Iron; the following is a good routine combination:

℞. *Tinct. Digitalis* ℥iv.
Tinct. Nuc. Vom. ℥vj.
Spt. Ammon. Arom. ℥iss.
Aquæ Chloroformi ad ℥xij. *Misce.*

Ft. mist. *Cpt.* ℥ss. *ex* ℥j. *aquæ ter die p.p.a.*

No mention is here made of ether, alcohol, ammonia, &c., which are often classified as cardiac tonics, but it is needless to say they possess no such action, being simply cardiac *stimulants* which may be administered when a rapid stimulation of the feeble cardiac muscle is required, whilst other remedial agents are getting time to exert their more permanent influence.

The patient having been kept in bed till the symptoms of cardiac failure have been relieved by the administration of heart tonics, rest and suitable diet, he may be permitted to sit up daily for gradually lengthened periods, after which other valuable and necessary adjuncts to the treatment are indicated.

Exercises.—These have been already incidentally referred to in dis-

cussing preventive treatment. The fact must be constantly borne in mind by the physician that the reserve force of the heart can only be developed to its fullest extent by a judicious and skilfully carried out system of muscular exercise. The patient who has just recovered by the help of rest and digitalis from a serious breakdown of compensation has but a small degree of reserve force; this can never be augmented by a continuance of these measures; should he make any severe muscular exertion dilatation and heart failure would be certain to occur. But by gentle walking exercises, gradually lengthened each day, the mass of cardiac muscle may be further improved in tone and contractility till a moderate strain fails to induce breathlessness. The guide to the limits to be placed upon exercise is a simple one; the walking being at first upon the level, and slow, is always to be stopped upon the first sign of difficulty in respiration or palpitation; fatigue of the skeletal muscles should not be induced. The exercise should always when possible be taken in the open air, and gradually rising ground may be selected, provided the pace is slow and deliberate. Oertel's mountain climbing can only be permitted in very exceptional cases in young subjects, and where there is no dyspnœa; every advantage of such methods can be obtained from the safer procedure of locomotion on the level or on a slight incline. Games like golf and croquet may be indulged in, but every exercise in which spurting is necessary should be finally abandoned.

The *Nauheim-Schott* treatment is less in vogue: it consists in the use of baths of increasing strengths of calcium and sodium chlorides impregnated with carbon dioxide. With the bathing is associated a system of resistance movements, in which the patient performs various flexion and extension exercises involving the upper and lower extremities and the trunk, the movements being partially antagonised or resisted by a trained attendant. Under this treatment it is claimed that the bulk of the heart diminishes, the pulse falls and compensation is hastened and perfected.

Every advantage obtained by the Nauheim-Schott treatment can be gained by employing the baths and movements at home. The saline constituents of the bath may be supplied by dissolving in an ordinary sized bath (35 gallons) from 4 to 10 lbs. Sodium Chloride and from 6 to 12 oz. Calcium Chloride, the smaller amounts representing the No. 1 and the larger quantities corresponding to the No. 6 bath. The weaker baths are taken without effervescence, and after a few days CO_2 is added by using a 5-oz. tablet of Sandow's fused Sodium Bisulphate with its corresponding weight of Bicarbonate of Soda. The composition of the No. 6 bath, as already stated, is 10 lbs. Sodium Chloride and 12 oz. Calcium Chloride; this is to be impregnated with CO_2 by adding 24 oz. sodium bicarbonate and 28 oz. hydrochloric acid, but the use of the fused tablet is preferable to that of the free acid, which causes a too rapid evolution of the gas. Mackenzie, who has studied the effects of the bath at the spa, satisfied himself that these were due mainly, if not

entirely, to the temperature (89° F.), and that they could be procured at home by using plain tap water at the same temperature.

Massage will effect everything that the Schott methods profess to produce, and it possesses the distinct advantage that it can be employed in the early stages of convalescence even before the patient is able to leave his room.

At a later stage Zander and Swedish movements are decidedly advantageous, and the combined massage and hot douching to be had at every hydropathic establishment at home are certainly preferable in nearly every case to the long journey to Nauheim, with its accompanying expenses and serious drawbacks.

When compensation has been so restored that all ordinary walking exercises cause no breathlessness or cardiac disturbance a visit to a Swiss resort, when the patient's time and means permit, will be most desirable. Mountain walking exercises (not climbing in the strict sense) may then be gradually commenced and persisted in, as long as no inconvenience is experienced, in order to develop the fullest possible amount of cardiac reserve force by promoting the hypertrophy of every available muscular fibre in the enlarged heart.

Many *symptoms* or *complications* occurring in valvular disease, being of a more or less mechanical origin, appear in varying frequency and degree, in association with the disease of a particular valve, and the treatment of these symptoms may be separately glanced at. It must, however, be always remembered that they are in every instance but a demonstration of heart failure, and their presence is a clear indication for the exhibition of the remedial agents already discussed.

Anasarca is the most common of these; it is more prominent in mitral regurgitation than in aortic lesions, but any form of valvular disease affecting the left side of the heart will cause dropsy when secondary compensation breaks down, owing to failure of the right ventricle. Disease of the tricuspid itself is so rare that it may be omitted from consideration, the chief factor in the production of cardiac dropsy being tricuspid insufficiency caused by dilatation of the right ventricle. This is the ideal condition for rest and digitalis, but in addition to these, remedial agents should be employed with the view of drawing the dropsical fluid off when digitalis fails to achieve this.

The first thing to do in such a case is to combine with the digitalis another cardiac tonic or a diuretic, in order to augment the amount of urine voided. Squill is a favourite adjuvant, but the combination of Blue Pill, Squill and Digitalis, known as Guy's, Baly's or Addison's Pill, is preferable; the popular formula is a modification of this, in which 1 gr. of each of these drugs is given in a pill thrice daily: ¼ gr. Calomel every 2 hours for 24 or 36 doses is often most efficacious. Sometimes one large dose—5 to 10 grs.—has a more powerful diuretic action than the above, but Mercurials should not be employed when renal disease is present.

Iodide of Potassium, as already stated, possesses valuable tonic action

on the heart, and being also a diuretic, it may be given in 10-gr. doses with the digitalis. Caffeine and Broom are employed in the same manner.

When the dropsy is associated with high pressure and very scanty urine, digitalis must be stopped and Trinitrin or other vaso-dilator should be given; perhaps there is nothing in such a case so useful as teaspoonful-doses every hour of Sweet Spirit of Nitre. Salicylates act as diuretics, and they may be advantageously employed with digitalis when rheumatic or gouty symptoms are present.

In the treatment of cardiac dropsy by diuretics the physician should remember that the action of the members of this therapeutic group of drugs is most fickle and often disappointing; he therefore often has to try one diuretic compound after another to obtain a free augmentation of the amount of urine passed.

Diuretin is much vaunted, but the writer has found it to be the least dependable prop in the difficult situation; the allied compound Agurin promises better results. Both substances may be given in doses of up to 15 grs. Theophylline, which is isomeric with Theobromine and the synthesised alkaloid Theocin, are given in half the above doses. Lactose in 60-gr. doses every hour often acts powerfully. Cymarin, the active principle of Canadian Hemp, is advocated by Abrahams, but the writer has no experience of its action. ℥j. may be given of the 10 per cent. tincture of the dried rhizome of Apocynum.

With the view of raising the systemic and renal pressure when this is low, Suprarenal Gland or Adrenalin is often useful; 3 grs. dry extract or 20 mins. of the solution of Adrenalin Chloride (1 in 1,000) may be given by the mouth, or half this amount of the solution by hypodermic injection.

Bitartrate of Potash sometimes succeeds when everything else fails, but its best effects are only obtainable in purgative doses.

Saline purgatives must be resorted to when cardiac tonics and diuretics fail; the rationale of this treatment lies in directly removing a large amount of fluid from the blood by the intestinal glands, which indirectly reduces the dropsy, as the blood must be recouped from the exuded fluid in the subcutaneous tissue. Any strong saline may be administered, but the most decided result is obtainable in water-logged conditions by Hay's method of giving 2 oz. Mag. Sulph. by the mouth dissolved in its own weight of water after a 24-hours' fast and abstinence from all fluids. In this way several pints of intestinal liquid may be promptly removed from the body.

When the swelling of the legs increases in spite of these measures, there is no resort left to the physician but puncturing the skin. The cutaneous surface having been carefully sterilised by washing with an antiseptic solution, a number of minute punctures should be made by a Glover's needle in the most dependent parts, as in the dorsum of the foot and about the ankle. Warm flannels wrung out of hot boric solution being wrapped round the parts, the fluid is permitted to exude so

as to drain effectually the subcutaneous tissue. Southey's tubes may be inserted, but upon the whole needle punctures are safer and less liable to be followed by erythema and sloughing; the scrotum or œdematous prepuce may also be freely punctured. Accumulations of fluid in the peritoneum, pericardium and pleuræ must be relieved by tapping. A salt-free diet may be tried, but little advantage is to be gained by a rigorously dry dietary.

Owing to the weak state of the heart in all cases where increasing anasarca is present the diaphoretic agents so valuable in renal dropsy are contra-indicated. Thus the hot pack, hot-air bath, pilocarpine, &c., cannot be safely employed, but the skin should always be encouraged to act by warm bedclothing.

Dyspnœa, Cyanosis, and Hæmoptysis will call for special treatment; the best means of dealing with this group of symptoms of pulmonary embarrassment is to open a large vein in the arm so as to immediately relieve the high pressure in the engorged right auricle and right ventricle; after the removal of 20 to 30 oz. blood, a full hypodermic dose of Strychnine should be given and the digitalis treatment pushed. The application of leeches in less urgent cases may be tried, but cups should be applied over the bites if any impression is to be made upon the overburdened right heart. Oxygen and compressed air may be inhaled when the cyanosis is marked.

Chloride of Calcium may be advantageously administered by the mouth in cases where there is much capillary oozing from the bronchial or gastric mucosa; it also tends to check the dropsical tendency, and acts as a true tonic to the heart muscle by improving for the time the blood circulating in the coronary arteries.

Cardiac pain and distress, when these fail to be relieved by digitalis, may be treated locally by Belladonna and Chloroform Liniment applied over the precordium under oiled silk, or a large belladonna plaster may be worn over the heart. When the pain is paroxysmal and accompanied by a high blood-pressure pulse and anginal symptoms, Amyl inhalation usually affords speedy relief, and this relief may be kept up by large doses of Iodides, which sometimes may be advantageously combined with Arsenic in small doses.

Insomnia, as already stated, is most safely relieved by a full dose of Paraldehyde given in diluted alcohol, but when caused by cardiac pain and a general sense of severe discomfort there is nothing so efficacious as a moderate dose of Morphia given hypodermically. Chloral Hydrate is recommended, but in full hypnotic doses this drug is dangerous. Trional is unobjectionable, but often fails in inducing sleep.

Visceral congestions are best relieved by full doses of saline purgatives. Dry-cupping of the chest, loins, or hepatic regions is often very efficacious in relieving bronchial, renal and liver congestion. The administration of Mercurials in these conditions usually affords a considerable degree of relief, but they should not be persisted in for more than a day or two at a time. One full dose of 5 grs. Calomel or Blue Pill followed by a

saline purge after 8 hours' interval is the most efficient way of obtaining the full advantages of mercury.

Dyspepsia is often a most serious symptom owing to the accumulation of flatus in the dilated stomach; this causes pressure upon the already overburdened heart, and greatly embarrasses its action. In acute distress due to this condition the best procedure is to lessen materially the amount of food given by the mouth and to supplement it by rectal feeding. Carminatives may be freely given to cause expulsion of the imprisoned gas, and Papain or Pepsin to assist the digestive process and hasten the passage onwards of the food into the duodenum. Carbohydrates, as already mentioned, should be given sparingly.

Constipation need hardly be considered, since saline purgatives are so clearly indicated for the relief of other symptoms, and their employment for this purpose keeps the alimentary tract clear. It must, however, be remembered that in the condition under consideration where the entire intestinal surface is in an abnormally sluggish state, scybalæ may form in a surprisingly short time after free purgation. The bearing down which their expulsion calls forth may dangerously raise the intrathoracic pressure, and therefore a daily evacuation of the bowel is imperative in all cases of failing heart power.

HEMIPLEGIA.

The treatment is in its first stage that of Apoplexy, which has been detailed under its own heading. The management of the case after the symptoms of shock or coma have passed away consists in a judicious remedying of such complications as constipation, rentention of urine, tendency to bedsores, insomnia or restlessness. Mental as well as physical repose is essential as long as the danger of a second seizure is probable, and it is a wise precaution to restrict the diet, as in cases of head injuries, to farinaceous food and milk, avoiding alcohol in every form and strong tea and coffee.

The period of absolute rest in bed is liable to be unduly prolonged, and though no routine rule can be laid down for the guidance of the physician on this point it will be advisable to get the patient to a sofa or couch within a fortnight after his seizure has occurred when this is possible.

Drugs at this stage are usually administered with the view of absorbing the clot in the cerebral tissue or in the occluded artery, but there is little evidence of their utility; no harm, however, is liable to arise from a mild course of Iodides, and since more or less restlessness or cerebral irritability may be present, Bromides may be combined with them. Strychnine must be avoided; any action which it exercises in the early stages is an injurious one. Organic Phosphorus or Glycerophosphates may prove useful as a restorative to impaired cerebral tissue, but even this drug had better be avoided during the first few weeks.

The treatment of the palsy consists of measures for the preservation or restoration of the nutrition of the wasted muscles and neurons, for the prevention of articular adhesions, faulty position of the affected

limbs or joints due to contraction of unantagonised muscles and for the remedying of ataxic or disordered muscular movements.

The first stage of the treatment should be directed to the correction of the faulty position of the affected limb, which shows itself as soon as early rigidity sets in; the tendency of the arm to be drawn towards the trunk and of the forearm to be flexed at the elbow must be counteracted by placing a large pad, small pillow or sandbag in the axilla and keeping the elbow-joint extended. In a similar manner the lower extremity should be mechanically treated by outward rotation and abduction, with flexion of the ankle and eversion of the foot.

This early rigidity or spasticity may not show itself for several weeks after the original seizure; in the meantime serious impairment of the joint and muscular movements may become established by the gluing together of the arthritic surfaces and surrounding nerve and muscular tissues. It is therefore necessary as a simple precautionary measure to begin gentle passive movements within a week after recovery from the so-called stroke. By this treatment neuritis may be prevented and the tone of the impaired muscles and their nutrition may be improved, so that wasting is reduced to a minimum.

As the early rigidity advances much may be done by the skilful application of loosely bandaged splints or sandbags to counteract the abnormal attitude of the affected limbs due to excessive action of the flexors. When these are resorted to early, before marked flexion of the joints sets in, the appliances can be usually borne without discomfort, and late rigidity may be entirely prevented. (Late rigidity being always structural, the permanent shortening of the muscles cannot be remedied by the application of splints, which can only further increase the mischief.)

The treatment of early rigidity by mechanical appliances is liable to be overdone, and unless rationally carried out had better be omitted. Thus if it prevents the employment of massage and passive movements more harm than good will result. The bandages should be removed several times a day and gentle passive movements with *light* massage carried out whilst the patient is still confined to his room.

Electricity is much vaunted; its value is trifling compared with that of the mechanical measures just mentioned, and it should not be employed to supplement massage and passive movements till after the expiration of two months from the seizure. The best routine is to commence with the continuous current, using 5 to 10 Leclanché cells, and large, well-moistened electrodes.

Thus in the early rigidity of the forearm and hand the extensor muscles may be gently and very slowly stroked with one electrode, whilst the other is kept stationary; any current which causes strong contraction or pain must not be employed. Passive movements at the digital, metacarpo-phalangeal and wrist joints should be perseveringly employed, and a large globular object may be left in the palm of the hand to prevent contraction of the flexor muscles. Once the patient is able to move about with help from room to room all splints should be abandoned in

order to enable him to constantly exercise the weakened muscles, care being taken that by the aid of the sound limb the faulty position of the affected one is kept corrected by the patient himself. Before retiring to rest the splints should be reapplied so as to keep up this correction during sleep. Though it is maintained that no possible advantage can be expected from electrical treatment of the site of the brain lesion the writer has seen benefit follow the application of a current from five Leclanché elements, with one large electrode upon the forehead and the other over the occiput. After a week the current strength may be doubled, and he has employed ten cells, causing the current to flow from an electrode placed over the site of the hæmorrhage on one side, with the other pole situated over the opposite region of the skull.

Later on, should the patient be able to move about in the open air, he must be encouraged to exercise constantly the muscles of the leg, stopping short of fatigue, an attendant being placed on each side to avoid falls. Whilst resting in the seated posture with his foot flexed, the forearm, arm and shoulder muscles may be likewise exercised, after which a short walk will again bring into action the leg muscles. When the return of power begins to manifest itself in the impaired muscles, inco-ordination and disorderly movements akin to what may be seen in ataxia may be observed; these must be met by careful re-educational methods, as in Fraenkel's system, passive and active movements being assiduously practised till the patient learns the necessary new movement-memories.

The permanent spasticity following the attack of loss of power in the muscles has been successfully remedied in some instances by resection of the posterior roots of several of the spinal nerves and by the injection of Alcohol into the trunks of the nerves supplying the rigid muscles (see under Paralysis, Spastic).

The treatment of the aphasia which often accompanies the hemiplegic condition when this affects the right side of the body will be found detailed under Aphasia. The hemiplegia caused by cerebral tumour can only be dealt with by measures applicable to the relief of the primary disease.

HERNIA.

With the increasing safety and success of herniotomy, when the patient is young and strong, operation will usually be chosen as the best course of getting rid of the hernia and such appliances as may be necessary for its control, though when a hernia is reducible, a carefully planned truss may be fitted when the patient is in the lying posture; this if it is capable of preventing a descent of the intestine or omentum into the sac will suffice in most cases. The truss must as a rule be worn for life, though not unusually a case of hernia when treated from infancy by the continuous application of a neatly fitting truss may be found to be cured by the end of the second or third year.

Special circumstances may, however, be present in a given case which

should determine the surgeon to do an operation for the radical cure of the rupture. Thus if the individual desires to enter into one of the public services or if his life is to be one involving intense muscular activity or strain he should be advised to submit to an operation; all femoral herniæ in young subjects should be treated radically owing to the danger of strangulation. When a truss fails to keep up the bowel or where a prolapse of the omentum proves to be irreducible, the opening should be sealed up by the surgeon, and it is becoming the general routine practice to recommend a radical operation in all cases of herniæ occurring in children of all ages.

The reduction of a *recent* hernia is effected by *taxis;* the patient should be placed in bed or on a couch, whose feet are to be elevated. The thigh should be partially flexed and the limb rotated inwards to secure as much relaxation as possible of the tissues surrounding the neck of the sac. The latter being grasped between the left fore-finger and thumb, gentle traction in a downward direction is made, whilst with a kneading movement of the thumb and fingers of the right hand the tumour is slightly squeezed in order to reduce its bulk before being pushed up. No force in the ordinary sense of the term should ever be employed; the return of a knuckle of bowel to the cavity of the abdomen conveys an unmistakable sensation to the surgeon's fingers as the tumour slips suddenly upwards from his grasp, but a mass of omentum ascends gradually and without noise. If undue pressure is exercised the hernia may be reduced *en bloc,* the entire sac with its contents being forced within the abdominal wall, but still outside the peritoneal cavity. If symptoms of *strangulation* have already appeared only the greatest gentleness is permissible. The history of the case should be a guide; thus when the gut has been down for 24 to 36 hours and obstruction of the bowel and vomiting are present taxis must not be attempted. In such cases the first touch of the surgeon's fingers should convince him of the danger of rupturing the bowel by the application of any pressure. Tightly strangulated femoral herniæ in young subjects are especially dangerous, but in elderly patients old inguinal ruptures may often be reduced when great skill and caution combined with general anæsthesia are employed, even after symptoms of strangulation have appeared. A hot bath is often a useful adjuvant.

When taxis has failed the patient should be put to bed and arrangements at once made for carrying out the operation of herniotomy; during the necessary delay the skin should be shaved and painted with Tr. Iodi and a large enema administered; it is needless to say that purgatives are always contra-indicated. In patients with Bright's disease or diabetes, where formerly operation was denied altogether, it is now done under local anæsthesia, the best choice being novocain ½ per cent. and adrenalin, both in weak solution so that the infiltration method may be employed.

Herniotomy.—The patient is prepared in the ordinary way for operation; the skin having been shaven and thoroughly cleansed with soap and water, is afterwards carefully sterilised by sponging with methylated

spirit and then with Tr. Iodi. If an anæsthetic has not been previously tried, the surgeon, before proceeding with his incision, once more may try a gentle application of the taxis; the operation is sometimes satisfactorily carried out under local anæsthesia. An incision should be made through the skin over the neck of the tumour and in the direction of its long axis; each layer of tissue on its exposure is to be carefully divided till the sac is reached. This must be opened with caution to avoid injury of intestine or omentum. The opening of the sac is usually accompanied by the escape of serous fluid, and its interior is smooth and shining and has its vessels running in the direction of its long axis. The latter point readily differentiates the sac from the intestinal wall.

Much is to be gained by observing the nature of the fluid which escapes upon the opening of the sac; if it is clear and odourless there is probably little injury to the bowel from the strangulation. A turbid, bloody or foul-smelling liquid shows that the constriction has already lowered the vitality of the intestine and permitted the sac being infected with the colon bacillus. In either case the sac cavity must be flushed with hot sterilised saline solution, after which the structures entering into the strangulating ring are to be carefully explored, layer after layer being divided, commencing in the dissection with the most superficial stratum and cautiously proceeding till the deeper fibres are divided sufficiently to remove the constriction without severing tissues which are of value in the final closing up of the aperture in the radical treatment of the hernia. The strangulation having been relieved the tumour is gently drawn downwards to bring into view the intestine at the line of constriction. This is closely scrutinised after being well cleansed with warm saline solution and dried by a lint swab, in order to ascertain whether it has been only temporarily impaired or irretrievably damaged. If the purple discoloration speedily begins to lessen and the groove caused by the constriction shows any signs of vermicular contraction passing downwards when the bowel is pinched by the finger, the knuckle of intestine may safely be pushed up into the peritoneal cavity. On the other hand, should a lustreless and ashy-grey appearance of the strangulated mass be evident, it must be accepted that the death of the parts below the constriction has already taken place or will certainly follow. This may be corroborated by pricking the tissues with the point of the scalpel, and no bleeding follows.

The gangrenous condition being thus obvious, the surgeon should draw down the loop as far as possible and resect it, cutting clear of the injured tissues, the mesentery being resected at the same time and the ends of the divided bowel united end-to-end or by natural anastomosis. It may be necessary in some cases to remove a few feet of bowel, the portion above the stricture which has been dilated and paralysed often requiring removal.

Occasionally the area of the gut destroyed by pressure may be so limited that it can be invaginated by a seromuscular or Lembert's suture without puncturing the mucous coat. When the bowel involved is the

great intestine and the exhausted condition of the patient does not permit of a prolonged stitching operation the surgeon will feel compelled to leave the gangrenous bowel *in situ* after incising it in the sac, trusting to a second operation at a later date to close the resulting artificial anus.

Omentum may be returned like bowel when found to be healthy, but when gangrenous it must be first ligatured with catgut, which is made to transfix the pedicle, after which the mass is cut off and the pedicle with its occluded vessels is to be returned to the abdominal cavity, care having been taken to insure that no small knuckle of bowel has been concealed within the omental tumour.

The final stage of the operation when the gut or omentum has been found to be in a condition capable of being returned is to proceed with the removal of the sac and closure of the hernial canal as in the radical operation for the cure of hernia.

After-treatment consists in rest to the bowel, but should abdominal distension persist a large enema may be administered after several hours, and when relief does not follow a dose of castor oil followed by 1 c.c. of pituitrin and an enema should be given in order to insure the restoration of peristaltic action in the distended bowel. When vomiting persists, and especially should this be foul-smelling, the stomach should be washed out, and this practice is often advisable before operation. In ordinary cases where no complications arise after operation, it is no longer considered wise or necessary to lock the bowels up with opium or astringents. An enema may be given after 24 hours, and a dose of Castor Oil 24 hours later. Should the symptoms of strangulation remain unrelieved after the operation an exploration of the abdominal cavity is imperatively demanded after a careful examination has been made of the usual sites for another hernia which had been overlooked. The same rule holds good when symptoms of obstruction remain after a hernia has been reduced by taxis, when the cause will usually be found to be a strangulation which has been unrelieved in a hernia returned *en masse*.

Obstructed or *incarcerated* hernia occurs in elderly subjects who suffer from large irreducible herniæ. If the symptoms do not yield to a skilful application of the taxis, herniotomy must be resorted to in order to avoid strangulation.

In some cases the surgeon will find it necessary to operate by opening the abdomen in the middle line, and after the removal of omentum the internal ring may be closed by a purse-string suture applied from above.

Irreducible hernia should be treated by the radical operation when possible, but in old subjects when the tumour is large a bag truss is usually all that is required.

Umbilical hernia is to be treated upon the same lines as hernia in the femoral or inguinal regions. When occurring in infants, strapping applied over a small flat pad and embracing the flanks is quite sufficient in the majority of cases to insure closure of the opening. In adults this form of hernia is very often irreducible, and may be kept from increasing

by an abdominal belt containing a long strip of steel, to the centre of which is fitted a large pad which extends considerably over the margins of the hernial opening. Owing to the danger of strangulation and incarceration it is advisable to recommend a radical operation. When strangulation has already occurred there is no resource but herniotomy, and after relief of the constriction the opening must be closed and the sac excised.

Radical Operation for the Cure of Hernia.—As already stated, this is now advised as a routine in all young subjects. The operation is modified in many details in the hands of different surgeons and in endless ways to meet the conditions found present in a given case and according to whether it is situated in the inguinal or the femoral ring or at the umbilicus or other weak spot in the abdominal wall. Thus for the cure of a hernia in the inguinal region an incision is made through the skin along the inguinal canal, the aponeurosis of the external oblique is divided, and the sac is separated from the cord up to the internal abdominal ring. The isolated sac is either invaginated into the inguinal canal by a ligature attached to its fundus, which is then drawn up through the inner ring into the abdominal cavity, the ends of the ligature being brought out through the abdominal wall; or the neck of the sac is ligatured by transfixion, the ends of the ligature being brought out through the abdominal wall and tied, after the sac below the pedicle has been cut away. Leaving an opening either above or below for the cord in males, the inguinal canal is then obliterated by stitching the internal oblique and transversalis to Poupart's ligament, the upper lip of the incision in the external oblique being also separately stitched to Poupart's ligament, after which the skin incision is closed by sutures.

After a satisfactory and successful operation for hernia no truss should be worn unless subsequent signs of bulging occur. This is usually due to weakness of internal oblique and transversalis at or just behind the conjoint tendon. Further operation is contra-indicated unless an attempt be made to darn the muscle with silk.

After an operation care should be taken that no active muscular exertion be permitted for several weeks after the patient has commenced to move about.

The radical operation for femoral hernia is conducted upon the same lines. After the exposure and opening of the sac it is ligatured by transfixing its neck; the portion of the sac below the ligature is then cut away. Each end of the ligature threaded into a long curved needle is passed through the femoral canal, and the point of the needle made to appear externally after perforating the abdominal wall, and the ends are tied together. Usually it is necessary to occlude the femoral canal by stitching the pectineus muscle, fascia and Poupart's ligament together, as formerly carried out, or, as suggested by Dowden, to use the extraperitoneal fat as a plug *above* the crural canal to prevent descent of another sac.

In all cases of hernia where a truss is employed to keep up the pro-

lapsed bowel or omentum it is of vital importance that the appliance should fit the patient properly, otherwise it becomes an additional menace to his safety, especially if the pad permits the hernia to descend behind it or by its side. This may arise from the weakness of the spring of the instrument. When the services of an experienced truss-maker are obtainable they should always be requisitioned, and the surgeon should see that the pad is of the proper shape and size, and that the spring of the instrument is neither too strong nor too feeble. As a rule it may be discarded after assuming the horizontal position at night, but it should be adjusted in the morning before the patient leaves his bed.

It is always advisable to have two trusses, so that the one in reserve may be employed while the ordinary one is being recovered or repaired. Some patients provide themselves with a waterproof instrument for use when bathing.

When the patient cannot interview an instrument-maker the surgeon should supply him with measurements from which a well-fitting truss may be fashioned. Ready-made cheap instruments are often unsatisfactory and sometimes dangerous. The size of a tape passed round the pelvis at a level of half-way between the iliac crest and the great trochanter and meeting at the hernial opening should be supplied, together with an estimate of the size of the latter, stating the side on which the hernia is situated and whether in the femoral or inguinal region.

The writer has several times witnessed arrested development of the testicle following the continuous application of a tightly fitting truss in young subjects. This is liable to occur in rapidly growing boys when the instrument has been worn for too long a period without being replaced by a larger one. The mortality of the radical operation being now, thanks to aseptic methods, almost nil, such a risk should never be permitted, and after the failure of cure by the truss, operative measures should not be delayed, even in the case of infants.

HERPES.

Herpes Labialis seldom requires treatment; when the irritation is severe the vesicles may be fomented by applying a small sponge squeezed out of hot water; after drying the part it may be painted over with Flexible Collodion. The sores which follow are sometimes very slow in healing when the patient keeps picking away the scab; the application of a solution with a camel's-hair brush of 10 grs. to the ounce Nitrate of Silver hastens resolution, or the crusts may be kept moistened by Glycerin of Borax.

Herpes Preputialis is also a fleeting ailment, but sometimes in ataxic patients it proves an intractable affection. The best method is to employ a desiccating powder like Zinc Oxide, Calamina or Fuller's Earth when the prepuce is long and an ointment when the glans is uncovered.

Herpes Zoster, Shingles or *Zona* is seldom diagnosed till the eruption of vesicles has already appeared, though the primary pain may be so severe as to demand a hypodermic of Morphia. When the cause of this

pain has not been suspected and any severe form of counter-irritation has been employed to lessen it, such as sinapisms, blisters, &c., the eruption is always formidable and sloughing of tissue may follow. The use of a spray of Ethyl Chloride is most comforting at this early stage when applied to the skin near the spine at the level of the involved nerve, and it is equally soothing at a later stage after the eruption has disappeared.

Upon the appearance of the first few vesicles arises the question of treatment to cause abortion of the eruption. Dupas lays absorbent wool soaked in 90 per cent. Alcohol over the developing vesicles, and covers it in with oiled silk. Unna paints the region over with Ichthyol or covers it with Zinc and Resorcin Gelatin. Alcoholic solutions of Resorcin (2 per cent.), of Thymol or Menthol have been used for the same purpose, but in all probability no local application has any abortifacient action.

The best routine is to powder freely over the site of the eruption with equal parts of Zinc Oxide and finely powdered Starch, and cover with a soft uniform layer of absorbent wool, which should be kept in position by a bandage or girdle. This prevents the vesicle being ruptured by friction against the clothing, or by scratching. Any desiccating powder as Fuller's Earth, Talc, Calamina, Bismuth, &c., may be similarly employed. The application of Unna's Zinc Jelly at this stage is a favourite method of treatment with many physicians; the writer prefers the powder and wool, as it can be often removed easily for inspection. Boric Acid in dry powder may be substituted for the zinc where the skin is liable to be infected as in uncleanly patients. Claisse treats the vesicles like burns of the second degree; after puncturing each with a sterilised needle he dresses with Picric Acid Solution, and always finds healing most rapid and satisfactory. Where the vesicles when first seen are already ruptured by friction the best application will be an ointment; any soothing, astringent and antiseptic unguent may be freely applied on lint or old sterilised linen, as—

℞ *Liq. Plumbi Fort.* ʒss.
Hyd. Ammon. Chlor. *gr.* x.
Ungt. Zinci Oxid. ʒij. *Misce.*

When pain is severe during the eruptive stage, 20 grs. Camphor, 10 grs. menthol or 5 grs. Cocaine may be added to the above.

Analgesics may be required internally, and the safest of these is Antipyrine given in 10-gr. doses, morphine being only employed where the pain is very severe, as in herpes attacking the ophthalmic division of the fifth nerve. In this form of zoster, Cocaine may be instilled into the conjunctival sac and the lids and temples covered over with an ointment of Calomel (15 grs. to 1 oz.), dry powders being contra-indicated, as the ulceration will be encouraged to proceed under the crusts and lead to extensive scarring. The eye must be watched, as the accompanying

conjunctivitis and keratitis may lead to serious ulceration and perforation ending sometimes in danger to the globe.

Neuralgia is very liable to remain after the eruption has completely resolved itself, and in elderly subjects this may become formidable, especially in eye cases, but not infrequently also when the trunk nerves have been involved. Quinine, Antipyrine, Phosphide of Zinc ($\frac{1}{10}$ gr.), and in gouty subjects Colchicum, Aspirin or Salicylates may be employed. The continuous and high-frequency currents often afford relief, whilst improved hygiene, liberal feeding, change of air, rest and alteration of the environment may be tried. Morphia is contra-indicated in such cases owing to the danger of establishing the opium habit. Arsenic is often recommended, but Eustace has observed several cases of bilateral herpes which were caused by arsenic, and he believes that the bilateral type is always so produced.

HICCOUGH

Occurring in the course of serious diseases, as renal or organic stomach affections, may prove fatal by inducing exhaustion, and it must be met promptly by agents directed against the primary cause. Thus the hiccough arising in the uræmic state should be treated by eliminatory measures, as brisk saline purgatives, hot-air baths or hot packs and Pilocarpine hypodermically. When occurring during the progress of stomach affections the most rational treatment will be to evacuate the contents of the organ by an emetic or by a skilful lavage with the soft rubber tube.

In most instances, however, this symptom must be met by empiric methods, the remedy which acts instantaneously in one case proving valueless in the next, so that the physician is compelled to resort to one agent after another till he discovers the remedy suitable for the case under treatment.

The simplest manœuvre is to cause the patient to hold his breath for the longest possible period, and if this fails, to close the mouth firmly and pinch the nostrils to arrest totally the respiration till some degree of cyanosis is produced. Compression of the eyeballs may stop it speedily.

Hiccough in children is often dissipated by their companions who have learned the trick for themselves by inducing a sudden degree of fright, but usually it is not desirable for the physician to resort to this as a therapeutic agent; a cold shower-bath is often efficacious in hysterical patients. Compelling the patient to raise his arms vertically above his head and keeping them there till they fall by reason of muscular exhaustion acts in a similar manner by strong arrest of the attention, which modifies the respiratory action.

Firm and continuous pressure for a couple of minutes over the phrenic nerve in the neck, over the supra-orbital at the brow, and ice to the auditory meatus often act promptly. A large sinapism or a hot poultice to the pit of the stomach may be tried, or a Cantharides blister may be applied over the phrenic or upper cervical nerves. Often intractable cases yield to forcible continuous traction on the tongue for a couple of

minutes. Sneezing induced by the insufflation of strong snuff or the inhalation of Ammonia may be tried. The continuous current applied with one pole over the phrenic and the other on the epigastric region sometimes stops the spasmodic contraction of the diaphragm.

Internal remedies must also be employed in empiric fashion. The simplest consists in the administration of any warm carminative as Sal Volatile diluted by water, a small dose of undiluted Alcohol, Oil of Peppermint, Turpentine, Capsicum, Tr. Card. Co., &c. When these fail inhalation of Nitrite of Amyl or Nitroglycerin by the mouth may be tried; Chloroform Narcosis is usually very efficacious, especially in hysterical cases, and where deep anæsthesia is necessary Ether is preferable.

Cannabis Indica holds a place next to Opium amongst narcotics employed for the relief of the spasm. Bromides in large doses, Chloral, Hyoscine, Valerian, Camphor, Musk, Prussic Acid and Antipyrine are but a few of the host of agents recommended. A good routine in intractable cases is a powder consisting of $\frac{1}{8}$ gr. Cocaine, $\frac{1}{12}$ gr. Morphine and 5 grs. Bismuth Carbonate placed upon the tongue and washed down with a little water every two hours, a capsule of 1 min. Creosote being given also every 2 hours alternating.

A full hypodermic of Morphia seldom fails to give temporary relief, and often the spasm does not return.

A serious responsibility rests upon the physician who is called to give relief to the agonising discomfort caused by the hiccough appearing as a terminal event in advanced renal disease or gastric cancer in patients dying from the effect of the primary lesion. With the view of soothing the last hours of life the question of affording euthanasia becomes urgent, and too often the attendant feels compelled to withhold the narcotic in case the sufferer might not regain consciousness before death and his friends might consider that the injection had hastened his end. The wisest and most humane course under these circumstances is after a consultation with another physician to take the patient and his friends into his confidence, and assure them that the hypodermic injection of morphia will relieve suffering without hastening death, though the patient may pass away in his sleep.

HIP-JOINT DISEASE.

The great majority of the cases coming under the care of the surgeon are of tuberculous origin, and the most important point in their treatment is the promptitude with which rest can be secured for the articular surfaces. A great change has been witnessed in the treatment of hip-joint disease during the last 20 years, operative procedures as incision and amputation being now very rarely resorted to. Most surgeons have entirely abandoned excision, and Bowlby has recently published very remarkable success in 900 cases at the Alexandra Hospital treated by rest and extension with general hygienic measures, the mortality being less than 4 per cent., though 40 of the series were examples of bilateral disease.

As soon as the earliest signs of rigidity, tenderness and pain present themselves the child should be placed upon his back in bed, lying upon a firm hair mattress, a weight and pulley being employed to secure extension, the weight being attached to a stirrup. The degree of traction can never be such as will secure separation of the opposed articular surfaces, the object being to secure fixation and absolute rest from muscular spasms and startings, hence with young children the weight need seldom exceed 1 or 2 lbs. in order to avoid stretching of the ligaments. The traction in all cases where deformity is present should be applied in the direction of the axis of the contracted limb, and Edmund Owen points out the importance of making the traction in the line which the thigh takes when the pelvis is squared and the loins are flat. Where much adduction is present counter-extension by means of a perineal band is necessary, and abduction may be corrected by attaching a weight to each limb or by applying a double long splint with a hinged cross-bar.

Restless children may be treated upon the same principle by the use of a double Bryant's splint and elevation of the foot of the bed; a Thomas's splint, on an abduction frame, may be applied at once, though the patient should be kept in bed till the deformity has disappeared and the pain has passed away.

The weight and pulley or other form of extension should not be discarded till all symptoms and signs have been removed, but absolute rest of the joint must be afterwards maintained for a very considerable period, varying from at least 1 year and upwards, during which time the affected limb must never be permitted to bear any portion of the weight of the body.

As the tuberculous nature of the joint affection clearly indicates open-air treatment, it becomes a matter of vital importance to secure immobility of the articular surfaces by some method which will enable the patient to move about or be carried out of the sick-room, and this is especially desirable in the summer months. For all practical purposes, the skilful adjustment of a Thomas's splint suffices when pain, tenderness and muscular rigidity have been combated by extension. After the application of the splint a patten should be attached to the sole of the boot on the sound side in order to prevent the foot of the affected limb touching the ground, then by the help of crutches the patient should be permitted to walk about for a period of twelve months. During this time gentle friction or mild massage of the muscles may be practised, but movement of any kind at the hip-joint is not permissible.

Very young children may have both limbs encased by a double Thomas's spinal caries splint, so that they can be carried about in the open air. Phelps' box answers the same purpose. The objection to the routine use of Plaster of Paris splints is the danger of an abscess being overlooked till the skin has become involved.

In neglected cases where extension fails to reduce the contracted state of the limb muscles these should be stretched under Chloroform, and occasionally it may be even necessary to perform tenotomy, after which

extension must be again employed. Should an abscess occur it never should be permitted to discharge spontaneously, as septic infection of the cavity or sinus is certain to occur. It may be aspirated and the sac injected with Iodoform emulsion, and some surgeons recommend similar treatment of the joint itself when signs of effusion are present.

When sinuses are already present these should be opened up and scraped, and any diseased bone gouged out or sequestra removed, but as all partial operations on tuberculous bone are liable to prove unsatisfactory it is a good practice to first try the effect of injecting warm Bismuth Jelly into the open sinus, as often complete healing follows unless a sequestrum is present. Where there is evidence of carious or dead bone in the joint the gouge or chisel must be used after an open incision by Kocher's method. This gives much better results than excision of the head and neck of the femur, though when the head of the bone has become dislocated upon the dorsum ilii, and the acetabulum is extensively diseased and numerous infected sinuses are present, there may be no other choice but excision or amputation of the wasted limb to prevent lardaceous disease or death from exhaustion.

Much may be achieved in the treatment of this disease by the employment of the vaccine method, which will be described under Phthisis. Even when secondary infection by pus-forming organisms has taken place in the sinuses a vaccine may be prepared from cultivating the cocci, and this may be employed in addition to Human T.R. Tuberculin. In all operations about the diseased joint, the practice of the surgeon should be to avoid drainage so as to prevent this secondary infection; the cavity of the abscess or of the joint being thoroughly disinfected after curetting, the skin wound must be carefully sutured and sealed from the air, a quantity of Iodoform Emulsion having been left in it. (Though Bismuth Jelly possesses such remarkable antiseptic action upon the open sinuses, it must not be injected into a sealed abscess cavity unless drainage is provided.) By resorting to vaccine treatment in apparently hopeless cases amputation may sometimes be avoided, but the worst cases should not be permitted to die without the chance being given to the patient of an operation. Nearly 40 years ago the writer operated for the late Dr. Newett upon a girl whose femur had spontaneously fractured in the upper third from extensive tuberculous disease; the neck, head and upper part of the shaft were destroyed by caries. After removal of the limb a large proportion of the ilium, ischium and the whole of the acetabulum were gouged away, exposing the pelvic fascia. The tissues composing the buttock were infiltrated with gelatinous and caseating products and riddled with old sinuses. The ligature applied to the femoral artery cut through the diseased coats of the vessel, necessitating dissection of the external iliac, which he ligatured in the pelvis. Notwithstanding that the patient had suffered from night sweats and repeated hæmoptysis before the operation she made an excellent recovery and is still living and well. Bowlby has drawn attention to the

remarkable fact that phthisis and scrofula very rarely develop in patients suffering from hip-joint disease.

Where complete recovery has occurred in neglected hip-joint disease with ankylosis of the joint in such a position as renders the limb useless and progression impossible or highly inconvenient, an osteotomy operation should be undertaken to correct the deformity, the section of the bone being made at the neck or below the lesser trochanter according to the requirements of the case. Murphy's arthroplastic operation, which consists in transplanting between the ends of the bones a flap of fatty tissue, has proved useful in some cases by providing a movable joint.

The treatment of non-tuberculous or acute *septic* inflammation of the hip-joint is to be carried out on similar lines. Extension in these cases may be resorted to in order to diminish pain, but the acute abscesses which are sure to form will demand prompt incision and free evacuation of the pus, which differs materially from the secretion found in the tuberculous cases. These abscesses are liable to point in the pelvis or extend along the planes of deep areolar tissue in the thigh, and pyæmia is apt to occur, hence the freest drainage is necessary after thoroughly flushing out the abscess cavity with Hydrochlorite solution. The joint will usually require to be explored by an anterior incision, and if the head or neck of the femur is found to be necrosed they must be excised and a counter-opening made for drainage through a large-sized tube.

The after-stages of the affection may be curtailed by the judicious employment of a vaccine prepared from cultures of the purulent fluid, provided that the infection keeps localised.

HOARSENESS.

This is but a symptom or sign of several different diseases, and should not be regarded merely as a synonym for laryngitis.

The treatment in every case must be that suitable for the removal of the primary cause—tubercle, cancer, syphilis, diphtheria, œdema, perichondritis, catarrhal laryngitis, papillomatous growths, singers' nodes, pachydermia laryngis and extrinsic causes which by producing paralysis of the muscles interfere with the perfect approximation of the vocal cords as in thoracic aneurisms. The most frequent form of hoarseness which the physician is called upon to treat is that arising from excessive use of the voice, which induces a chronic laryngitis; the treatment of this affection is dealt with under Laryngitis (see also under Pharyngitis, Throat Affections and Aphonia).

HODGKIN'S DISEASE—see Lymphadenoma.

HOOPING COUGH—see under Pertussis.

HYDATID DISEASE.

Prophylaxis is of vital importance; the hydatid cyst is the result of the introduction into the human alimentary canal of the eggs of the *Tænia echinococcus*—a small tapeworm infesting the dog, sheep and

wolf. The human hydatid is the bladder stage of this parasite's existence. The eggs find their way into the human stomach chiefly through drinking water. Hence the necessity, in districts where the parasite abounds, to look most closely to the filtration of water and the purity of food. The utmost scrupulosity should be observed as regards the personal cleanliness of all who come into close relations with dogs. A minute worm is found in dogs in vast numbers in the small intestines, and the human hydatid is the bladder stage of this parasite. The dog becomes infected by eating the offal of sheep suffering from hydatid disease. As the mature worm does not exceed $\frac{1}{5}$ inch, it is easily seen how readily the minute ova in the last joint of the worm which alone contains the developed sexual organs may find entrance into the human stomach in water or from the soiled hands of individuals who are in the habit of caressing the dog.

Diagnosis has been simplified by the discovery of the presence of specific anti-bodies in the blood-serum of patients suffering from hydatids, the antigen being easily obtained from any sample of preserved hydatid fluid. Another aid in diagnosis is the presence of eosinophilia and of basophilia.

The surgeon should aim in every case when this is possible at complete excision of the cyst with its inner wall by carefully dissecting out the tumour from the surrounding adventitious tissue. Where this is not practicable the cyst should be freely incised, its contents thoroughly evacuated and the cavity packed with sterilised gauze, which in each subsequent dressing is to be replaced by fresh packing till the complete obliteration of the sac has been effected. The steps of the operation obviously require modification according to the nature of the organ or tissues in which the cyst has developed.

The liver is the most common site, more than half of all hydatids being found in this organ. A pedunculated cyst depending from the under-surface of the liver may be easily reached by an anterior abdominal incision; a ligature having been applied to the pedicle when the neck of the tumour is long and narrow, the cyst may be removed by cutting through the pedicle below the ligature.

Hydatids embedded in the hepatic tissue demand a different treatment; the organ being exposed by abdominal section and the cyst isolated from the peritoneal cavity by packing the edges of the wound with sponges, the wall is incised and its contents drawn off. The incision in the cyst is next enlarged so as to thoroughly expose the white parasitic wall, and whilst this is being gently drawn upon by forceps its delivery is facilitated by a jet of normal serum injected between it and the adventitious fibrous capsule in which it lies. The resulting cavity is then thoroughly cleansed by irrigation and its lips sutured before closing the abdominal wound.

Where the parasitic cyst wall cannot be removed, the lips of the incision in the adventitious cyst may be sutured to the edges of the abdominal wound and the cavity packed with gauze as in Lindemann's

method. Deeper hydatids must be removed through a posterior incision over the lower ribs which will require excision so as to open up the pleural cavity, the cyst being then reached through an incision in the diaphragm.

When an hepatic hydatid cyst has already suppurated, it must be treated as an abscess. The abdomen should be opened, the purulent contents of the sac evacuated by a free incision, and after irrigation with an antiseptic solution the cavity should be packed with gauze or a free drainage provided by introducing a rubber tube after the margins of the cyst wall have been stitched to the lips of the abdominal wound.

Pulmonary and pleural hydatids can be successfully treated by excision of two or three ribs, removal of the cyst contents and of its parasitic wall, with or without drainage. Aspiration is liable to cause death in pulmonary hydatid disease, and must never be resorted to. Should suppuration occur in the pleural cavity, a free incision must be made between the ribs, and the space washed out and drained as in empyema. Abscess of the lungs, if near the surface at the base, may be successfully treated in a similar way.

Hydatid cysts in the brain have been successfully removed when near to the surface by a trephining operation; these cysts are usually sterile, containing no scolices or daughter cysts.

HYDROCELE.

This may be safely left alone till it assumes dimensions which cause inconvenience. Temporary relief may be obtained by tapping, though except in the child the fluid is bound to accumulate again.

The patient should be seated in a chair with the buttocks brought forward to the edge; the surgeon grasps the scrotum from behind near the neck of the sac, and by squeezing the tumour the skin and tunica are made very tense. The testicle and any large scrotal veins being located, a fine sharp trochar with its canula is plunged into the sac, the canula being pushed home as the trochar is withdrawn, when the contents of the sac will be thoroughly evacuated. The trochar should be made to enter the tunica above the centre of the tumour by pushing it directly backwards, elevating the point slightly so as to avoid injury to the testicle, and care taken to insure that no hernia is present. The scrotal wound is afterwards sealed by the application of Collodion or by a small pad of lint soaked in Friar's Balsam, and the patient is made to rest for a few hours.

For the radical cure of ordinary hydrocele the older operation of injecting the emptied sac with 2 drs. weak Tincture of Iodine or 30 mins. Carbolic Acid and kneading the scrotum gently so as to insure thorough contact may be resorted to where for any reasons a cutting operation is inadmissible.

For all ordinary cases the modern plan of retroversion of the sac by making an incision in the scrotum is the safest and most reliable procedure. The incision should be sufficiently large to permit of the testicle being delivered through the wound with the parietal layer of the sac

retroverted, after which the lips of the wound in the latter are sutured with catgut behind the epididymis and the sac well washed out before returning the testicle to the scrotum and closing the skin wound. The patient should be confined to bed for a week.

In old hydroceles with very thick walls the parietal portion of the sac should be dissected out and excised, all obvious bleeding-points caught and tied, and the cavity temporarily packed with gauze till all hæmorrhage is stopped, after which the skin wound may be closed by suturing, the stitches being placed very close together to prevent inversion of the wound.

Congenital hydrocele sometimes disappears and does not return; the closure of the inguinal canal by a well-fitting truss prevents the descent of a knuckle of bowel and causes obliteration of the open funicular process, which connects the abdominal cavity with the sac of the tunica vaginalis.

When a truss fails, tapping or acupuncture may be tried, and if the fluid continues to accumulate, the upper part of the sac should be exposed and the neck treated as in the radical cure for hernia, and the hydrocele dealt with by the retroversion of the lower portion of the sac.

Infantile hydrocele usually yields to tapping with an aspirator needle or to acupuncture by a Glover's needle, but when these fail the sac may be excised or retroverted as in the treatment of ordinary hydrocele.

Encysted hydroceles of the cord, of the testicle and of the epididymis (spermatocele) may be tapped or acupunctured, and when this fails excision of the sac should be effected. Injection after tapping usually suffices, but an encysted hydrocele of the cord may communicate with the peritoneal cavity, and should not be injected with any irritating fluid; sometimes it may be cured by the application of Iodine externally.

Hydrocele of a hernial sac may exist after the cure of a hernia has been accomplished by the use of a truss which has obliterated the neck of the old sac; the best method of procedure in such a case is to excise the sac after ligaturing its neck.

HYDROCEPHALUS, Acute—see under Meningitis.

HYDROCEPHALUS, Chronic.

If the accumulation of fluid is confined to the ventricles (internal hydrocephalus), an attempt should be made to permanently drain them, but when the fluid is located in the subarachnoid and subdural space (external hydrocephalus), the drainage of the ventricles is unnecessary or futile. To differentiate between the two conditions Dandy and Blackfan's method of injecting phenol-sulphonephthalein has proved valuable; this reagent is excreted in the urine, and the rate of its elimination determines whether the fluid is within or without the ventricles, being much retarded in the internal variety. Sharpe inserts a needle into the ventricle and another into the lumbar subarachnoid space, and when the flow from the ventricle needle is greatly in excess of that from the lumbar puncture he judges that the ventricle is blocked. His operation

aims at drainage by inserting six linen strands into the ventricles in the internal type of hydrocephalus and the same number into the subarachnoid or subdural space in the external variety, bringing their ends out through the temporal muscle and fascia beneath the scalp. Absorption of the threads does not occur for several months, by the end of which time a permanent canal becomes established. Two-thirds of all his cases were successful.

Another method consists in the introduction of a fine bent tube of gold into the descending horn of the lateral ventricle, the end projecting from the ventricle being secured in its place by sutures applied to the inner aspect of the dura mater, thus establishing a free communication or drainage between the interior of the ventricle and the subarachnoid space, so as to remedy the blocking of the natural drainage channel of the brain and cord.

Drugs internally are of little value except in syphilitic cases, where Mercury and Iodides should be steadily pushed, but in any case where tapping of the ventricles or lumbar puncture is to be tried these drugs should be employed simultaneously with the operative procedure, and the effect of an elastic bandage applied to the skull should be carefully watched.

The treatment of the various forms of *Cephaloceles* in which some portion of the cerebrum or its membranes project under the scalp through a congenital opening in the cranial bones is usually very unsatisfactory. Small meningoceles, if they have a narrow neck, may sometimes be successfully dealt with by reflecting a flap of the scalp and closing the neck of the sac by ligatures, so as to prevent the escape of cerebro-spinal fluid.

HYDRONEPHROSIS.

The treatment of an accumulation of fluid in the dilated pelvis of the kidney consists in the early removal of the cause. Thus in Glénard's disease or where the floating condition of the kidney exists the hydronephrosis is at first intermittent, disappearing as soon as the normal position of the kidney is restored and the kinking of the ureter removed. The prevention of further attacks may be achieved by the use of suitable abdominal supports, as described under Glénard's Disease; when these fail, the surgeon should resort to the operation of fixation of the kidney, and if necessary also of the liver.

The most serious cases are those where the ureter has become blocked by an impacted calculus. Where the blocking is of recent occurrence and the tumour not very tense, the simple operation of manipulating it through the abdominal walls should have a fair trial. With the anatomical position of the kidney and ureter and their relations to other organs in the abdomen before the surgeon's mind, he may try a series of massage and pressure movements with the view of dislodging the calculus or causing the fluid to flow past it into the bladder. This manœuvre is worthy of a trial, and before commencing it the patient's abdomen

should be freely poulticed or swathed in warm water bandages covered by a piece of stout mackintosh for 48 hours—a local hot pack. It is needless to say that undue force should not be employed.

Aspiration or tapping must be resorted to when the tumour is tense and of large dimensions. It may be the only means of prolonging life where the opposite kidney has been previously destroyed by an old impaction or where the hydronephrosis is bilateral, and the tapping may be repeated as often as necessary. The site of the puncture is of importance. The sac should be entered from behind, midway between the last rib and the iliac crest at the outer border of the erector spinæ muscle. On the left side the best spot is one just in front of the interval between the last two floating ribs. All the fluid should be removed through a moderately fine and long needle, and it may not again accumulate owing to the previous destruction of the entire secreting structure of the kidney, or the tapping may, by relieving or removing the pressure and irritation, cause the descent of an impacted calculus into the bladder, or it may be followed by subsequent discharge of hydronephrotic fluid into the bladder without the descent of any obstruction. These results, though very improbable, have been recorded in isolated instances, and justify the operation of tapping before resorting to more severe and dangerous measures. An attempt may be made to establish drainage by inserting a fine rubber tube into the sac through the canula or hollow needle before withdrawal, but the establishment of a permanent fistula is most unsatisfactory and should if possible be avoided.

The best routine surgical procedure is to expose the kidney by a lumbar incision, tap the sac and draw the organ out through the wound, where it should be freely incised along its convex border so as to thoroughly explore its pelvis. If the obstruction is found to depend upon the formation of a valvular septum at the entrance of the ureter, the valve should be slit vertically and its edges sutured in the transverse direction. Should an impacted calculus in the upper part of the ureter be found, it should be removed by forcing it back into the renal pelvis, from which it can easily be extracted through the wound.

Where the obstruction is found to be the result of old adhesions between the ureter and the outer surface of the pelvis, these should be carefully dissected out, and it may be necessary to divide the duct and insert its lower end into the most dependent portion of the dilated pelvis by the operation of uretero-pyelo-nephrostomy, or a lateral anastomosis may be effected. A very large sac may sometimes be successfully reduced by removing a portion of its walls or by infolding them by a series of sutures after transplanting the orifice of the ureter into the lowest part of the cavity. Drainage of the kidney in all cases is necessary till the distended pelvis has time to contract before the removal of the tube. Where a fistula fails to close owing to the continuous discharge of urine, the only resource left to the surgeon is to perform nephrectomy and excise the organ, and this may be obviously found necessary when the exploratory incision reveals an advanced stage of disorganisation of the gland. Such

a procedure cannot, however, be entertained unless the opposite kidney is known to be functioning in a normal manner.

In some cases the history and nature of the case will show that the nephrectomy should be carried out through an anterior incision made as in ordinary laparotomy for the removal of an ovarian cyst; a necessary preliminary in all such operations is catheterisation of the ureters from the bladder in order to establish proof of the integrity of the kidney on the opposite side.

When the incision of the sac reveals a purulent condition of its contents, the pyonephrosis should be dealt with by free drainage or nephrectomy, as described under Pyonephrosis.

HYDROPHOBIA.

The success of *Preventive* treatment had of late years been conclusively demonstrated by the immunity enjoyed by Great Britain and Ireland through the muzzling regulations, and a similar result has been achieved in other regions by rigid quarantine regulations.

Only a comparatively small proportion of human beings bitten by a rabid dog is found to develop hydrophobia, the percentage being probably under 15. For wolf bites the percentage is above 70, and the proportion in both cases rises when the naked skin has been bitten.

The importance of cauterising the wound is obvious, and the success of this prophylactic measure will depend upon the promptness and thoroughness with which it is carried out. An extemporised tourniquet should be instantly applied upon the proximal side of the wounded site and the bite thoroughly cleansed; innumerable instances are on record where the infective process has been prevented by sucking the wound, though such a procedure cannot be regarded as free from danger where any abrasions of the mucous membrane are present.

The most effective agent for the destruction of the germs in the wound is the actual cautery, but as this is very painful caustics are more frequently resorted to. Owing to its portability Nitrate of Silver is the one usually depended upon, being generally in the pocket-case of the veterinary surgeon and of the practitioner; it is, however, one of the least reliable and most painful of caustics. Pure Carbolic Acid thrust deeply into the wound on a piece of pointed wood is a very powerful steriliser; any caustic or corrosive substance which happens to be at hand may be employed. The thorough excision of the bitten area by the knife is recommended, but as even this heroic procedure should not justify the victim in refusing Pasteur treatment in case the suspected animal should be afterwards proved to have been suffering from true rabies, excision is unnecessary unless in such cases of extreme isolation as will prohibit a journey to the Paris or other Pasteur Institutes. Every person bitten by an animal known to be rabitic should submit without any unnecessary delay to a course of Pasteur treatment, whether Negri bodies can or cannot be found in the cerebral nerve cells of the dog.

The rationale of treatment depends upon the long period of incubation

of the disease, this being never shorter than two and often as long as six to ten weeks, during which period the patient can be effectually prevented from developing hydrophobia by a series of immunising injections of a modified or attenuated virus along with the toxins produced by it, protection being established before the symptoms of hydrophobia have time to show themselves. In a few cases the incubation has been much longer, and a period of two years in one authenticated case intervened between the reception of the wound and the invasion. The best results are obtained when the treatment is sought at the earliest stage, but in every case it should be sought, even should a month or more have intervened. Pasteur informed the writer in 1891 that on studying his atlas he found the mortality to rise with the distance which the patient had to travel from the country in which he was bitten to the Institute in Paris, being very high in those foreigners whose home was at a distance and in those whose railway facilities were very imperfect or absent.

The initial step in Pasteurism is to obtain a uniformly strong and unvarying virus capable of producing death after a constant period of incubation. This "fixed" virus is stronger than that obtainable from a rabid wolf and many times more powerful than that from a rabid dog, and is procurable only after passing the latter through the bodies of 100 rabbits.

If the spinal cord of a rabbit killed by this virus is removed and exposed in a sterilised jar to air deprived of moisture by the presence of caustic potash, and kept in a temperature of 77° F., it is found that every day produces a diminution in the power of its contained virus.

The routine is to inject into a patient bitten upon the limbs or trunk an emulsion of ½ c.c. of a cord dried for 14 days and rubbed up with 30 mins. sterilised broth. This is done in the morning, and a similar dose is given the same evening from a cord dried for 13 days. Upon the second day injections of cords dried for 12 and 11 days are administered, and so on till upon the ninth day a single injection is administered from a cord which has only been dried for 3 days. This is the strongest dose employed during the 15 days of treatment.

For the treatment of face and head bites and wounds caused by rabid wolves a more vigorous routine known as the *intensive* method is employed, in which 1 c.c. of a cord dried for 3 days is administered as early as the seventh day, and the injections are prolonged over a period of 22 days.

The mortality after rabid wounds has by these means been reduced (from 15 per cent. in the untreated) to about 1 in 400. Many modifications in the original Pasteur method are carried out, such as (1) dispensing with the drying process by the use of fresh virus; (2) diminishing the activity of the virus by treating it with antirabic serum as now practised at the Paris Institute; or (3) by Harris's plan of carrying out the desiccation *in vacuo* till a dry powder is obtained many times more powerful than the cords used by Pasteur; this powder preserves its virulence for a couple of years when kept in a refrigerator. Harris

has reduced the mortality to 1 in 1,000 by the use of this modification.

When symptoms of hydrophobia appear in an individual previously bitten by a rabid animal death may be regarded as certain; the few reported recoveries are believed to have been cases of pseudo-rabies or of a neurosis produced by the dread of the disease. The only thing that can be accomplished by the physician once the symptoms of hydrophobia have appeared is to ameliorate the dreadful sufferings of the patient. He should be placed in bed in a very quiet and darkened room, and as few people as possible should be permitted to congregate about his bedside. Hypodermic injections of Morphia, or Opium and Chloral by the bowel, afford some measure of relief to the suffering when Chloroform or Ether inhalations cannot be tolerated. The difficulty and dread of swallowing may be minimised by painting the pharynx with Cocaine solution. Tracheotomy may ward off death from asphyxia through laryngeal spasm. Of the host of narcotics and antispasmodics, none have been proved of any curative value. By Curare the patient's life may be prolonged; $\frac{1}{12}$ to $\frac{1}{2}$ gr. may be injected every 20 minutes till there are evident signs of general loss of muscular power. Harris reports one case cured by intravenous injections of Hydrochloride of Quinine and Urea, 15 grs. every two hours.

HYDROTHORAX.

Restricting the term "hydrothorax" to those passive effusions the result of chronic Bright's disease, and valvular lesions in which they appear generally in both pleural cavities as part of a general dropsy, their treatment is obviously that of the primary affection. In cardiac cases the exhibition of heart tonics like Digitalis, which also acts as a powerful diuretic, is clearly indicated. Saline purgatives are always valuable. In the effusions of renal disease, diuretics, as already discussed under Bright's Disease, are useless, since the function of the kidney is in abeyance, the only resource left to the physician being saline purgatives and such powerful diaphoretics as the hot pack and Pilocarpine. Tapping may be resorted to when the mechanical difficulty renders the breathing impossible. In the passive hydrothorax accompanying malignant growths in the chest, the only procedure is tapping with a fine Southey's trochar and canula, to which a thin rubber tube is attached, the fluid being permitted to drain slowly away into a vessel in which the free end of the tube is kept submerged. For the treatment of fibrino-serous effusions, see under Pleurisy.

HYPERIDROSIS—see Perspiration, Excessive.

HYPERMETROPIA.

This condition is due to an error of refraction caused by the focus of entering parallel rays falling posterior to the retina. The treatment consists in the use of a suitable convex lens which renders the eye em-

metropic, in order that parallel rays may be brought to a focus on the retina.

The efforts to accommodate tax the ciliary muscle, and the condition known as "accommodative asthenopia" ensues when the hypermetropic eye is strained over near objects or when the patient has been reduced to weakness by some illness. This asthenopia may be remedied by the use of convex glasses which meet the requirements of close vision.

Severe hypermetropia is best corrected fully, especially in children, with glasses which should be worn constantly. If strabismus is present, such glasses will remedy this complication, provided the squinting eye when corrected retains the power of fixation. Where the squint is constant an operation may be required. In the case of older subjects, convex glasses of different strengths are required for near and distant vision, and these may be mounted in the same frame.

HYPERPYREXIA.

The treatment of hyperpyrexia will be found detailed under the heading of each primary disease in which the high temperature occurs (acute rheumatism, sunstroke, typhoid fever and malaria), but a brief summary of the usual methods may be here enumerated for convenient reference.

The new antipyretics—Antipyrine, Antifebrin, Phenacetin and other coal-tar products—are not to be depended upon. Quinine is also seldom admissible, though sometimes in the case of children it may be employed as an adjunct to other treatment, in order to prevent the temperature rising again after it has been reduced to safe limits.

The only reliable and safe method of reducing the excessive fever temperature is by abstracting the heat by means of the application of cold air or cold water to the surface of the body. The cold air plan is much less satisfactory than the hydropathic method, but occasionally in the case of children it may be employed with benefit by placing a large cradle under a sheet over the patient's naked body as he lies in bed upon a firm mattress, with a number of ice-bags suspended from the roof of the cradle.

The speediest and most efficacious of all methods, and the one which is the best suited for such conditions as acute rheumatism and sunstroke, where all movement of the patient's body is undesirable, consists in "cold effusion," when the temperature rises to 106° F. This is carried out with the patient lying upon a large mackintosh placed over the mattress; a single sheet being spread over his naked body, the sheet is kept wetted by a copious stream of cold water poured from a jug or watering-pot with a perforated outlet. By elevating the head of the bed and manipulating the edges of the mackintosh the superfluous water is made to flow into any convenient receptacle placed upon the floor. If the temperature of the water employed at the beginning of the affusion be about 70° to 80° F. all feeling of shock is obviated, and cold water (40° to 50° F.) will then cease to be unpleasant. As soon as the rectal temperature falls below 101° F. the sheet and mackintosh are to be

removed, and replaced by blankets after the surface of the body has been rapidly dried.

The "cold or wet pack" is applied in a somewhat similar manner as the patient lies upon a mattress and blanket with a mackintosh placed between. A sheet wrung out of water at about 60° F. is wrapped around him, leaving only the head and feet free. By replacing the sheet frequently with a fresh one wrung out of cold water any desired antipyretic effect can be obtained.

The "cold bath" is used in hospital where a portable appliance and skilled attendants are always at hand. The bath being wheeled alongside the patient's bed, he is lifted carefully out upon a sheet by two or three nurses, and the sheet is lowered into the water as he lies upon it. The temperature of the water at first should not be below 80° to 90° F., but after a few minutes it is gradually reduced to 65° or 70° by the addition of cold water or crushed ice, and the immersion is continued till the rectal or mouth temperature falls to 101°, which usually occurs in about 20 minutes. A further fall to normal or below it usually takes place after the patient has been lifted out of the bath and placed in his bed.

"Cold sponging" is not to be relied upon for the reduction of hyperpyretic temperatures unless carried out by heroic methods simulating cold affusion, but it is a valuable plan of controlling the fever heat after this has been first reduced by the bath, wet pack or cold affusion. In the case of children thorough cold sponging supplemented by gentle rubbing with large pieces of ice will sometimes act as effectively as the cold bath.

HYPOCHONDRIASIS.

Accepting Gower's definition of hypochondriasis as a morbid state of the nervous system in which there is mental depression due to erroneous ideas of such bodily ailments as might conceivably be present, the line may be drawn between it and insanity with somatic delusions, though the tendency of most modern writers is towards regarding every case of hypochondriasis as a form of melancholia.

Owing to the danger of suicide in the graver type of hypochondriasis, the borderland between it and insanity having been already passed, the only treatment available in most cases will consist in removal to a properly equipped asylum.

The treatment of the minor forms of hypochondriasis is often most unsatisfactory and disheartening. The physician having satisfied himself by thorough and painstaking examinations that there is no organic disease present, finds himself placed in a difficulty. If he obeys his instinct and proceeds to impress upon his patient the view that his symptoms are purely imaginary, and if he makes light of his suffering, he only aggravates matters by causing him still further to concentrate all his faculties upon his abnormal feelings; this drives him to seek the advice of one physician after another till all his morbid sensations become

intensified, with the result that he crosses the line dividing the sane from the insane condition.

It is in the highest interest of such a patient that the humane physician should endeavour to secure his complete and whole-hearted confidence by a thorough and sympathetic investigation of his complaints, after which he may be able to explain to him the nature of the neurosis and to convince him of the absence of any organic disease without falling into the common mistake of arguing him out of his abnormal sensations. Any departure from the typically healthy standard should be corrected; thus insomnia, dyspepsia, constipation, anæmia, or other disordered condition should by appropriate treatment be remedied.

Exercise in the open air, especially if carried out in the company of others, boating, bathing, fishing, golf, or any active amusement in which the patient's mind is lifted off his sensations, will do more than physic. Travel, if the patient's means permit of it, if not, when possible, a complete change of employment may be advised. Resorting to spas, hydropathics or places where invalids congregate often does harm; the patient returns somewhat improved, but with new combinations of sensations derived from comparing notes with his suffering brethren who flock about most health resorts. As a rule, anything which insures a complete change of habits and of thought is likely to be followed by benefit. Massage is often beneficial, and static electricity in some cases proves useful.

The treatment, whilst mainly moral and psycho-therapeutical, need not necessarily exclude drugs, though officious prescribing is to be discountenanced for the same reasons which should deter the physician from writing out an elaborate diet table. A drug which will diminish the excitability of the sensory terminals will do no harm, and may effect some good, as in the management of hysteria. Valerian is the most suitable; a pill containing a grain of each of the valerianates of zinc, iron and quinine is the best routine, and the addition of asafœtida is often beneficial. As in hysteria, strychnine is usually harmful. The valerianates may be alternated by a mixture containing 3 to 5 grs. Antipyrine with 15 mins. liquid extract of Coca, but narcotics including alcohol should be always avoided; the cocaine, morphia, alcohol and chloral habits are especially liable to become developed in such patients.

HYPOSPADIAS.

Where the deficiency in the floor of the urethra is confined to that part of it which traverses the glans, the case will require no interference unless there should be a constriction or stricture at the outlet of the passage which may require dilatation or incision and muco-cutaneous suture. Where the deformity exists in the penile portion of the urethra there is usually much curving of the penis, and urination causes great discomfort from the direction in which the stream flows; it will be necessary to remedy the arching of the penis by a deep and free incision made in a transverse direction across the median groove. By extending the

organ and suturing the margins of the wound in the vertical direction the penis becomes straight. Afterwards a new floor for the urethra may be made by dissecting a flap from the cutaneous covering of the lower part of the penis or scrotum.

When the floor of the urethra is absent as far as the perineum the condition resembles that which is seen in some Australian tribes. The writer exhibited, many years ago, a specimen of artificial hypospadias which he found in an aboriginal of the interior of Australia. He ascertained from an explorer that at least one tribe in the centre of that Continent performs the serious operation of slitting the male urethra open from the glans backwards, through the perineum towards the bladder, evidently with the view of preventing procreation. A careful examination of the specimen proves to what extent the most serious plastic operations may be carried out when recovery follows a barbarous mutilation undertaken without anatomical knowledge, and performed with the crudest of instruments, and without the slightest conception of the necessity of aseptic methods.

The treatment of the congenital variety of this perineo-scrotal hypospadias which simulates hermaphroditism can only be carried out by a very elaborate and extensive series of plastic operations which seldom prove successful. As the determination of sex is often impossible in these cases it is a wise rule to bring up the child on the supposition of its belonging to the male sex, and not to attempt surgical interference with the deformity.

HYSTERIA.

The *prophylaxis* of hysteria is an important problem, the solution of which becomes imperative when the mother of neurotic children is deeply tainted herself with the neurosis. As it is usually impossible to prevent the patient speaking of her ailment in the presence of her children or of dealing in a rational manner with any neurotic symptoms which may appear in them, the question of separation becomes an important one. It is easier to send the female children to a school at a distance than to remove the parent for a prolonged sojourn in a nursing home.

The elements of preventive treatment suitable to a neurotic child are essentially the same as those indicated for the cure of the hysterical condition in older patients.

As soon as any hysterical manifestation shows itself the general health of the patient should be carefully looked into. Her diet should be liberal and administered with frequency and regularity. Active open-air exercise should be insisted upon, even to the extent of producing slight fatigue. Regular hours for rest are essential. Everything which overstimulates the hypersensitive cerebral centres is to be avoided, as is also every excitement of the emotions or passions. Healthy and constant mental occupation should be advised, with avoidance of the evils attendant upon social dissipations, with their late hours and unnatural excitements. Few things are so detrimental to precocious neurotic children

as the modern institution of juvenile at-homes and late dancing parties. Sound, wholesome literature instead of the maudlin, sentimental trash of cheap novels, should be supplied as food for the mind, care being taken that the patient be not permitted to tax the memory or perceptive faculties too severely. Recreations or exercises, as sketching, painting or music, are certainly to be preferred to mechanical needlework or lace-making, which permits of too much introspection and moping. Sea bathing and the morning cold bath when admissible are valuable adjuncts; the patient should be strongly advised to retire early to bed and to persist in early rising, and take some mild form of exercise before breakfast.

Errors in digestion or assimilation require to be remedied. Anæmia calls for iron; menstrual disorders, constipation and all sources of peripheral irritation as errors of refraction, adenoids, &c., should be dealt with on approved principles.

The main element in the treatment of hysteria must be moral or suggestive, and directed to the strengthening of the inhibitory power of the conscious self and the educating of the subconscious self as in the preventive treatment of insanity. Though the neurosis is not to be regarded as a form of insanity, the mental state of the patient demands the most careful hygienic management. As in many forms of insanity home treatment is usually unsuccessful, so in hysteria the best results are only obtainable in confirmed cases by removal to a good nursing home in which complete isolation from her friends is rigidly carried out.

In the early stages of hysteria, before isolation is pronounced to be necessary, an attempt may be made to treat the patient at home if her relations possess sufficient tact and firmness to carry out moral treatment alone or with the assistance of a skilled nurse. The physician should take her relatives into his confidence, and make it clear beyond the possibility of being misunderstood how her case stands. This is generally only half attempted, and her friends too often interpret the physician's remarks as meaning that the patient is either malingering or labouring under some delusions or fancies. Consequently their management of her, with this erroneous impression, is fraught with disaster. The co-operation of a strong-minded, judicious relative, possessing tact and firmness, though not devoid of sympathy, but capable of suppressing sympathetic manifestations, is of infinitely more value than drugs. The influence of such a mind operating upon the victim of hysteria can be guided by the physician in such a way as to strengthen the patient's will-power and enable her to successfully combat the tendency to yield to displays of emotional disturbances. Lecturing or scolding the patient continually is to be condemned, and ridicule is most injurious. Each case must be managed as the judgment or tact of the physician directs. Sometimes the influence of the strong will of the physician may accomplish results which appear as almost miraculous, but these can only be obtained after he has entirely gained the complete confidence of the patient by a comprehensive study of her various symp-

toms, and convinced her that there is no mystery in her ailment and that *recovery is certain* if implicit obedience to instructions is maintained. Manifestations of sympathy and the attachment of undue importance to individual symptoms are as fatal to successful treatment as is the ignoring of these altogether by the physician—extremes which the well-balanced medical mind always avoids.

Drugs should be considered as of secondary importance when compared with the moral treatment. Valerian has long enjoyed the reputation of being the most valuable member of this class of remedies. To be of any use, however, it must be given in doses much above the strength of those usually employed. Drachm doses of the simple tincture, or an equal quantity of the ammoniated preparation freely diluted, may be given three or four times a day, or the following pill may be administered—

℞. *Zinci Valerianæ*
Quininæ Valerianæ
Ferri Valerianæ
Asafœtidæ ana gr. j.
Extracti Valerianæ q.s. Misce.

Ft. pilula. Mitte tales xxiv. *Sumat unam ter in die post cibos.*

Valerian and Asafœtida are regarded erroneously by some physicians as part of the moral treatment of hysteria, producing their good effects through the patient being compelled to swallow something nauseous and disgusting. Valerian benefits the hysterical condition in no such way, but it does good by diminishing the hypersensitiveness of the peripheral nervous apparatus, rendering sensory stimuli less powerful to affect the hypersensitive and unstable nerve centres. Asafœtida acts probably in the same manner, and Sumbul and Musk have similar action in less degree. Antipyrine in small doses intensifies the good effects of these drugs. Borneol-isovalerianate or Bornyval is an elegant and efficacious substitute for valerian when given in 4-min. capsules, and it is hardly conceivable that it could act upon the moral or suggestive hypothesis, moreover, many hysterical patients manifest no marked repugnance to these drugs, though they continue to derive benefit from them.

Bromides are of value where there is evidence of insomnia and sexual excitement or ovarian tenderness. Their routine administration, especially in lean subjects, is productive of much mischief. They are certainly more suitable and more clearly indicated in the class of hysterical patients met with by Continental physicians, and which is rare in Britain.

Strychnine almost invariably intensifies the hysterical phenomena, probably through its power of rendering the peripheral and centric sensory portions of the nervous system more acutely sensitive. Alcohol, morphia, cocaine and chloral must be always avoided owing to the great danger of the establishment of a habit in hysterical patients; when hypnotics are indicated the newer drugs as Trional should be employed.

When the above methods fail in dispelling the manifestations of the neurosis, the only resource left to the physician is to insist upon Weir Mitchell treatment and rigid isolation for a period of 8 or 10 weeks. By this treatment cases have been brought under easy and rapid control which hitherto have been considered altogether outside the sphere of practical therapeutics. It is only in such grave cases that the method in its entirety should be recommended, and it is contra-indicated where marked melancholic symptoms are present or where any serious organic lesion is known to exist.

Isolation must be complete; the patient therefore should be removed from all her friends and relatives and placed in a suitable nursing home with a reliable and well-chosen nurse, the character and experience of whom must be of the highest order, as absence of skill in the nurse is as serious an obstacle to success as is want of experience, tact and firmness in the physician. Isolation must exclude all intercourse by correspondence or letters with the patient's relatives till the treatment has been wellnigh completed; she should see no one but the physician, nurse and masseuse. Should such arrangements not be thoroughly accepted by the patient and her friends before her removal, the physician should frankly decline to carry out the treatment after explaining to them that without complete isolation failure is sure to follow.

Absolute rest of body and mind is the next essential, the patient not being permitted even to stand upon her feet for a moment, just as if she were suffering from severe typhoid fever. She is not allowed to use her arms or hands, being fed by the nurse as a child. Books, games, sewing and usual ordinary harmless occupations are forbidden for the first few weeks, the routine of life being made as monotonous as possible so as to arouse longing for a new existence and create a desire to enter fully into the spirit of the treatment in order that recovery may be achieved as soon as possible. After 2 or 3 weeks the nurse may be permitted to read to her, and the other restrictions may be gradually withdrawn, letters being allowed from home at the end of the third or fourth week. It is wise to maintain the horizontal position in all severe cases for at least 6 weeks.

Overfeeding is the third factor in the treatment. Milk alone should be given for the first ten days, at frequent intervals, and gradually increased as massage is commenced, until enormous quantities are consumed. After three or four days sometimes 6 or 8 pints are swallowed daily. Strong beef tea, chicken soup, meat jellies, tea, coffee, chops, fish, steaks, poultry, eggs, bread and butter, oysters, oatmeal porridge, vegetables of all kinds, puddings, and any form of plain, wholesome, digestible food may be administered in very large quantities.

Massage is an important part of the treatment. It should be commenced upon the third day and be carried out in the most thorough manner, gradually extending the operation till an hour's good deep kneading of the muscles and tissues of the body can be borne by the patient. In bad cases two applications lasting for three-quarters of an

hour each, morning and evening, may be required. At the beginning it is well to confine the operations to the extremities, and the movements should be limited to the superficial structures. Afterwards the deeper tissues and muscles may be kneaded till in a few days the entire body, excepting the head and face, receives a fair share of manipulation.

In this way the blood and lymph circulations are greatly stimulated, effete products are washed away, waste materials being removed, and fresh pabulum brought with great rapidity to the refreshed tissues. The increased amount of nourishment is thus used up to the greatest advantage, and the patient's body weight increases to an astonishing extent. Wasted muscles and emaciated limbs become plump and agile, and the change in the patient's aspect and dimensions is such in 10 or 12 weeks' treatment as to tax the credulity of those who had not previously witnessed the success of the treatment.

Hydropathy is now usually added to the other elements of the Weir Mitchell treatment; it may be commenced with cold sponging after each massage séance, the warm, tepid and finally the cold bath being indulged in every day after the third week of treatment. Douches and cold sprays to the spine may follow the warm or tepid bath advantageously, and the needle bath is often very valuable when spasmodic seizures are threatening.

Electricity is the last element in the Weir Mitchell plan of treating hysteria. The uses of electricity will be more fully mentioned under the head of the treatment of the local manifestations in the following pages. When used as a factor in this method it is employed as an adjunct to massage. The interrupted strong current is selected, and the various muscles or groups of muscles are thrown into contractions. The moral effect produced upon the patient by demonstrating that the muscles which she believed to be permanently paralysed are still capable of active movement should be further strengthened by suggestion on the part of the physician, whose way is thus opened up to the successful persuasion of the invalid to exercise her feeble will upon the muscles. Each attempt at voluntary movement may be assisted by the electrode if this is applied at the psychological moment.

After the conclusion of the Weir Mitchell course it is a good plan to insist upon the patient having a change to a seaside resort before returning to her home.

Of late years hypnotism has been employed in the treatment of hysteria, but the physician will be wise who leaves the use of this remedy to those few who have made a study of it. Consciously or unconsciously he is successfully employing suggestion all through the treatment every time he assures the patient that she is certain to get well and every time that he confidently states that the remedies, medicinal, dietetic, &c., are certain to do good.

It is this element of suggestion which adds therapeutic value to many drugs from time to time prescribed for the disease, and which cannot conceivably act in any other way. Thus the hypodermic administration

of a little saline solution is often followed by astonishing results, and Lutton and Crocq were led to state that in the allied neurasthenic condition 75 mins. injected every month enabled weakened and invalided patients to develop energy sufficient to fit them for earning a living. The injection of brain matter, cardin and other organic products acts similarly.

Special symptoms will require individual treatment, thus—

The most serious condition which the physician can be called to treat is that in which the line between hysteria and insanity has been already crossed by the patient; Weir Mitchell treatment as ordinarily carried out in a nursing home is not suitable in such cases, and the only resource left is to send the sufferer to a properly equipped asylum.

Convulsions.—When the physician is called to a patient during an attack of convulsions or of hysterical coma, if he be confident of the accuracy of his diagnosis, he can have the satisfaction of often bringing the fit to an abrupt termination, after dismissing the sympathetic and alarmed bystanders. The patient, if in bed or upon a sofa, is so placed as to enable the physician to pour a stream of cold water suddenly from a height upon her face, without saturating the bedclothes or garments of the patient. This free douching is soon followed by a return to complete consciousness, and in subsequent fits the mention of it is often enough to arrest all symptoms. Sometimes a little cold water thrown forcibly against the face acts like magic, but the physician should state in the hearing of the patient that the application is to be repeated every 2 or 3 minutes till she gets out of her attack. Pinching the nostrils whilst the mouth is kept closed, so as to arrest the breathing entirely for a short period, may arrest an attack instantly. The vapour of strong Acetic Acid or Liquor Ammoniæ to the nostrils may produce the same good result.

Deep pressure over one ovary sometimes arrests a fit of convulsions or of coma, but it often fails; and when it does appear to arouse the patient it leaves her in a very excited and excitable condition. A better plan is to make firm pressure upon the supra-orbital nerve as it emerges from its bony canal.

Electricity is always of value if at hand, and by placing one electrode over the front of the neck and the other over the pit of the stomach a smart interrupted current may stop the paroxysm in a few seconds. It has no such effect in epilepsy, and may be used therefore as a means of arriving at a positive diagnosis of the nature of the convulsion, and so strengthening the physician's confidence in proceeding upon moral or suggestive lines.

Deep pressure upon the arteries and tissues at the base of the neck, so as to interfere with the cerebral circulation, as is sometimes successfully tried in stopping epileptic fits, may cut short the attack of hysteria or hystero-epilepsy; firm pressure on almost any region of the body will often act effectually in controlling hysterical phenomena. The room should be cleared of all active sympathising spectators, and the physician

should give his orders and carry out his operations without the least sign of hesitancy or wavering. This latter he cannot do unless he be very positive about his diagnosis; indeed, little can be done with hysterical patients as long as the physician has any doubt whatever lingering in his mind about the case being one of the genuine neuroses. The patient by intuition recognises his want of confidence in himself, as shown by some very trivial circumstance, and the result is that the demon refuses to be exorcised and his efforts prove futile to control the manifestations.

When the coma has lasted for a considerable time and the douche or electricity has failed, the application of a hot cautery iron gives prompt results. The writer has cut short attacks of both convulsions and coma by giving directions in a loud and firm tone of voice for the heating of an iron and the ordering of a portion of the skin to be exposed for cauterisation. He has, however, never seen a case where the actual carrying out of this measure appeared to be justified. Nitrite of Amyl sometimes arrests the paroxysm, and a hypodermic of Apomorphine to effect emesis is also a potent agent.

The paroxysm of coma, or convulsions, or delirium having been arrested, the routine moral treatment already detailed should be firmly instituted and carried out with patience.

The various local forms of *Paralysis* should be treated by the means recommended as useful for the general hysterical condition. Massage, passive motion and electricity employed locally afford, in conjunction with moral treatment, the best hope of success. The same measures prove useful in dealing with *contractures* or flexions of joints, which are also successfully removed by the application of a circular blister around the joint. The Weir Mitchell method of treating contractures consists in the injection of Atropine into the contracted muscle before attempting massage or passive motion. Swedish movements and gymnastic exercises are always beneficial. The method of employing these therapeutic agents will vary with the locality and nature of the affected parts or organs. Where there is much pain and tenderness over joints or bony prominences a sponge as hot as can be borne without risk of vesicating may be employed with benefit.

Aphonia may be treated by voice exercises and the methods described already under Aphonia. It yields readily to electricity, which may be employed in various ways for the treatment of this affection. By the aid of the laryngeal mirror one electrode is placed in contact with the vocal cords, the other being fastened to the outside of the larynx. By a button in the handle of the interior electrode the current is turned on, and the shock often causes the patient to instantly find the use of her voice, perhaps for the first time for many months. The applications should be repeated till the aphonia entirely disappears. Sometimes one sitting of a few minutes suffices, but more commonly several are required to insure that no return occurs. The Faradic or interrupted current should be used, and contact may be made 5 or 6 times during each sitting.

Static electricity may be used; it is preferable to galvanism and its

effects are more lasting. It may be used in a variety of ways, the simplest being that of passing a series of shocks through the larynx from a Leyden jar. As the aphonia is, however, only one of the many manifestations of the hysterical state, it will be advisable to administer the static electricity in a way that will affect the entire system. The simplest and mildest method of using it is to place the patient on an insulated stool or in an insulated chair, and by means of a metal foot-plate to connect her body with the positive pole of a Carré, Holtz, or a Wimshurst machine. This condition of continuous positive electrification is called the static bath. By changing the poles, negative electrification is produced and a series of sparks may be drawn by approaching a large brass electrode to the patient's body; or the static breeze or spray may be employed by using an electrode with numerous points.

McClure insulates the patient, and for the first two sittings administers the bath; afterwards by bringing a wooden ball close to the skin, but not close enough to produce a spark, he moves it in all directions over the body. When the paralysed part or an area of *anæsthesia* is approached the ball is laid aside, and sparks (light or heavy) are extracted by means of metal electrodes. Aphonia may be similarly treated by drawing sparks from the skin over the larynx.

General Faradisation may be employed in hysteria, as static electricity is administered by the static bath, in order to bring all parts of the body under the influence of the current. With her naked feet the patient stands upon a large metal disc or moistened sponge electrode connected with the negative pole of the battery, and the physician places himself in connection with the positive pole through a wire held in one hand, with the other he holds in contact with the patient's body a large metal ball enveloped in a moistened sponge. The current thus passes through his body, and also through the patient as it passes from pole to pole. In the same way Galvano-Faradisation may be employed as by de Watteville's method. High-frequency and sinusoidal currents and the hydro-electric bath are also employed; the effects obtainable are probably due entirely to suggestion.

Cutaneous hyperæsthesia is best dealt with by static electricity as just described by drawing sparks from the affected regions as in local anæsthesia; it also will yield to smart counter-irritation or the cautery.

Vomiting when purely hysterical may be suddenly stopped by a light application of the cautery to the skin of the epigastric region, and hysterical *hiccough* yields readily to the same treatment. When either symptom shows a tendency to return a mustard-leaf or a cantharides blister may be applied, or Faradism or static electricity may be employed.

Anorexia Nervosa is best dealt with by a course of Weir Mitchell treatment, and as in the treatment of obstinate hysterical vomiting the food introduced into the stomach by the siphon may be retained and digested thoroughly, whilst that administered in the normal way is usually rejected or remains for a long time unchanged in the organ. Rectal feeding is generally useless.

Hystero-Epilepsy.—The treatment of this apparently formidable malady (major hysteria) is to be carried out upon the same lines as are indicated for the management of a patient suffering under a severe convulsive seizure. Nitrite of Amyl in the writer's experience sometimes proves of decided value in bringing the attack to a speedy conclusion, and Pilocarpine has been credited with similar powers. Bromides in full doses, though not capable of effecting the good results observable in epilepsy, occasionally may be found to lessen the tendency towards the repetition of the seizures. Prolonged Weir Mitchell treatment is clearly indicated. The various Continental methods of treating the manifestations of the severer forms of hysteria by the application of magnets (metallo-therapy) and other agents need not be discussed; they can only exercise any benefit through the influence of suggestion, which may be more rationally employed by other methods.

ICHTHYOSIS.

Local treatment is of chief importance in this congenital and often hereditary skin condition, though Pringle has reported good results from Thyroid feeding, and Jackson states that he has cured it by irrigation of the colon, and others affirm that Pilocarpine hypodermically is always of use. Cod-Liver Oil is certainly beneficial in all cases, and especially in the mild type of the condition known as *Xerodermia* or *Keratosis pilaris* these agents may be advantageously employed to supplement local treatment.

The scales or plaques the result of the keratinisation of the epithelial cells must first be removed by prolonged immersion in a warm bath, with gentle scrubbing and the use of a Superfatted Soap, Borax, Resorcin or Salicylic Acid. Often a weak alkaline bath meets all the requirements if sufficiently prolonged and assiduous friction be employed by means of hair gloves.

After drying the surface a bland, unirritating animal oil or fat should be gently rubbed in till the skin is brought to the natural suppleness. Lard Oil or Neat Oil is the best, but any vegetable oil may also be used, and Olive Oil is free from objectionable odour. Vaseline or Glycerin may be used for the exposed parts of the body, but upon the whole the face and hands are best treated by pure Lanolin, which should be gently rubbed in till it disappears. Suet or Cacao Butter answers well in some cases, and Pringle prefers the official Glycerinum Amyli. Jamieson uses an ointment consisting of the following:

℞. *Resorcini* ʒj.
Olei Amygdalæ ℥j.
Lanolini ℥iij. *Misce.*

The bath should be used once each day for long periods, but the inunctions should be performed twice a day. When the skin has been brought to its natural feel and appearance, a hot bath once or twice a week and

a daily application of the oil will keep the subject of simple ichthyosis in a tolerably comfortable and presentable condition. Mild cases get on with one thorough inunction in the week. In a case occurring in a weak, thin boy the writer had an excellent result from one thorough application of Cod-Liver Oil every week, but the odour of the oil is a great drawback to its employment.

Flannel should be worn next the skin, and in some cases great comfort and benefit may be obtained from chamois or wash leather under-garments. Where eczema exists the weeping surface or fissures must be treated by emollients before resorting to the alkaline bath and friction.

In *Ichthyosis Hystrix*, where there is much hardening, the callosities may be excised or gently scraped with a curette, or dissolved by the application of a lotion consisting of one part of the B.P. Liquor Potassæ in two parts of water.

Sodium Ethylate Solution or Salicylic Acid dissolved in Collodion may be more conveniently used to destroy the growths, and will not cause injury to the underlying skin. After the removal of the cakes, an ointment containing 10 grs. of Iodide of Potassium in solution rubbed up with 1 oz. Lanolin may be used with advantage. Resorcin (10 per cent.) or Naphthol (5 per cent.) ointments may be tried in the later stages of treatment, or 1 dr. Resorcin added to each ounce of Glycerin. Amyli.

IMPETIGO.

Under such names as *Porrigo, Ecthyma,* and *Impetigo contagiosa,* this cutaneous coccic infection is recognised as identical with the so-called Football Impetigo and other epidemic types of impetigo. Adamson has shown that the streptococcus produces clear blisters or vesicles, whilst the staphylococcus causes a pustular eruption, but generally the primary infection is soon mixed with staphylococci.

Impetigo cannot exist or flourish upon a perfectly healthy person, hence the importance of looking after everything which improves the nutrition of the body. As there is always some departure from the healthy standard, feeding, exercise, fresh air and absolute cleanliness must be attended to.

The first step in the treatment consists in the removal of the yellow crusts and the exposure of the raw oozing surface upon which the cocci are multiplying. Bathing of the parts in warm water should be followed by a Boric Acid poultice, after which the application of any *weak* antiseptic as Ungt. Hydrarg. Ammon. diluted with twice its weight of lanolin or of zinc ointment suffices. When small patches exist, these, after thorough cleansing, may be painted over with a 20 per cent. solution of Nitrate of Silver. Where the eruption involves a considerable area of the body, warm baths containing Permanganate of Potash or a trace of Perchloride of Mercury should be administered. The inner clothing should be carefully sterilised, and care taken to avoid scratching with the finger-nails, whereby the cocci are transplanted from one region of the skin to another.

Porrigo is the usual term applied to impetigo of the scalp, and the condition is generally complicated with pediculi invasion. The scabs should be soaked with Paraffin Oil; warm bread and water poultices will be often required in addition to persistent sponging till the crusts are removed, after which the hair should be cut close, the entire scalp washed with saturated Boric Acid solution, and an ointment consisting of one part of White Precipitate ointment and two parts of Zinc ointment should be freely rubbed in.

An autogenous vaccine may be resorted to in inveterate cases, which may simulate Sycosis, but local treatment always suffices when carefully carried out.

IMPOTENCE.

Mechanical impediments to the sexual act should be met by appropriate surgical measures.

Functional causes supply the majority of the cases seeking advice, and many of these are in recently married individuals to whom much mischief may be done by the administration of drugs. The situation arises from ignorance and nervousness, and produces sometimes a dangerous depression of spirits. The majority of cases of this nature right themselves in a short time if left alone, and all that is generally necessary is a little sound advice and no drugging. The stereotyped instruction to rigidly abstain for a time from all attempts at sexual intercourse is a mistake, unless under special circumstances; nature generally soon sets matters right. This is especially true in those cases where emission occurs before penetration has taken place, and then a successful coitus may take place when the act is attempted again a short time after failure. Moral treatment is all that is necessary in most cases where the incapacity is imaginary.

In paralytic cases where impotence arises from previous recent excesses, but where the generative organs have not apparently suffered structurally to any obvious extent, total abstinence from all attempts at intercourse must be rigidly advised till evidence is forthcoming that nature means to assert herself. During this period vigorous exercise, with good living and abstinence from alcohol, with the daily use of the cold shower bath or sea-bathing and tonics, are very useful. Of tonics, Iron in full doses of the tincture of the perchloride in combination with Strychnine is the best, and Easton's Syrup of the phosphates is a valuable preparation given three times a day in doses of at least 1 dr.

Aphrodisiacs as a rule do harm, and should not be prescribed in these cases. The mere production of an erection is a different thing from power to perform the sexual act successfully, and these artificial aids generally fail, and after each failure the position of the patient is decidedly worse. For this reason he should be urged not to attempt the act till he feel that he has reason to believe that the attempt will be more successful than the last, and the patient's own sensations will be his best guide.

When this treatment fails, other measures remain, and these may at

once be resorted to without waiting in those cases occurring after middle life, or in those who have indulged in sexual excesses or in masturbation to the extent of causing atrophy of the testicles or penis. In such patients there is often weakness of sexual desire, but sometimes it is not diminished, and the physician finds that the mental depression associated with the impotence is so serious as to call for active treatment in order to prevent hypochondriasis or other form of mental disease.

Electricity in the treatment of premature loss of virility comes next in value to abstinence and the general hygienic measures just mentioned. This remedy may be used in various ways. The writer has observed that the best results follow from the employment of a moderately strong continuous current. One large sponge-electrode being placed over the lower end of the spine, the other is applied to the groin, spermatic cord, testicles, penis and perineum in succession. The sitting should last for 20 minutes, and may be repeated twice a day. The interrupted current may be employed occasionally with advantage for the space of about a week, during which the continuous is suspended. Benefit may sometimes be obtained from the wearing of a good Pulvermacher chain battery round the pelvis or loins.

Massage or gentle kneading of the scrotum and testicles, followed by free sponging of the parts with cold sea-water twice a day, has a decided influence in improving the tone and nutrition of the generative organs, and should always be tried in conjunction with electricity.

If the failure is a purely functional one arising from some deficiency in the apparatus necessary for erection, authorities speak highly of Cantharidin in small doses—3 mins. of the B.P. tincture—or of Phosphorus. The writer has never prescribed these remedies for this purpose, and is doubtful of their utility. Damiana has proved itself to be an aphrodisiac of considerable power without doing harm in most cases of loss of virility due to early sexual excesses or premature weakness of the genito-urinary centres in the cord. It may be advantageously combined with Strychnine as in the following:

℞ *Ext. Damianæ Liq.* (1 *in* 1) ℥iiss.
Tinct. Nucis Vomicæ ℥vj.
Sanmetto ad ℥iv. *Misce.*

Ft. mist. Capiat ℥j. *ter in die post cibos ex aqua.*

Yohimbine Hydrochloride is a more powerful though comparatively safe drug obtained from yohimbehe bark. It is procurable in $\frac{1}{18}$-gr. tablets, of which one to three may be given thrice daily or 10 mins. of 1 per cent. solution may be administered. Hypodermic injections of Poehl's Spermin (15 mins. of 2 per cent. solution) and 5 gr. doses of Orchidin or of Didymin by the mouth are highly recommended.

Where the impotence occurs as the result of some organic or functional disease it may reasonably be expected to pass off when the affection is

removed, and it is needless to say that appropriate treatment should be directed to the mischief of which it is symptomatic. Thus in diphtheritic paralysis, lead poisoning, renal affections, neurasthenia, diabetes and ataxia, impotence may be the condition which first directs the patient's attention to some departure from health.

In impotence following head or spinal injuries the best hope of success will lie in the judicious administration of small doses of Perchloride of Mercury ($\frac{1}{10}$ gr.), or of $\frac{1}{24}$ gr. of the Chloride of Gold and Sodium, or of 5 grs. of the Iodide of Potassium. Phosphorus and Strychnine should be used with the greatest caution in such cases. After a few weeks or months of this treatment the use of a weak continuous current, passed through the cerebrum for a few moments and followed persistently with galvanism of the spine from the head to the sacrum, will accomplish all that drugs can be expected to achieve. It has been noted in locomotor ataxia that after suspension treatment in some cases impotence for a time disappears. The writer has, however, observed the spontaneous temporary disappearance of impotence in one very advanced case where this symptom had been marked for many years.

INCONTINENCE OF URINE, AND ENURESIS.

Enlargement of the prostate is the commonest cause of urinary incontinence in elderly subjects, and must be dealt with by radical surgical measures. The physician must always be on his guard against mistaking the dribbling overflow from a distended bladder for incontinence, a condition which is very liable to arise during the course of prolonged fevers and other affections where neglect of catheterisation will tend towards a fatal result; when any doubt exists the catheter should invariably be used. Incontinence due to vesico-vaginal fistula, to the presence of prostatic or urethral concretions, or to structural bladder or urethral diseases or deformities must be dealt with surgically.

The neurosis known as *nocturnal incontinence* or *enuresis* is common in male and female children as the result of the survival of the purely reflex nature of the micturating act in the infant. There is usually nothing abnormal during the waking hours in the functions of the bladder in these cases, and there is no dribbling away of the urine at night, which is passed in a full stream during sleep.

The first step in the treatment should be the removal of any cause which tends to keep up peripheral stimulation or irritability, when any such is discoverable; it must not be forgotten that the causal agent may be located at a long distance from the bladder, as the presence of adenoids has been frequently demonstrated to be an effective factor in enuresis, though there may not be increase in the frequency of micturition during the waking hours.

Of the sources of stimuli arising within the genito-urinary tract itself the most frequent are pinhole opening in a narrow foreskin, a very long or adherent prepuce, or a bladder calculus, though the latter cause will probably also lead to vesical disturbance during the waking hours, and

the same remark holds true for hyper-acidity, hyper-alkalinity, and *Bacillus coli* in the urine, all of which should be met by appropriate remedies in every instance where the urine is abnormal. The presence of threadworms should be sought for, as these migrate from the anus at night and may set up smart vulvar irritation and anal pruritus; obstinate constipation acts in the same manner.

Often, however, no obvious source of peripheral irritation can be detected. Before resorting to drug treatment the physician should supervise the arrangements of the patient's meals, sleeping hours, &c. The diet should be plain and unstimulating, late meals and especially fluids before bed-time being forbidden. A careful nurse or mother soon finds out what articles of food or what beverages are followed by any aggravation of the symptoms, and these can be avoided. As a rule a strong animal food dietary is objectionable, but some children are worse upon a pure farinaceous diet, with slops. The bedclothing should not be too heavy, and a hard mattress is preferable to feathers. The child should be taught to lie upon either side, and sleeping upon the back may be prevented by fastening an empty cotton-reel or bobbin or spool by means of a tape round the chest. This will awaken the patient when he turns over upon his back during the night, and feels the hard substance pressing against his spine. It is certainly the case that some children will not suffer from nocturnal enuresis unless they turn over on their back in bed.

The great secret of the successful treatment of this condition lies in careful and conscientious *nursing*. The writer speaks from the experience of several hundred cases treated during the last 40 years in a large industrial school where the complaint was constantly met with in a considerable number of the younger girls residing in the institution. After the child has emptied the bladder he should be made to go asleep upon his side, and he must be lifted out of bed within a couple of hours and made to pass urine again, the operation being repeated in 3 or 4 hours and again before the usual time of getting up. A sensible and reliable nurse soon learns the peculiarities of each patient, and discovers the hours and number of times when such awakening is necessary as the intervals are gradually lengthened. The great majority of cases will respond to this plan of treatment alone without drugs, though in every case these may be judiciously employed to shorten the duration of the period of nursing.

Any form of punishment is reprehensible; even the threatening of punishment may seriously aggravate the condition in hypersensitive children. Suggestion may be legitimately tried in patients old enough to be impressed strongly by the physician's confident assertion that they will certainly get over the habit of bed-wetting.

Belladonna, pushed till its physiological action is obtained in a mild form, is the most reliable drug. It can only be of use in doses capable of partially paralysing the bladder. Children bear belladonna well, and some show remarkable tolerance of the drug, but there is difficulty in

proportioning the proper dose, and no rule can be given to fix the quantity exactly for any given age. A child 3 or 4 years old may get 3 mins. of the B.P. tincture in the afternoon, and again in the evening before bed-time. This may be gradually increased till 10 mins. are reached, if dryness of the throat and dilatation of the pupils are not observed. It is this great difficulty in arranging the dose of the drug which has led to failure. The physician must be careful not to leave the increasing of the medicine in the hands of inexperienced nurses. There is practically no danger in keeping up the action of the drug for two or three weeks, after which it may be gradually diminished, as the bladder soon recovers its normal rhythm when the micturating habit has been thoroughly broken for a short time. Atropine as a rule should be avoided, since the tincture of belladonna has been standardised, but some physicians recommend the hypodermic injection of 1 min. of the liquor in the case of a 4-year-old child before bed-time, the quantity being doubled for a child 15 years old, but these doses sometimes produce delirium.

Hyoscyamus may be substituted for the belladonna tincture, and it is especially indicated where the bladder is irritable during the day-time. As a rule the belladonna should not be administered in the forenoon hours. Bromide of Potassium has now and then given good results, but is very much inferior to belladonna. It may, however, be combined with it advantageously. The following mixture may be prescribed for a child 7 years old:

℞. *Tincturæ Belladonnæ* ℥iij.
Potassii Bromidi ℥v.
Syrupi Simplicis ℥j.
Aquæ Floris Aurantii ad ℥iv. *Misce.*

Fiat mistura. Cujus capiat cochleare unum minimum, mensurâ, vespere et hora somni.

The combination of Strychnine with belladonna has given excellent results in atonic cases; 2 mins. liquor strychninæ may be combined with each dose.

Chloral Hydrate has been highly recommended—the writer has found it to increase the mischief; like Cannabis Indica, Opium, Codeine, and other narcotics, it would appear as if the dreaming which follows the administration of narcotics is very liable to excite the bladder, and often an intelligent child will state that he always dreams that he is micturating before he wets the bed.

Sumach (*Rhus aromatica*) has given excellent results. Unna states that it acts upon the muscular fibre of the bladder. The writer has used it in the case of a young adult with considerable amelioration of the symptoms. The fluid extract (1 in 1) may be given 3 times a day in doses of 5 mins. to children under 2 years, and 10 mins. to children of 8 years old. Rhus Toxicodendron (*Poison Ivy*) in small doses has been

found to check incontinence of urine, but in no way is it superior to the *Rhus aromatica*, and it may cause irritation of the stomach and bowels. Antipyrine has been proved effectual by Phillips, who gives 8 to 10 grs. to children 7 years old and increases the dose, continuing the drug for 3 or 4 months without injury. Lycopodium and Ergot have also occasionally proved useful in atonic cases, and Cantharidin in minute doses has sometimes given good results.

Some physicians advise blistering the sacral region, and Harkin reported good results from painting the upper cervical spines with Liquor Epispasticus. It is just possible that these methods act by preventing the child sleeping upon the back.

Painting the orifice of the urethra over with Collodion, or encircling the penis with plaster or an elastic band, are generally futile procedures.

Electricity when there is an atonic condition of the sphincter has proved useful in some cases, but its effects are transient. Picard applies one pole to the membranous part of the urethra in boys, and to the entire urethra in girls, and places the other pole above the pubes.

Cystoscopic examination of the bladder is seldom quite negative in these cases, and it should therefore always precede local treatment. The writer has found tuberculous disease more than once labelled incontinence. At other times, especially in women, œdematous patches are found around the internal meatus. They are often associated with some uterine mischief, to which treatment must be directed.

When conscientious nursing in combination with belladonna, hyoscyamus or rhus fails, a trial may be made of passing a graduated bougie or sound into the bladder in order to stretch the posterior urethra. If no result follows, a few drops of Nitrate of Silver solution may be lodged in the prostatic portion of the canal by means of a suitable syringe attached to a rubber catheter. In girls the solid nitrate may be applied to the entire urethral passage.

Obstinate enuresis in young women may be treated by injecting 3 to 5 grs. Nitrate of Silver dissolved in 2 drs. water into the empty bladder at intervals of a week or 10 days, and Simms recommended dilatation of the organ by forcible injections of warm water up to the extent of 20 oz.

Gerbsman's method of treatment consisted in placing the patient in the knee-chest position and applying massage to the vesical neck through the rectum for two or three minutes at a time.

The most obstinate and long-continued cases are to be met with in female patients, when the incontinence may become complete both in night and day time. Gersuny's operation may then be tried; he dissects the urethra from its surroundings for $\frac{3}{4}$ inch, seizes its outer freed border with forceps, and puts on a twist of half a circle, fixing it in this position with sutures; immediate continence results. Frisch, in a case which relapsed, dissected the urethra again, and made a further twist of half a circle, and he holds that this is the best of all operations for incontinence. Before resorting to this heroic procedure the urethra may be

gradually dilated by the passage of a series of large sounds till the finger can be finally introduced into the bladder; this method, though not likely to effect a cure, can do no harm, since the incontinence is already complete: it has been followed sometimes by good results.

The after-treatment of nocturnal incontinence will consist in the administration of tonics like Strychnine, Iron, Quinine, and Arsenic, with sea-bathing, open-air exercises and attention to the dietary, strong tea or coffee never being indulged in after the early evening hours.

INFLUENZA.

Preventive treatment in the presence of a great pandemic is impracticable; all the individuals in the affected zone being apparently enveloped in an ocean of the germs, ordinary isolation measures are useless. In sporadic cases this is different, and the aged, the feeble and the diseased should be kept away from any patient suffering from even a mild attack of influenza; full doses of Quinine and Eucalyptus are believed to afford some protection. A point in prophylaxis of vital importance, and one usually overlooked, is the necessity for the rigid isolation of an influenzal patient who is suffering from the pneumonic complication. Early in the great epidemic of 1890 the writer observed the highly contagious nature of the influenzal pneumonia, and witnessed many instances where a pneumonic case infected a number of convalescing patients who had escaped lung complication.

When the first symptoms of influenza show themselves the patient should be immediately ordered to take to his bed; there are few diseased conditions in which the mortality is so notably influenced by rest and protection from exposure. The bronchial surface is left in such a receptive condition that any change of temperature in the surrounding atmosphere is liable to lead to serious infection from other micro-organisms, against which the healthy patient is usually immune. By compelling the victim of influenza to remain in his room for at least a week the complications of the disease are largely prevented. His strength should be maintained from the onset by judicious feeding with milk, soups and other liquid nutritious articles of diet.

The intense headache and pains in the back and limbs, even when very little fever is present, should be relieved by Antipyrine (5 grs.) administered at the beginning of the attack, and half this quantity given every 3 hours generally affords very speedy relief. The action of the drug upon the skin hastens the elimination of the poison and cuts short the course of the affection. It appears also to neutralise the toxin, and it should be combined with 2-gr. doses of Citrate of Caffeine.

Quinine is stated by Yeo to be the best of all drugs in influenza; he believes it to be really an antitoxin, and he recommends from 1 to 3 grs. dissolved with 20 grs. citric acid to be taken every 3 or 4 hours in an alkaline mixture of Carbonate of Ammonia and Bicarbonate of Potassium. This treatment, he states, prevents complications and sequelæ, but the writer believes the action of Antipyrine to be more reliable, and it is

principles. The best routine agent in these cases is the administration of small doses of Antipyrine in combination with Salicylates to promote elimination and to counteract the influence of the toxins lingering in the blood and tissues. The anosmia yields in time to Strychnine hypodermically, and long-continued profuse sweating should be dealt with by the same drug.

Insomnia is often a troublesome sequela, which should be treated not by opiates, but by Trional, Sulphonal, Paraldehyde or Veronal.

INGROWING TOE-NAIL.

The cause of this condition should be avoided; it consists in the habit of paring the nail squarely so as to leave a sharp angle under the skin edge, which is forced into the skin by the pressure of a tight boot with a narrow, tapering or schooner-shaped toe.

In trivial cases the clipping of the free margin of the nail, so as to leave the angle of nail projecting beyond the skin, and scraping of the dorsal surface with the edge of a bit of glass or with the knife so as to reduce its thickness and to produce a tendency to curling upwards or backwards of its lateral margins, and the removal of any cuticle accumulated under the ingrowing edges of the nail, are all that are required to give relief and prevent further progress of the condition.

If ulceration has already occurred a minute roll of gauze or of tinfoil should be neatly packed down between the tender overhanging skin and ingrowing edge so as to insinuate itself under this edge and cause elevation of it. Strapping should be then applied, so as to retain the roll in its position and at the same time to drag upon the overhanging integument and keep it pulled away from contact with the ingrowing edge. In a short time the roll of tinfoil can be easily packed well under the inturned edge, so as to secure its thorough elevation; it should not be removed for several days, after which the space may be filled with Boracic Acid, Nitrate of Lead, Alum, Oxide of Zinc, or with the following—

℞ *Pulv. Iodoformi* ʒiv.
Calaminæ Præparat. ʒij. *Misce.*

Nitrate of Silver, Sulphate of Copper, strong Solution of Perchloride of Iron, pure Carbolic Acid, and Acid Nitrate of Mercury are useful for the destruction of exuberant granulations, and occasionally they destroy the sharp inner edge of the nail which is beyond the reach of the knife and scissors, but mere paring of this margin of the nail is useless. Pürchauer softens the nail by several applications of a 40 per cent. solution of Caustic Potash, scraping its surface after each application till the nail becomes a mere film in thickness, after which it may be lifted up with forceps and cut as easily as paper.

When the ulceration does not disappear, under cocaine or ether spray the overhanging granulations and integument may be shaved clean off by means of a sharp scalpel and the wound left to heal under antiseptic

dressings. If Cotting's modification of this method be pursued excellent results are obtainable; he extends the incision backwards so as to remove all granulating tissue together with a slice from the side of the toe, taking care, however, not to interfere with the inner margin of the nail. This method, if skilfully performed, often gives better and more lasting results than those following the operation of avulsion.

A more radical operation is to carry the incision through the nail, removing a considerable longitudinal strip of it, and then to excise completely the matrix belonging to the portion of nail removed, and the overhanging skin.

Where the ulceration process has loosened the entire nail *avulsion is necessary.* This is accomplished, when the patient is fully under the influence of an anæsthetic or under local anæsthesia, by inserting one blade of a pair of dressing forceps under the centre of the nail to its root and securing a firm grip as the blades are closed, and by firm traction the nail is removed.

One-half of the nail may be removed, after previously cutting it in two, by inserting one blade of a pair of fine and sharp-pointed scissors under its centre and pushing it down to the root. The loosened portion may then be easily removed by the forceps. Powdered Boracic Acid being freely applied, the wound may be enveloped in lint moistened with Spirit Lotion and surrounded with oiled silk. Should trouble arise after the growth of the new nail the entire matrix must be dissected out after a second avulsion has been performed.

INSANITY.

The increase of insanity during late years has directed much attention to *preventive* measures. Obviously the most important of these should consist in the prevention of the marriage of all individuals possessing a marked family history of any degenerative psychosis, since in a large proportion of cases the malady is hereditary. Marriage need not, however, be forbidden when the family history clearly indicates that the insanity of the parent was obviously of the acquired type, though here there is often room for the suspicion of an underlying deep neurotic taint which assisted the onset of mental aberration. The marriage of individuals whose family history on both sides shows a strain of insanity should be regarded as little short of criminal unless the female be beyond the child-bearing period.

In the upbringing of the offspring of parents of neurotic type much may be done by moral and educative treatment, and as stated in the article on Hysteria the children of a mother suffering from the graver degrees of that neurosis should, when possible, be removed from her influence and sent to a boarding-school at a distance. The unstable psychic or neuropathic inherited condition being liable under severe strain to cross the boundary-line between an ordinary neurosis and a confirmed psychosis, every form of severe mental application and all profound emotional strain and sexual excitement should be guarded

against as far as possible. The part played by syphilis and alcoholism in the production of insanity must always be borne in mind. Though the pernicious habit of self-abuse is often the result of mental deterioration, it may certainly become the cause of it in youths with a well-marked neuropathic taint. Therefore in such a close investigation should be pursued regarding the habit, and moral treatment should follow.

The treatment of the different types of insanity—dementia, mania, melancholia, paranoia, idiocy, moral mania, monomania and their varieties—would require for a proper description of the necessary details space very far beyond that at our disposal. Moreover, these details can only be carried out in institutions specially designed for the purpose, and furnished with elaborate machinery for isolating, watching, nursing, dieting, exercising, amusing and instructing the victims of mental disorders.

Early removal to a suitable institution is of the utmost importance, and as a rule it may be said that in acute cases every day's delay diminishes to some extent the chance of permanent restoration. To undertake the care and management of insanity in the patient's home would be in the majority of cases a serious mistake and a cruel wrong to the patient, whose chances of recovery would be thereby seriously diminished. Where the patient's ailment is such as does not prevent his travelling and mixing with the public, his early removal from home under the watchful care and close surveillance of a physician during a prolonged tour by rail or sea may be fairly tried with some hope of success before resorting to the restraints of an asylum. Such cases are, however, upon the whole rare where this method of treatment is available or warrantable. Only in a well-equipped asylum can rest, isolation, feeding, moral treatment—psycho-therapeutic or suggestive—be properly carried out, and the objections of the friends of many patients have been met by the introduction of the villa system into most of the modern planned institutions.

Feeding is an all-important element in most cases, and often it must be carried out by the nasal tube and siphon. Adam advocates the open-air treatment as in the Nordrach system, with very generous feeding. Beyer recommends the use of a bath at 95° F. for hours at a time, the patient spending his day in the bath, where he takes his meals, and is moved from the bath to bed at night. The drug treatment of the various forms of insanity resolves itself into the judicious administration of remedies, with the view to correct the many deviations from the normal physiological state which may exist either as the cause or as the result of the abnormal state of the mind. Thus tonics for loss of appetite, and cod-liver oil, iron, and other restoratives are indicated when emaciation or anæmia exists.

Sleep should, speaking generally, be insured. Narcotics should be avoided, except when pure hypnotics fail; the favourite drug is Chloral. Hyoscine has given excellent results in several large asylums, and the hypodermic injection of $\frac{1}{100}$ gr. of pure Hyoscine Hydrobromide generally

produces the most desirable calm and sleep. Veronal, Sulphonal, Trional, Paraldehyde, Chloralamide, and other hypnotics may be used according to their recognised indications. Opium and its alkaloids are generally objectionable. (See following article.) Bromides are valuable in acute maniacal states, but their administration in all melancholic forms of insanity should be avoided. A favourite hypnotic in many asylums is a mixture of Sodium Bromide and Chloral Hydrate.

INSOMNIA.

The different types of insomnia are difficult to classify. Secondary or symptomatic and primary insomnia are accepted as embracing all cases of sleeplessness. The primary division includes the insomnia due to *psychic* causes such as mental excitement, grief, worry, brain fag and that to be met with in the neurotic and psychopathic strains which manifest neurasthenia, hysteria, hypochondriac tendencies, or other latent affinities with melancholia and the different types of insanity. This primary class will also include the large group of *toxic* insomnias. This group, however, overlaps those included in the secondary or symptomatic division of sleeplessness in which the insomnia is the result of some primary diseased condition as fever, pulmonary, cardiac or renal disease where the exciting cause of the wakefulness is often toxic. Hence in the treatment of insomnia little aid is to be expected from a rigid classification of its different types, the wisest course in each case being to institute a careful search for the primary cause upon the removal of which the success of all rational treatment depends. It must also be remembered that in a neurotic individual a trifling symptomatic or secondary cause may induce severe insomnia, whilst the same factor is harmless when present in an individual possessing a more stable nervous system.

Thus severe insomnia may be produced in some neurotic individuals by a cup of tea taken late in the evening, by the presence of some trivial personal discomfort as coldness of the feet, or by any sudden change in the hours of diet; some patients cannot sleep after a late supper, whilst others fail to get any sleep if they retire to rest with their stomachs empty. Sleep may only come to those who retire to bed immediately after wearying the brain with active exercise. Others may be wholly unable to sleep if any previous mental activity has been indulged in. It is a common experience to find amongst active brain workers that sleeplessness follows after taking a day of rest and calm, and often the freedom from care and the repose of the Sabbath result in the loss of sleep for the night, whilst insomnia often seizes the clergyman after his severe day of exciting mental strain.

A common variety of sleeplessness described by the writer under the name of *habit* insomnia is met with in which no immediate cause is discoverable, the affection having been originally produced by an exciting cause long since removed, and the patient has acquired the habit of lying awake. The mere dread of not sleeping is a powerful factor in such cases when the idea presents itself to the mind of the patient after retiring to rest. The

rhythmic nature of the natural sleep process must always be kept in mind; when this rhythm is broken by any serious change in the hour of taking rest a troublesome habit insomnia may develop; the individual lies awake till the usual sleeping hour arrives, and the conditions being then so different from those associated with his former regular sleeping hour that sleep does not supervene.

Under the different headings in the present volume the sleeplessness associated with each disease is referred to amongst the complications of the affection. The aim of all treatment should be the removal of the primary cause as dyspepsia, gouty conditions, cough, pyrexia, pain, pruritus, dyspnœa, failing compensation, obstinate constipation, &c. This should be undertaken in every instance before resorting to the routine administration of hypnotics, though the use of these in some cases is imperative when the cause is not capable of being removed, and in many cases even after the causal factor has been dealt with, should habit insomnia have developed. A word of caution is, however, necessary in dealing with narcotics; when pain is the immediate cause of insomnia ordinary hypnotics are useless, as sleep will not supervene till the pain has been relieved by morphia or opium. Prohibition of these drugs is necessary when the cause of the pain is irremovable, as the opium habit is certain to become established if the drug is employed as an hypnotic, and the same remark applies to alcohol.

The cause of primary insomnia being discovered and remedied by strict obedience to the violated health law, the conditon may be expected to gradually pass away without drugging, unless a confirmed habit of sleeplessness has become established. There are minor aids which in such cases should not be despised before resorting to hypnotics.

Thus change of scene, a sea voyage, free open-air exercises near the sea, indulged in till a decided degree of fatigue is felt, the avoidance of all mental overwork, and, as far as possilbe, of anxiety and worry, should be advised. A long, smart walk just before bed-time is an excellent hypnotic, if the patient upon finishing it retires immediately to his room, undresses without sitting down, and goes to bed.

Cold feet must be warmed and rubbed till tingling is produced. Robust patients can dip their feet for a few seconds into cold water, and restore the local circulation by having them rubbed briskly with a coarse towel. Feeble folk must generally fall back upon night socks and the objectionable hot-water bottle. Cold-water bandages to the forehead or scalp seldom do much good, and may keep the patient awake by causing discomfort locally. A hard bed is better than feathers, and a hop pillow may have a good moral effect. Where the patient tolerates it, elevation of the bed's head is a decided advantage, especially where there is want of vascular tone. Some fancy that they can sleep better when their bed is placed due north and south.

Various plans are recommended for wearying the brain, such as counting up numbers, repeating poetry, &c. The influences of monotonous noises or vibrations to which the patient has been long familiar, as the hum of city traffic, the sound of machinery, of running water, &c., are often productive

of good. The writer knew of an instance of protracted and dangerous insomnia in the wife of a blacksmith, which, after failure of all hypnotics and absolute stillness, yielded to the music caused by the loud hammering on an anvil in the forge beneath her bedroom. He has witnessed an hospital patient who could not sleep till she got a small and rather noisy clock from her home and placed it by her bedside. It is as common an experience for sleep to become less sound in individuals who have slept for years in the centre of a noisy city after they move into peaceful suburban districts as in the opposite change from silence to noise.

A large warm or a cold-water draught before lying down occasionally soothes some patients. The habit of reading oneself to sleep by the aid of some uninteresting author, though not to be recommended, is often efficacious. The absence of light is generally essential, and the morning sun should be shut out by double blinds.

Massage is a powerful hypnotic, and sometimes very wakeful and neurasthenic patients fall asleep during the performance of it. Sometimes, however, massage may excite. Eccles advises thorough rapid massage of the abdomen, thighs and legs, so that a temporary anæmia of the brain may be produced by the blood flowing into the dilated vessels of the manipulated regions. A warm or hot compress to the abdomen tends to prolong the dilatation of the abdominal bloodvessels, and sound, refreshing sleep often supervenes.

Hydropathy is occasionally valuable, and in some cases gives permanent relief. A warm bath should be taken till the patient is almost beginning to feel weak. He may then be enveloped in a flannel bath-sheet, and when lying on his bed upon the top of the bedclothes his body should be perseveringly rubbed down by an attendant with a linen Turkish towel till a grateful sense of drowsy languor is felt, after which he should get under the bedclothes. The Wet Pack may be employed for 45 minutes with advantage, but it will be better to use a sheet wrung out of tepid or warm instead of cold water, as generally recommended. Friction with a rough warm towel should be afterwards employed, and the amount of over-clothing should not be such as to encourage profuse perspiration, which may keep the patient awake. The local pack to the trunk may likewise be employed with advantage, and after getting to bed its good effects may be kept up by giving a hot drink. Gellhorn uses a piece of calico, 18 inches wide and nearly 3 yards long, rolled up like a bandage, and a third of it wrung out of cold water. With this he bandages the leg, the wet portion being carefully covered up by several layers of the dry part as well as by a layer of gutta-percha tissue, and a stocking drawn over the whole; the dilatation of the vessels which follows diminishes the amount of cerebral blood and induces sleep, especially where there is any cerebral congestion. The Cold Douche is valuable in allaying the cardiac excitement upon which the insomnia may depend.

Electricity may be used in many ways. The writer employs a weak constant current of 5 cells of a Leclanché battery, with one electrode on the forehead and the other on the occiput for 5, 10 or 15 minutes. The

interrupted current to the spine, alone or in conjunction with massage, has been used in some cases with satisfaction, and Faradisation of the head has often proved useful.

Static electricity gives best results. After insulation of the patient upon a glass stool, his body is brought into connection with the conductor of a Carré or Holtz machine, and when thoroughly electrified a fine metal point is held opposite several spots on the scalp and forehead not near enough to produce a spark. The sensation is as if a light wind or breeze was pleasantly playing over the region, and McClure has found sleep come on whilst this form of electric soufflé was being employed. The production of heavy sparks is not necessary or advisable, but the use of the metal cap and static insulation gives the best results which can be obtained from electricity. The high-frequency current is less satisfactory.

Drugs must be employed when the above-mentioned remedies fail, and there is little danger of the formation of a drug habit if the narcotic be only employed for short periods in order to break the habit of lying awake, especially in cases where the insomnia has been of recent development.

Alcohol is of great value when used with caution and discretion in temporary insomnia. The various spirituous beverages have very different therapeutic actions, which cannot be explained by their alcoholic strengths. Thus for insomnia wines are inferior to whiskey, and brandy does not produce as good results as whiskey. Strong ale is highly hypnotic, and so is porter or stout. To obtain the best hypnotic effect from alcohol, it should be given in one full dose just as the patient has undressed and lain down in bed. It acts more certainly if given warm, but not hot. One wineglassful of good whiskey, made into punch, and swallowed as a draught —not sipped in spoonfuls—is a most invaluable soporific. Where the physician has reason to dread the formation of the alcohol habit it may be mixed with a bitter, or may be forbidden altogether after a short time. The danger of intemperance is much greater when alcohol is ordered to be taken with meals; but this danger, when the drug is used in simple insomnia, should never be lost sight of. It is surprising to notice, when the patient abstains from the use of alcohol at all other times, how the same dose may continue to produce its beneficial hypnotic effects without requiring augmentation for long periods. Headache and malaise seldom follow, and when they do they may be prevented by using a more matured spirit. The product of the patent or silent still should be condemned; the writer has satisfied himself that it is more liable to lead to the alcohol habit than a mature pot-still whiskey, especially if swallowed in concentrated form.

Opium or Morphia is the most certain in its action of all sleep producers. It possesses the power of relieving pain by preventing the conduction or perception of painful impressions, and sometimes this can be done by employing small doses which would have no soporific effect in ordinary states. As sleeplessness is so often caused by pain in the innumerable diseases coming constantly under the notice of the physician, it must be used often to induce sleep as in neuralgia, sciatica, pleurisy, cancer, angina,

&c. In simple chronic insomnia, whether produced by mental overwork or occurring in the insane, and when not caused by or complicated with pain, opium or its alkaloids should not as a rule be employed.

Where the insomnia is of very short duration, and caused by mental worry or overwork, which is not at all likely to be repeated or become a habit—in short, where the cause is fleeting, or has already fled—opium is an invaluable hypnotic, and may be employed in such a case with great advantage. The dose should be a full one, 1½ or 2 grs. of opium, or 35 mins. of the solution of morphine. The dose should be given as the patient lies down, and darkness and quiet should be maintained. If sleep does not result in two, three, or four hours, the same quantity may be again administered.

When morphia is administered hypodermically as an hypnotic for the first time a dose of alcohol may be given a few minutes before it, or 1 min. of Solution of Atropine should be injected along with it. When severe pain is present larger doses of opium are required, and it is as a rule better in such cases to repeat the dose at a shorter interval than to give one very large dose. In chronic bronchitis with profuse secretion, in the late stage of phthisis, in congested states of the brain with contracted pupils, in renal affections and in all ailments of childhood or infancy, opium is contra-indicated. In the insomnia of delirium tremens it may be given in large doses. In the painful insomnia of cardiac distress hypodermic injections of morphia (¼ gr.) often give great relief and sound sleep when every other hypnotic has failed, but Paraldehyde should always be tried first.

In acute melancholia or mania, morphia is still sometimes employed, but Hyoscine and the newer hypnotics are generally far better. Codeine, Narceine, Pantopan or Omnopon, and the various preparations of opium, as Black Drop, Battley's Sedative, Nepenthe, &c., may be tried where the after ill-consequences of opium have been barriers to its use. Codeine is a very feeble hypnotic. Opium or morphia may be combined with most of the new hypnotics, and the writer has often relieved pain with small doses of morphia, and afterwards induced sleep by 15 grs. of Trional. The dose, even when the minor action of morphia only is required, will generally need augmentation, and this is one of the chief objections to the use of opiates in insomnia and all chronic conditions associated with sleeplessness. Dionin or ethyl-morphine-hydrochloride is also useful, especially in the insomnia of the morphia habit. It may be given in ½-gr. doses. Heroin Hydrochloride has similar action, and is preferable to other opium derivatives when the cause of the insomnia is due to bronchial irritation.

Indian Hemp is open to the objections to which opium is liable, and hence it is not a suitable drug in the treatment of simple chronic insomnia, and very often fails entirely. It does not, however, disturb digestion or cause headache. Cannabin Tannate is an excellent form for prescribing the drug in doses of 5 to 10 grs. in the insomnia of mania. Cannabinon is also recommended in similar conditions, but the dose should not exceed 1 gr.

Antipyrine and other analgesics by relieving pain may assist in the induction of sleep, and should always have a trial before resorting to narcotics.

Hyoscine Hydrobromide in doses of $\frac{1}{200}$ to $\frac{1}{100}$ gr. administered hypodermically is a powerful soporific, producing deep, quiet sleep in 20 minutes which lasts 6 or 8 hours and leaves no ill-consequences after awaking. In acute mania and other conditions of grave excitement with motor disturbance it is a most rapid and certain hypnotic. Krauss states that after its administration the maniac collapses as if struck by lightning, but the calming down of the general paralytic is gradual, his restlessness soon settling into peaceful slumber. It is obvious that a remedy of such potency is not one to be employed in a routine way in the treatment of simple chronic insomnia. Some authorities have reported sharp depressant effects and wild delirium from $\frac{1}{60}$ gr., and it will be wise to regard valvular disease as a contra-indication to its use. In insomnia associated with or depending upon a latent strain of insanity it is the most efficacious of all hypnotics. The drug may be given by the mouth, but it is less certain in its action than when injected.

Bromides are the least harmful of all hypnotics. In insomnia following prolonged mental activity and overwork full doses (30 to 60 grs.) of the sodium salt produce calm, deep, refreshing sleep. In severe cases it often fails, but failure does not leave the patient in a worse condition than if he had not taken the drug. It is indicated where sleeplessness is caused by mental over-activity, a state not of simple wakefulness, but where the brain is unusually active, as often occurs on the patient retiring to rest immediately after some mental effort or worry, without permitting a period of rest, during which the mental faculties should have been diverted into other channels. In this state there is some flushing of the face, and throbbing of the carotids and pulsations are felt in the cranium; it is a very frequent experience in public speakers and debaters. If 30 grs. of bromide produce no effect in an hour under these circumstances, the dose may be repeated, and if sleep does not soon follow, a full dose of warm whiskey punch will rapidly produce sound slumber. There is a state of restlessness of a different sort often observable in highly nervous patients after getting into bed, in which the slightest external stimuli call forth incessant and ineffectual attempts to dispose the limbs, head or trunk in such positions as will give a sensation of comfort and tranquillity. This, which might be called "acute fidgets," is controlled effectually by a few doses of the bromide, which probably acts by diminishing reflex excitability.

Insomnia shows itself often by the patient falling asleep almost immediately on retiring and waking up thoroughly soon afterwards, and lies tossing about till morning. These types of sleeplessness must be always kept in mind whilst selecting the most suitable drug for administration, but bromides are suitable in both varieties. A fair dose if given before bed-time will prevent the waking up, or a fuller dose may be given after the patient has got his brief preliminary sleep. The first-mentioned plan is, however, a better course to pursue, since it tends to break the habit of

awakening. Bromural and the other bromine compounds and combinations will be mentioned later on.

The bromides may be taken for long periods without hurt. In one patient with a bad family history of insanity who suffered from insomnia, the Bromide of Potassium combined with a small dose of Tincture of Hyoscyamus (20 mins.) was steadily taken almost every night for 25 years with most satisfactory results, and with no necessity for augmentation of the dose, and with no ill consequences. In acute mania McLeod induces "bromide sleep" by administering 2 drs. of Sodium Bromide in 5 oz. water every two hours during the day until 1 oz. is taken, and this quantity is repeated during the second day.

Chloral Hydrate has been extensively employed as an hypnotic in simple insomnia and delirium tremens. It is perhaps the most efficacious soporific which we possess when pain is not present. It is open, however, to two objections; these are the dangers of establishing a chloral habit, and the depressing influence which the drug exerts upon the heart. It directly affects the cardiac muscle, dilates the arterioles, and may injuriously affect respiration. Generally sleep is profound and refreshing, and the after ill-consequences are trivial. It acts rapidly, and the slumber may be prolonged to ten or twelve hours. Its depressant action should prevent its use in cardiac disease, in emphysema, and bronchitis, and in the late stages of typhus and typhoid insomnia, and in the sleeplessness following influenza, when the cardiac muscle is always weakened; it is likewise a dangerous hypnotic in ordinary senile insomnia for the same reason. In the insomnia of insanity its soporific virtues are so uniformly experienced that it is employed in a routine fashion in many asylums. Though patients have taken it without any ill-effects in these diseased conditions for many months, there is always a remote possibility of a lethal action upon the heart.

Whilst the victim of the opium habit may increase enormously with safety to life the dose of his narcotic, gauging its amount by the effects which he can measure by his own sensations, when he attempts a similar practice with chloral he may have no warning till fatal paralysis of the cardiac muscle ensues. This is the explanation of the many deaths "by misadventure" in medical men who have become victims of the chloral habit. It is useless to combine it with digitalis with the view of lessening its evil action of the heart, as is often advised. The digitalis has no cardiac tonic action for some hours after being swallowed, whilst the chloral may act injuriously within a short time.

Chloral acts rapidly, and should be given immediately before retiring to rest, and as some patients are very susceptible to its influence it is wise never to begin with a larger dose than 20 grs.

It has been combined with Morphia or bromides with advantage, and the writer believes that 1 or 2 oz. of whiskey given at the same time greatly increase its efficacy, and materially diminish its power of depressing the heart. Some authorities strongly condemn the combination of chloral and morphia as the most dangerous of hypnotics. The writer cannot

confirm this judgment. The value of the bromides when given with chloral is above dispute, as a smaller dose suffices.

The following combination is very efficacious:

℞ *Chloral Hydratis* gr. xxx.
Potassii Bromidi gr. xxxx.
Liq. Morphinæ Bimecon. min. xxx.
Syrupi Aurantii Flor. ʒiv.
Aquæ Destillatæ ad ʒiij. *Miscc.*

Fiat haustus. Sumat dimidium hora somni et residuum horas tres postea, si opus sit.

Bromidia and Liquor Bromo-Chloral Co. contain hyoscyamus and Indian hemp in combination with chloral and bromides; they may be given in teaspoonful doses.

Butyl-Chloral Hydrate possesses many of the good qualities of chloral and is less dangerous, but it is a much weaker hypnotic. Chloretone—a derivative—is given in 20-gr. doses in cachets, but has feeble hypnotic powers.

Chloralamide, now official as Chloral Formamide, may be given in 30-45 gr. doses. Sleep comes on in less than one hour. It seems less powerfully hypnotic than chloral, but there is no dilatation of the arterioles or fall of blood-pressure. It is indicated in the same class of cases as chloral in simple insomnia, and has been used as an hypnotic in heart diseases and bronchial affections. It is claimed for this drug that it is safe and that for very long periods the dose need not be increased, and that it tends to establish a *habit* of sleeping after its administration has been suspended.

Chloralose has given excellent results in doses of 4 to 10 grs., and it is claimed for it that it causes no digestive derangement, and that it is less dangerous than chloral, but it is decidedly less reliable as an hypnotic.

Hypnal or monochloral-antipyrine is vaunted, but it is heir to all the objections raised against chloral in the ordinary hypnotic dose of 20 grs.; it is perhaps the most depressant of the chloral compounds.

Isopral or trichlor-isopropyl-alcohol is another chloral product suitable for administration in the enema form, in 30-60 gr. doses, when there is gastric irritability or as a preliminary to chloroform narcosis.

Sulphonal may be given in doses of 30 grs.; it is the type of a pure hypnotic, possessing no analgesic properties. In insomnia uncomplicated with pain it acts with tolerable certainty, and it is free from any depressant action on the heart, and does not tend towards the formation of a habit. It is very slow in its action; sometimes three or four hours elapse before the soporific effect begins to manifest itself. It has a prolonged deferred action, which sometimes causes a drowsiness, which may last for a considerable part of the day following its administration. It has been very often noticed that this drowsiness extends into the following night, and some patients who use the drug constantly find that it produces better effects

upon the second night without taking any more of the drug in the meantime. It is especially suitable in the insomnia of individuals which shows itself by a waking up after a brief period of sleep on first retiring to rest. Ataxia or muscular inco-ordination, vertigo, giddiness and confusion of thought have sometimes been noticed after its prolonged administration, and hæmatoporphyrinuria and albuminuria have occasionally resulted. It is a good hypnotic for children, and it is tasteless and inodorous. 30 grs. partially dissolved in a little warm beef tea or hot water may be given about an hour before retiring to rest. When some alcohol is combined with it the dose should be given as the patient retires to bed, and its effects are very rapid when it is dissolved in hot punch.

Trional has largely taken the place of sulphonal as a pure and unobjectionable hypnotic, being less cumulative and more rapid in its action and not likely to cause prolonged drowsiness, headache or other nervous symptoms. It may be given in doses of 20 to 30 grs. just before retiring to rest, and it is very suitable for children. Upon the whole it maintains its position as the safest of all the newer hypnotics, though occasionally neuritis has been observed after its prolonged use, and very occasionally hæmatoporphyrinuria has been noticed. Tetronal, another allied sulphonal compound, acts like trional, but it is cumulative and less reliable than either sulphonal or trional when given in its usual dose of 15 to 20 grs.

Veronal is now official under the name of Barbitone. It should never be given in larger doses than 10 grs.; 7½ grs. in any hot liquid at bed-time should seldom be exceeded. It is decidedly in the writer's opinion a less safe and reliable hypnotic than trional, and many deaths have already been caused by its use when the drug was not prescribed by the physician.

Paraldehyde must be pronounced to be the most valuable of all simple hypnotics, as it is undoubtedly the safest and has the largest range of usefulness. It is the drug which the physician should always employ in the insomnia of patients whose hearts are in any way damaged, whilst in mania, melancholia and other mental states it is as rapid in its action as chloral, and without any of the drawbacks which follow the use of that drug. The sleep rapidly induced by paraldehyde is sound and refreshing, and seldom followed by headache, malaise or gastric disturbance. The ordinary dose is 1 dr., but treble this amount can be given with safety; it may be administered in a little whiskey, and given in this way it is by far the best routine hypnotic in delirium tremens. In very intractable cases of insomnia it may be given upon the second night after sulphonal administration, when a small dose will greatly intensify the prolonged deferred action of that drug. The only contra-indication of its use is pain, as it possesses no analgesic action.

It may be prescribed in the following draught, which is very suitable in those cases of insomnia where the patient is liable to fall soundly asleep on lying down, but may awaken in an hour or two and remain awake during the rest of the night. The draught may be reserved for such emergencies.

℞. *Paraldehydi* ʒiss.
Tr. Aurantii ʒiij.
Aquæ Cinnamomi ʒj. *Misce.*

Fiat haustus hora somni sumendus p.p.a.

Amylene-Chloral or Dormiol is given in doses of 20 to 45 mins. in capsule and has been much praised in mania, melancholia, hypochondriasis, and functional neurosis. It combines the properties of both chloral and paraldehyde. Amylene Hydrate produces reliable hypnotic effects in doses of about 1 dr. It is best given in capsules or in claret or any weak wine, and it appears to act like chloral, without exerting dangerous depressant action upon the heart in ordinary doses and it acts very rapidly.

Hypnotism has been resorted to when all measures have failed to induce sleep in neurotic individuals, but it is a remedy which should only be employed by those who have made a close study of its operations.

INTESTINAL OBSTRUCTION.

Cases of obstruction of the bowel are usually grouped into the *acute* and *chronic* forms, but a large percentage of acute cases occur in patients who have been suffering from some chronic obstructive lesion which suddenly causes complete blocking of the intestinal canal.

In *acute* obstruction, before any form of treatment can be thought of, the physician's duty is to exhaust every means of finding out the cause of the blockage, though he is never justified in delaying treatment till he has satisfied himself about the diagnosis of the cause. To do so, in the majority of cases is to abandon the patient to his fate, as the only hope, speaking generally, lies in early operation. The possible causes of the obstruction being recalled to his mind, he rapidly eliminates each till he arrives at the conclusion of the most probable and that the abdomen will require opening.

The rectum should be at once explored, and if impacted fæces are discovered these should be broken up by a scoop or by the fingers of the gloved hand, and the colon flushed out by a large enema of tepid water. Even when the bowel is found empty one copious enema should always be administered slowly, with the patient lying upon his left side, the pelvis being raised and the head depressed. If possible, 4 to 6 pints or more should be slowly injected with the hope that if any obstruction exists in the colon (scybalæ, intussusception, &c.) it may be passed by the stream of water and the whole of the large intestine distended by the fluid. If no result follows the enema should not be repeated; the physician should abstain from passing the long tube, and purgatives must never be administered.

A malignant growth or a stricture in the rectum affords clear indication for a rectal operation. The hernial regions should be carefully explored both at the usual sites and at the sciatic notch and obturator foramen. The presence of a hernia at once demonstrates the nature of the attack,

and demands the relief of the strangulated knuckle of bowel. If an old empty hernial sac be discovered the indications for operation are almost equally clear. The surgeon should cut down upon it and fully explore the peritoneal opening with the hope of finding and relieving any internal strangulation in the immediate neighbourhood of the internal ring.

When the above examinations fail to reveal a removable cause of the obstruction, the pain, vomiting and abdominal distension continuing, without waiting for a confident diagnosis the physician should decide upon calling in the aid of the surgeon in order to have an exploratory incision made. Whilst awaiting operative procedure intense pain may be relieved by hot poultices or ice to the abdomen and a single hypodermic injection of Morphia. The objection to Morphia as a routine is a real one. It relieves pain and paralyses peristalsis, and thus masks the symptoms and misleads the judgment of both the physician and surgeon regarding the gravity of the case, and so tends to the postponement of operative procedures till the patient has become poisoned by the toxins which accumulate above the seat of obstruction.

Lavage of the stomach should always be carried out before operating, and it often affords considerable relief to the vomiting whilst arrangements are being made for opening the abdomen.

The abdomen should be opened in the middle line between the umbilicus and pubes (unless when it is considered desirable to explore an old hernial sac). The incision should be adequate, and the first point which the surgeon should make for after exploring the hernial rings is the cæcum. This must be thoroughly examined, since if found empty the block is likely to be in the small intestine, whilst its distension will signify that the obstruction is somewhere in the great bowel. Should the cæcum be empty the fingers are to be directed into the pelvis, and search made there for any loop of bowel which is not distended; such an empty coil must obviously be on the distal side of the obstruction. The intestine is next passed between the fingers bit by bit till the obstruction is reached; the same process is applied to the colon should the cæcum be found full, the fingers being passed along the large bowel till the site of obstruction is reached. Should there be any great difficulty in following the intestine, the incision in the abdominal wall must be enlarged with scissors so as to admit the entire hand; the surgeon should avoid drawing out the intestines through the abdominal wound if possible, owing to the difficulty often experienced in returning them. When eventration or evisceration is absolutely necessary the protruded bowel should be enveloped in cloths saturated with hot saline solution, and covered over with a layer of thin mackintosh.

The obstruction is then to be dealt with according to its nature—*Bands, Meckel's diverticula,* strangulations caused by *internal hernia at the foramen of Winslow, apertures in the mesentery* or *pouches in the peritoneum* must be divided as in external herniæ.

Intussusception should be reduced after firm pressure has been made on the tumour to dissipate œdema; the sheath must be compressed from below upwards so as to squeeze the intussusceptum backwards, avoiding

traction on the entering loop, as rupture is liable to occur. Should the bowel be found to be dead or if reduction is impossible owing to inflammatory adhesions the tumour must be excised along with a portion of the dilated bowel above the intussusception. Occasionally it is possible to assist reduction by gentle dilatation of the opening through which the intussuscepiens enters.

Volvulus is most commonly met with at the sigmoid flexure, and the coil of bowel must be untwisted after emptying it; when this is found to be impossible, or when gangrene has already occurred, the twisted coil of bowel must be excised or an artificial anus established above the volvulus by colostomy.

Adhesions causing matting together of adjacent coils of bowel should, if possible, be separated so as to remove all kinking. *Cicatricial contraction* of the mesentery is also often present, and the gluing together of the intestines may be so intimate as to prohibit all attempts at separation, especially when malignant disease is present. In this latter case there is no resource left but to establish an anastomosis between the bowel below and above with or without removal of the occluded mass.

Stricture of the bowel, malignant or cicatricial, if found to be the cause of the obstruction, must be relieved by resecting the stenosed area, cutting wide of all diseased tissue, the operation when performed upon the small intestine being known as *enterectomy,* and when on the colon as *colectomy;* the divided ends of the bowel are brought together by end-to-end suture if in the small intestine or side-to-side if in the large intestine. *Enteroplasty* is only applicable to rare and very circumscribed cicatricial strictures where there is no suspicion of malignancy.

Where the stricture is malignant and acute complete obstruction has occurred, the best procedure is to open the bowel above the seat of occlusion, and to insert a Paul's or other tube, and after the relief of urgent symptoms has been achieved and the patient has recovered from the shock of the attack, a second operation should be undertaken within a week.

When the mass is found to be irremovable the only course left to the surgeon is to make an anastomosis by connecting the divided end of the intestine above the growth with the colon, or to make on artificial anus when the malignant tumour is situated in the pelvic portion of the colon.

In rare cases the abdominal obstruction has been found to be due to *thrombosis* or *embolism* of the *superior mesenteric vein or artery,* in which case if the main trunk has not been involved the gangrenous portion of the intestine may be resected.

Gall-stones or *foreign bodies* when found to be the cause of intestinal obstruction should be removed by a free incision made in the bowel opposite to its mesenteric attachments, but above the site of obstruction; this latter should be carefully examined, and if ulceration or gangrene is present a piece of the bowel should be completely excised after removing the calculus or foreign body, which should never be pushed onwards.

Idiopathic dilatation of the sigmoid and colon (Hirschsprung's Disease) is more likely to cause chronic than acute obstruction. When the

accumulated fæces cannot be removed by massage and enemata the dilated colon must be excised after the establishment of an artificial anus, and an anastomosis made between the lower part of the small intestine and the pelvic portion of the colon.

In every operation for acute intestinal obstruction the contents of the distended bowel should be removed by enterotomy. An incision being made into the distended coil, a long glass tube attached to several feet of rubber tubing is inserted, and the contents siphoned off in order to prevent the poisoning liable to follow on the absorption of the toxins produced by the *Bacillus coli*. The opening into the bowel should be closed after thorough sterilisation by the insertion of a double row of sutures before returning the intestine into the abdominal cavity.

In all desperate cases where the cause of the obstruction cannot be sought for, or when found cannot be dealt with owing to the critical condition of the patient, the only thing available is to perform an *Enterostomy*. The surgeon seizes the first distended coil of bowel which presents in the abdominal wound, draws it out, and whilst an assistant clamps it with his fingers an incision is made into the gut and a Paul's glass double-flanged tube inserted and tied securely in position. After the bowel has been emptied into a receiver by siphoning through a rubber tubing attached to the Paul's tube the coil of bowel is returned to the abdomen, a portion of its circumference being attached by sutures to the parietal wound to prevent the tube falling back into the abdominal cavity. After some days, when the condition of the patient warrants a further operation, the cause of the obstruction may be again sought for and removed, the wound in the intestine being closed by a double row of sutures.

The older methods of dealing with acute intestinal obstruction by pouring in quantities of metallic Mercury into the stomach, inflating the colon by pumping in air, forcible massage of the abdomen, inversion of the patient's body, dosing with large amounts of Morphia or Atropine to paralyse peristalsis, and the continuous use of copious enemata and O'Beirne's long rectal tube, have been abandoned for the direct surgical procedures already mentioned.

The treatment of *chronic* intestinal obstruction should be undertaken before acute symptoms supervene; in the majority of cases the cause is malignant disease, fæcal impaction or the kinking of the bowel caused by inflammatory or tuberculous mischief. The treatment consists in the removal of the cause after laparotomy when this is possible, or by the establishment of entero-anastomosis or of a fæcal fistula by colostomy, or by excision of the rectum when the obstruction is within reach from the anus or by the sacral route.

The after-treatment of intestinal obstruction is almost as important as the surgical methods employed for the immediate relief of the symptoms. The danger of shock is to be minimised by external warmth and large injections of warm saline solution into the rectum, or Murphy's method of continuous rectal infusion or intracellular injection may be resorted to. Strychnine or Pituitrin hypodermically is usually indicated. When the

precaution of a thorough wash-out of the stomach before operation has been seen to there will as a rule be no necessity to repeat the lavage, and when the bowel has been well emptied before concluding the operation meteorism will seldom supervene, but should abdominal distension show itself a Saline purgative—℥ij. Sodii Sulph.—should be given every 2 hours or small doses of Calomel may be administered. Severe abdominal pain may be relieved by one hypodermic dose of Morphia combined with $\frac{1}{100}$ gr. Atropine, but morphia when possible should be avoided in order to minimise the paralysis of the inflamed intestine so liable to follow. No food should be permitted for the first 24 hours, but the mouth can be kept moistened by teaspoonfuls of water at short intervals.

INTUSSUSCEPTION—see preceding article on Intestinal Obstruction.

The physician will be wise who refrains from making any attempt at reducing the invagination; he should without delay requisition the services of the operating surgeon. Should surgical aid, however, be not immediately available, he will be justified during the delay in administering an anæsthetic and gently squeezing or kneading the sausage-shaped tumour through the abdominal wall as an assistant elevates the pelvis. Failing to dissipate the tumour by this gentle manipulation, he may try the effects of a large enema of tepid water, or he may distend the colon with air by means of a Higginson's syringe. Unfortunately, the partial reduction of the intussusception which often follows is liable to lead him to conclude that the blockage has been overcome, so that postponement of operation is decided upon with disastrous results, as the only hope for a satisfactory issue from operative procedures lies in their being resorted to without an hour's unnecessary delay.

IRITIS.

The most important element in treatment of acute primary iritis consists in the instillation of Atropine solution (1 in 100). The patient may be ordered to bed in a darkened room and a smart saline purgative should be administered, but when the symptoms are not very acute he may avoid bed by wearing dark goggles. Pain, which is generally a prominent symptom, may be allayed by hot, dry compresses, by hot stuping, or by adding Cocaine to the atropine drops. If all other means fail, hypodermic injections of Morphia may be required. When there is much congestion three or four leeches applied to the margin of the orbit or temple give great relief. Blistering is still employed by some surgeons, but little benefit may be expected from it. As a rule, if wide and uniform dilatation follows the use of atropine, the case will soon yield. If there be much plastic exudation, and the atropine fails to enlarge the pupil widely, it must be pushed, a drop being distilled every five or ten minutes for six times with the view of dragging upon the adhesions. If this fails, the eye may be covered for the night with a piece of lint, smeared with atropine ointment.

Mercury should be freely given where the adhesions do not yield to

atropine dilatation in order to prevent complete posterior synechia or adhesion between the iris and the anterior capsule of the lens, which may so increase the tension in the eye as to produce secondary glaucoma. In syphilitic cases a few full doses of Novarsenohllon should be administered or the action of mercury must be kept up till there is evidence that the constitutional effects of the drug have been produced, after which the dose may be diminished. Salivation is seldom necessary, and should be avoided. Mercury is essential in most cases of iritis with much exudation of lymph, but in non-specific cases its action may be suspended as soon as this disappears. The influence of atropine should be maintained till it is clear that the danger of adhesions has passed away. In all ordinary cases the instillation of a drop may be repeated twice daily after the full effects have been produced.

In serous iritis, if a deposit form on the posterior surface of the cornea, it is sometimes recommended to tap the anterior chamber by inserting a fine cataract knife into it in front of the iris, and this may be repeated if the fluid accumulates again.

With a distinct rheumatic history, Salicylate of Soda may be given in full doses, also where mercury is indicated but cannot be tolerated. Better results may be obtained by Aspirin, which is also useful in gonorrhœal iritis.

Tuberculous iritis is best treated by rest and atropine without mercury; Tuberculin by the vaccine method has given excellent results. Turpentine in full doses internally (10 mins. every 4 hours) has been proved to possess remarkable power in causing absorption of exudations. Pilocarpine, Colchicine, Homatropine, and Physostigmine have been recommended, but the general management of a case of ordinary iritis may be summed up in the words—Rest, Atropine, and Mercury.

Good results have been obtained by injecting about $\frac{1}{3}$ gr. Calomel, suspended in glycerin or weak mucilage, into the tissues in the neighbourhood of the margin of the orbit.

Cyclitis or inflammation of the ciliary body is always present, and the atropine favours its resolution also, but should the ciliary body become much congested by the blood driven out of the iris in wide dilatation the instillation must be suspended.

In chronic iritis and cyclitis the same measures are indicated, and these may be aided by subconjunctival injections of saline solution.

Suppurative iritis and suppurative irido-choroiditis are generally the result of septic wounds, and little can be done to save sight, save by the evacuation of pus and irrigation with weak Perchloride of Mercury Solution. Pain should be relieved by Morphia hypodermically and Cocaine locally.

Sympathetic iritis is part of a sympathetic ophthalmitis. If the vision of the primarily affected eye be very poor, prompt excision of this eye may be successful in checking the sympathetic process. But if its vision be good, excision should not be rashly undertaken, as the originally injured eye may eventually prove the better of the two.

Treatment by salvarsan has given encouraging results.

In ordinary iritis where, in spite of atropine and mercury, or where the case has been neglected from the first and adhesions have formed which refuse to yield to atropine, they may require to be treated by operative measures. After the subsidence of the iritis an iridectomy should be performed when the posterior synechia is complete in order to restore the circulation between the anterior and posterior chambers, but it is most undesirable to operate whilst the inflammation is active owing to the exudation of lymph which is sure to follow.

JAUNDICE.

The treatment of this sign or symptom is discussed under Gall-Bladder, Gall-Stones, Liver Diseases, &c. All forms of jaundice are obstructive, whether caused by a gross blocking of the main duct as in catarrhal and gall-stone cases or in the more obscure cases as Weil's Disease and *icterus gravis*, where some toxin exists in the blood which renders the bile so viscid that it blocks the finer biliary passages. The appreciation of this etiological factor is a considerable aid in assisting therapeutical methods.

Catarrhal jaundice caused by swelling of the mucous lining of the common duct is relievable by the measures detailed in the article on inflammation of the bile ducts on p. 295. The jaundice produced by gall-stones, stricture or cancer of the ducts, malignant disease pressing on the ducts outside the liver, or in the head of the pancreas, can obviously only be met by surgical measures when these are practicable.

The jaundice due to the hepatic congestion caused by mitral and tricuspid disease can only be relieved by cardiac tonics aided by saline purgatives and rest.

Icterus neonatorum usually passes off when attention is given to the condition of the bowel and to measures calculated to improve digestion combined with the admission of a liberal supply of pure air, being either the result of catarrh of the ducts or of some temporary blood condition which renders the bile more viscid. It is to be distinguished from the rare form of congenital jaundice due to absence of the ducts, which is beyond the reach of remedies.

In the group of cases formerly known as hæmatogenous, and now recognised as hæmohepatogenous jaundice, where no obvious gross obstruction exists, the indication for treatment is the presence of the toxæmia, which should be met by eliminatory measures as saline purgatives, diuretics and diaphoretics. The source of the poison being probably intestinal, such disinfectants as Calomel in small doses, Salol, Naphthalin and other bowel antiseptics may be tried. Free lavage of the colon in such cases may be safely persisted in; the recent craze for feeding with the Lactic Acid bacilli may be indulged in, but little is to be expected from it even if the toxins are the result of microbic changes. Good acid buttermilk or home-made Koumiss is, however, an excellent dietetic article in all cases of jaundice.

Search should be made for inorganic poisons as phosphorus, antimony

or arseniuretted hydrogen, and ordinary obstructive jaundice may be eliminated by a careful examination of the urine, which shows no increase of the bile acids and salts; these may be entirely absent, and the stools will contain bile pigment and the *Proteus fluorescens* bacillus of Jaeger may be detected. In most acute forms of this type of *icterus gravis* the high temperature will require to be checked by sponging or cold packs, and the dangers of renal congestion or albuminuria averted by counter-irritation over the loins and intracellular injection of saline solution, in addition to purgation with Mag. or Sodæ Sulphas. Though the treatment of every form of jaundice is thus to be directed by an assault upon its primary cause, and all methods of treating the icterus as if it were a disease and not a mere symptom or sign should be regarded as quackery, nevertheless several empiric remedies may be legitimately employed when the cause is found to be irremovable.

Salicylates are regarded as possessing the power of rendering the biliary secretion more fluid or less viscid, and the soda salt may be given in full doses (15 grs.) thrice daily. Ragwort (*Senecio Jacobæa*), Carlsbad, Vichy and other alkaline waters, Chloride of Ammonium, small doses of Calomel, Euonymin, Podophyllin, Iridin, Oil of Turpentine, diluted Ac. Nit.-Hyd., and many other empiric agents are sometimes employed with success, but it is manifestly irrational to prescribe drugs which are believed to stimulate the function of bile formation when the common duct is blocked by a calculus or by a malignant growth. Occasionally the absence of bile in the intestines in the markedly obstructive types of jaundice may be remedied by the administration of dried Ox Bile in keratin-coated pills, which will pass unaltered through the stomach. The value of Carlsbad treatment apparently lies in the powerful eliminatory effect of large quantities of fluid which remove out of the system bile pigment and bile salts by the urinary, intestinal, and cutaneous tracts.

Pilocarpine is a drug of much value; it possesses the power of diminishing the intolerable itching of the skin caused by the influence of the reabsorbed bile upon the terminal sensory nerves. It may be given once in every 36 or 48 hours in hypodermic doses not exceeding $\frac{1}{4}$ gr. in both the obstructive and hæmohepatogenous types of icterus, and by some it is even claimed to possess specific action in the latter form of jaundice. The injection should be preceded by a hot pack or hot bath to induce sweating.

Iodides in large and fully diluted dosage sometimes relieve itching, so also does Antipyrine, and a prolonged immersion in a strong Sodium Bicarbonate bath often affords a considerable degree of relief.

JOINT DISEASE.

The term is a wide one, and embraces a number of affections whose treatment will be found under the head of the primary affection as Rheumatism, Rheumatoid Arthritis, Gout, Actinomycosis, Locomotor Ataxia, Pyæmia, &c.

When the inflammatory process is confined to the synovial membrane

the term "Synovitis" is employed, and under its own heading the treatment of this form of joint affection will be detailed.

Arthritis is the name usually employed as a synonym for Joint Disease, and implies the condition in which periostitis with osteomyelitis affecting the ends of the bones entering into the formation of the joint coexists usually with synovitis. It may be acute or chronic.

Acute arthritis the result of a septic infection, either caused by penetrating wounds or by *Staphylococcus* or *Streptococcus pyogenes* carried by the blood-stream, must be promptly treated by absolute rest for the joint and the entire limb. As disintegration of the articulation is liable to ensue the limb should be immobilised in the position in which a permanent ankylosis will insure the least inconvenience. Cold water, ice, Leiter's Tubes, or evaporating lotions should be applied as in the treatment of ordinary synovitis. Occasionally pain yields more promptly to the application of Spirit Lotion covered in by oiled silk—a method which places a superficial joint like the knee in the position of an internal part, encouraging the natural resistant powers of the tissues to have fullest scope in their struggle for resolution by permitting a free flushing of the parts with arterial blood. The method of causing an artificial passive hyperæmia acts in the same manner. An elastic bandage is applied above the joint to cause such a degree of pressure as will retard the venous circulation without diminishing the arterial supply. The hyperæmia may be kept up for long periods, but the most modern method is to apply it for only an hour or two at a time, after which the bandage is removed and the limb elevated to dissipate anasarca. Klapp's suction-bell acts in the same manner, but is only applicable to joints like those of the fingers. Leeching may be employed when pain is severe, and any local anodyne application like Belladonna may be used. Blistering is seldom of much use.

The weight and pulley may be employed where the tendency towards flexion is present.

Should fluid accumulate in the joint, the hypodermic needle may be employed for diagnostic purposes, and if its purulent nature is evident, aspiration should not be performed, but the joint must be freely incised without delay to completely empty the purulent collection, after which the cavity is to be flushed by a stream of warm Saline solution mopped out by a strong antiseptic and thorough drainage provided. Some surgeons inject a stream of Hydrogen Peroxide, others leave the joint filled by Iodoform emulsion as in the treatment of tuberculous arthritis. When extensive general destruction of the synovial membrane is found involving the capsule of the joint the entire cavity and any pockets connected with it may be gently packed with Iodoform gauze. In most instances much good may be accomplished by vaccine treatment after the specific microbe has been detected in the joint secretion or pus.

The treatment of early joint infections reached a high degree of perfection in France. Here the joint was thoroughly explored for any foreign body in the form of metal or cloth, or loose fragment of detached bone.

Such were removed. Thorough disinfection of the joint cavity was carried out by normal saline solution and ether. The synovial cavity was then closed completely and drainage was provided for down to but not inside the cavity of the joint.

Where the operation of incision is resorted to early, a good useful joint may be fairly hoped for. Secondary abscesses in the neighbourhood of the joint must be promptly incised, and these should be flushed out and injected with the hydrogen peroxide or other antiseptic. In severe cases ordinary drainage will often fail, and the method of *continuous* drainage must be carried out, by means of which the circulation of Eusol or Dakin's solution through the joint is kept up.

In cases coming late under observation, hopeless destruction of bone and cartilage may be discovered which will require the radical surgical measures suitable for the treatment of chronic joint disease: even amputation of the limb may be demanded to save life.

In mild cases the rest should not be too prolonged, and when the more acute symptoms have been thus combated, and all pain has disappeared for a time, passive motion may be carefully commenced, the surgeon feeling his way cautiously. Many joints have been hopelessly destroyed by rest prolonged long after the inflammatory action had subsided. It is this mistake which enables the unscrupulous bone-setter to thrive. Getting a joint affection in which all inflammatory action has long ceased, owing to treatment by some surgeon whose timidity prevents him beginning passive or forcible movements, the bone-setter pronounces the limb to be "out of joint," and after a few forcible movements he assures the patient that he has "put in" the joint, and the mobility and painlessness of the limb which follow apparently corroborate his statements. When the value of early massage and movements of a passive or forcible nature are universally appreciated, the principal occupation of the bone-setter will be gone. The arthritis which sometimes follows typhoid, influenzal and pneumococcal infection usually yields readily to the above measures.

Thickening from exuded inflammatory products outside the joint or effusion into the synovial sac may be dissipated by strapping or by the uniform continuous pressure of a Martin's rubber bandage. Any old sinuses in the neighbourhood of the joint should be injected with Bismuth Jelly.

Chronic joint disease, when rheumatism, gonorrhœa and rheumatoid arthritis are excluded, nearly always is tuberculous, commencing either in the synovial membrane or in the bones. In the former case the clinical type of the disease is recognised as "white swelling," which, if neglected, passes into the type in which the articular ends of the bones become finally invaded, causing destruction of the joint and abscesses.

The treatment of tuberculous joint affection has been described under Hip-Joint and Knee-Joint Disease, and is in the main applicable to all the other articulations affected by the tubercle bacillus. The principles to be carried out are in the first place those indicated in all other forms of localised tuberculosis—viz., (1) Rest, (2) open air, (3) improved feed-

ing with abundance of fats (Cod-liver Oil, &c.), and (4) a carefully carried out course of Vaccine treatment by the injection of minute doses of Tuberculin regulated by a series of observations on the opsonic index and temperature. Tuberculin R. (human) should always be used.

Local treatment consists, as in acute arthritis, of absolute immobility of the joint surfaces for a very prolonged period in the most suitable position of the limb should ankylosis become established, extension by weight and pulley to diminish intra-articular pressure and the induction of passive hyperæmia, together with the application of soothing lotions for the relief of pain. Seldom are leeching, blistering, the actual cautery or severe counter-irritation indicated in tuberculosis of joints. The aim of the surgeon should be to assist the natural efforts towards resolution by these conservative or preventive methods, perseveringly employed for many months or a couple of years, without any attempt at passive motion or operative procedures as long as hopeless disintegration of the joint structures has not occurred. The injection of Iodoform emulsion (10 per cent. in glycerin) is a valuable method of sterilising the joint after this has been washed out through a small canula by a stream of saline solution, and where the disease is limited to the synovial membrane a speedy improvement may be expected, and the X rays applied to superficial joints have been productive of good. Some surgeons publish excellent results from the injection of 5 mins. of a 10 per cent. solution of Zinc Chloride.

When disorganisation of the joint has occurred the operation of *incision* suitable in acute arthritis is contra-indicated unless carried out in a more radical manner. The whole cavity must be freely opened by a large incision, and the operation of *arthrectomy* or *erasion* performed. After freely opening the articulation, and if necessary doing it in such a manner as will cause disarticulation, the diseased synovial membrane is to be completely removed by scraping or dissection, and any diseased cartilage cut away at the same time. The joint is next swabbed firmly with a strong Antiseptic, and the skin-wound sutured without any provision for drainage if the surgeon is satisfied that he has been able to remove every scrap of the diseased structure.

Where the exploration of the joint reveals disease already affecting the bones, a more radical operation than arthrectomy is clearly indicated. If the bone disease be limited to the layer beneath the synovial membrane gouging should be resorted to. *Excision* or *resection* of the joint may be demanded, the affected bone being cut away along with the articular cartilages and synovial membrane in order to establish firm osseous ankylosis in such joints as the hip and knee and a fibrous union with a movable joint when the wrist, elbow and shoulder are operated upon.

No erasion, arthrectomy or excision of a tuberculous joint should be undertaken unless the joint be in a condition of quiescence, otherwise a return of disease is likely to occur.

Rarely will *amputation* be necessary, and it should only be resorted to when the above measures fail or where secondary suppurative infection

threatens to exhaust the strength of the patient, or where amyloid disease is supervening. The introduction of the treatment of long-standing sinuses by the injection of Bismuth Jelly has considerably lessened the necessity for amputation, as these often heal up completely after resisting scraping and dissection and the introduction of powerful antiseptic solutions.

It is hardly necessary to insist upon the importance of the rest cure being persevered with for a long period and of the dangers arising from any attempt to move the joint by active or passive motion till all evidence of the subsidence of the tuberculous inflammation has passed away. Disastrous results are more liable to follow premature movements than in the case of the more acute forms of arthritic infection after the subsidence of inflammation.

KALA-AZAR—see under Piroplasmosis.

KELOID.

This term is usually applied to the hypertrophic changes which occur in scar tissue, and the "true" keloid found in the skin without any evidence of previous wound is believed to be due to the same unknown causes operating upon minute abrasions.

Since most of the keloid growths tend to disappear they should not be interfered with till watched for a considerable period: all that is necessary is to protect the growth by a layer of adhesive plaster spread upon soft chamois or where pain or itching is present to paint the scar tissue over with a layer of Salicylic Collodion.

Should the keloid be upon any part of the body where uniform elastic pressure can be applied then a rubber bandage put on fairly tightly will often cause its disappearance. Finsen's Light and the X-ray treatment have in recent years afforded some very satisfactory results.

Fibrolysin should be tried in every case before resorting to operative treatment, twelve to fifteen injections being made at some distance from the scar tissue. As return is so often observed to follow excision, this should be avoided as long as no obvious disfigurement results; a number of deep linear scarifications may be made so as to divide the vessels feeding the keloid, and when this method has been combined with electrolysis, fibrolysin, massage and the X rays the best has been done for the case. Should the claw-like processes continue to grow outwards into the surrounding skin the surgeon must treat the case as if it was a fibro-sarcomatous growth, and excise the hypertrophied cicatrix with its numerous prolongations, cutting clear of all fibrous structure and filling in the gaps in the skin with numerous Thiersch grafts. Caustics should never be employed for the destruction of the growth, as return in an aggravated form is very liable to follow their use.

KERATITIS—see under Cornea.

KERATOSIS.

This term is applied to several distinct skin affections characterised by an accumulation of the horny cells of the epidermis, such as occurs

in the milder forms of ichthyosis. The treatment of this latter condition, known as Keratosis Pilaris, has been already described under Ichthyosis. It consists in repeated bathing and cleansing with soap and friction, and the continuous inunction of the affected parts by an emollient ointment or oil.

Keratosis resulting from chronic arsenical poisoning usually affects the palms and soles, and yields naturally upon stopping the administration of the drug and keeping the thickened skin well moistened by any greasy ointment. If the accumulated cells fail to disappear under such simple treatment a paste of Salicylic Acid will speedily remove them.

Keratosis Follicularis (Darier's Disease, Ichthyosis Sebacea Cornea) is the result of infection by psorosperms, and is refractory in its treatment. The crust-topped papules should be removed as soon as they appear by the application of the thermo-cautery, and after cleansing and mild friction in a warm alkaline bath to remove the nodular masses a paste of Salicylic Acid (1 part in 8 parts of glycerin) should be applied.

The last-mentioned treatment is also the most suitable for Keratosis Nigricans, but should the wart-like accumulations continue to grow in spite of salicylic treatment they may be excised.

Keratosis affecting the palms and soles, when not of arsenical origin, is rebellious to treatment. After thoroughly softening the cells with alkaline soap and prolonged immersion in hot water Salicylic Paste (1 in 8) should be applied perseveringly, or the same agent may be employed in double strength in the form of plaster or as a solution in ether (1 in 10).

KIDNEY DISEASES—see under Bright's Disease, Pyelitis, &c.

KIDNEY, MOVABLE—see under Glénard's Disease.

KNEE-JOINT DISEASE.

The treatment of simple inflammatory affection of the synovial membrane of the knee is dealt with under Synovitis. Arthritis of septic nature, when involving the joint, is treated as described in the article on Joint Disease by immobilising the limb, by inducing hyperæmia, and when extensive suppuration occurs by freely laying open the joint, thoroughly cleansing the cavity with normal saline solution and ether, and providing for drainage by tubes which, however, ought not to penetrate the joint cavity.

Chronic disease of the knee-joint in the great majority of cases, when rheumatic affections are excluded, may be accepted as of tuberculous origin. The measures detailed under Hip-Joint and Joint Disease are to be carried out in addition to open air, improved feeding and perfect hygiene.

Local measures, as already mentioned, will embrace prolonged absolute rest by means of splints and extension to correct any abnormal position of the limb. Whilst active mischief is present the *entire limb* should be rendered immovable. Pain is to be met mainly by rest, but also by cold or warm applications, counter-irritation by means of blisters or the

cautery iron, leeching, or anodyne liniments, or lotions. As the more active symptoms subside and abnormal position of the limb is rectified it is of the very greatest moment that the patient should be rescued from the atmosphere of his bedroom and tempted to spend as large a portion of the day as possible in the open air. By means of a Plaster of Paris casing or a leather splint this may be managed without much danger, but the application of a neatly fitting Thomas's Knee Splint is much better. When it is in use the joint is open to daily inspection or to the convenient application of local remedies, as strapping over Scott's dressing, Iodine, &c., or the application of a Martin's rubber bandage. With an accurately fitting splint and a thick sole on the boot of the sound foot the patient can be permitted to move about.

When the disease is confined to the synovial membrane a good result in young subjects may be expected without resorting to operative measures.

When signs of abscesses occur these should invariably be incised before the skin is allowed to become infected; rigid antiseptic precautions being undertaken, the joint should be opened and a stream of warm liquid employed to thoroughly cleanse and sterilise the cavity. Eusol or other hypochlorite solution is very suitable for this purpose. After its use the wound should be carefully sealed up without drainage.

Where evidence of considerable disintegration of the joint exists the best procedure is to resort to arthrectomy or erasion provided the disease is inactive. An elastic bandage and tourniquet being applied, the joint should be freely opened by turning up a rectangular flap, the tubercle of the tibia being divided without separating it from the patella and without cutting, if possible, the ligamentum patellæ. Every recess in the cavity being thus exposed, the synovial membrane is dissected or curetted off the bones and from the lateral and posterior ligaments; the crucial ligaments together with the semilunar cartilages are next removed, and the surfaces of the bones scraped or gouged so as to leave no trace of diseased tissue behind. The tubercle of the tibia is fixed in position, the joint is sealed up by suturing without any provision for drainage, and immobilisation being secured by a suitable splint, firm ankylosis may be expected within a period of about 12 months. Occasionally some degree of mobility of the joint may be obtained, but as a rule it is not wise to try for this, as recrudescence of inflammatory action is liable to supervene after attempts at passive movements. The best results as regards mobility are obtainable in those cases undertaken early, before the destruction of the crucial ligaments has occurred.

If upon opening the joint by a free semilunar incision the articular surfaces are found to be extensively and deeply diseased, the best procedure is to resort to excision of the joint. The patella, if found to be sound, is turned upwards, or sawn across, its cartilaginous layer being afterwards sliced away, the lateral and crucial ligaments are divided, and the saw being laid on, a slice of bone is removed from the lower end of the femur and from the upper end of the tibia, taking care that the sections

are made in the horizontal plane, so that ultimately firm osseous union will occur between the femur and tibia in a straight line. To facilitate this desideratum some surgeons resort to the use of ivory pegs, steel nails or a thick silver wire suture in order to avoid angular deformity by keeping the leg in exact line with the thigh; where deformity already exists, the hamstring tendons should be divided. Complete immobility must be secured, as after the operation of erasion, by the use of a long back-splint or a plaster or a leathern casing, which must be worn for at least a year in order to prevent the yielding of the new osseous tissue. The best results are obtainable in operations undertaken after puberty and before the age of about 30 years. Excision of the knee-joint will shorten by almost a year the treatment of a case of tuberculous disease of the knee-joint.

Amputation will be the only course open to the surgeon when the above methods have failed; or when, during past middle life, septic infection has been added to the tuberculous.

Genu Valgum (knock-knee) and Varum (bow-knee) are described upon p. 328.

Deformities arising from ankylosis in the semiflexed position must be met not by forcible extension, and as a rule the weight and pulley cannot be relied upon. The best procedure is to excise a wedge of bone from the region of the deformed knee-joint, including the articular surfaces of the femur and tibia, and bringing the sawn surfaces into contact so as to maintain the limb in the straight position.

Loose Cartilages may often be dealt with successfully by transfixing them with a strong steel needle, after which they can be cut down upon by a deep incision and turned out. More frequently, however, it will be necessary to perform an arthrectomy, and after opening the joint by an incision at the side of the patella the cartilage should be dissected out, the joint washed by a stream of sterilised saline and sealed up. It is worth while in the case of adults to try the effect of a suitable apparatus applied to the limb which will prevent all movements save those of flexion and extension before resorting to arthrectomy.

Morison has pointed out that the chief cause of internal derangement of the knee-joint is not merely looseness, but fracture of the semilunar cartilage, which must be removed by operation when an active life is necessary, and he emphasises the great dangers of sepsis following all operations on the knee-joint.

LABOUR.

The practitioner should never forget that nine out of every ten women in labour would deliver themselves safely if left alone, and that an attendant who is unable or unwilling to approach the birth canal with surgically clean hands merely adds a considerable element of danger to these cases, while in the small minority where interference is required safety from the risks of labour will be dearly bought if the hand which brings it introduces into the vagina the germs of puerperal fever.

In the *first stage* of labour the practitioner should accustom himself to make out the position of the fœtus and the amount of progress by abdominal palpation. A vaginal examination is only required to discover the degree of dilatation of the os and possible prolapse of the cord. Before making it the hands should be scrubbed with soap, warm water and nail-brush for 5 minutes, special attention being paid to the nails, which should be kept carefully trimmed. Methylated spirit (70 per cent.) is then swabbed on with cotton-wool, and the hands are finally immersed in 1 in 2,000 Perchloride or Biniodide of Mercury for 2 to 5 minutes. The vulva is then washed with warm water and sterilised liquid soap and sponged with plenty of 1 in 2,000 perchloride or drachm to the pint lysol solution. The hair on the labia, unless very scanty, should be clipped short. The examination is made with the hand dripping with antiseptic, and no other lubricant is necessary. Rubber gloves are now very commonly worn for vaginal examinations. It is quite true that one cannot guarantee an aseptic skin, and that one can guarantee an aseptic glove. Considerable experience of students and nurses has taught me, however, that a rubber glove gives a dangerous sense of security to those who are not perfectly familiar with antiseptic methods. It is at once recognised that the bare sterilised hand is contaminated and must be reimmersed in antiseptic if it has accidentally touched the bedclothes, the patient's thighs or one's own person. The same fact is not so easily grasped when one is relying on a rubber glove; one even sees well-meaning individuals after a cursory sterilisation of the hands carefully transferring all the surviving microbes on the skin of the left hand to the surface of the right-hand glove in the lengthy process of fitting each finger into place, and then proceeding to inoculate the vagina with them. There is only one way of safety for the obstetrician, and that is to develop an aseptic conscience. If he has that, he will be perhaps a little safer, and certainly easier in mind with gloves on; if he has it not, gloves may make him more confident, but they cannot render him less dangerous to his patient. The gloves should be fresh boiled in a batiste bag, and shaken out of it into 1 in 2,000 Perchloride or Biniodide. They should be put on wet with the aid of a gauze swab dripping with the lotion, and never with the bare hand. The hands should be as carefully sterilised as if gloves were not to be worn, and the gloved fingers should be kept in sight from the time they leave the lotion basin till they enter the vagina so as to avoid the possibility of contamination. Gloves must be worn if the patient is suffering from syphilis, or if the doctor's hands are rough, chapped, abraded, or have been recently exposed to septic substances—*e.g.*, pus or fæces.

After making out the size of the os and observing the frequency and force of the pains the doctor can make up his mind whether or not to leave his patient for the time. If the first stage is slow and the patient is becoming tired and fretful he is likely to be pressed to give some relief. Chloroform should not be given unless there is a prospect of delivery within two hours at most. Ergot is totally inadmissible. Quinine is unreliable as an oxytocic. It is at this stage that the doctor will have to

consider the advisability of the use of morphine and hyoscine injections, known so widely to the lay public as "twilight sleep." As used at first the method consisted in the giving of Morphine ($\frac{1}{6}$ or $\frac{1}{4}$ gr.) combined with Hyoscine ($\frac{1}{100}$ gr.) repeated in an hour or two if necessary, and in this method the results were rather haphazard, some patients being greatly relieved and eased and others being apparently unaffected. The more modern method is to give the initial injection and to follow it up by one to three doses of Hyoscine ($\frac{1}{100}$ or $\frac{1}{200}$ of a grain) as required, usually at intervals of one or two hours. The room is kept perfectly quiet, lights are lowered and every disturbance of the patient avoided. Most authorities are agreed that while this method is being carried out the medical man should remain in constant attendance. The results claimed for this method are more uniformly successful. The pains are not interfered with, and may even increase in force and frequency. A certain percentage of the children do not cry out vigorously at birth and breathe at first very quietly, but after considerable experience of the method, I must say I have never seen a case of asphyxia or stillbirth which could be fairly ascribed to the influence of the drug, and I believe those who have tried it most extensively are of the same opinion. Chloroform may be safely given in the second stage, and these patients take it well. In my opinion, the method is of great value in the case of nervous, highly strung and excitable women, but should not be used indiscriminately. It may be remarked that some patients while under the influence of the drug become restless and intoxicated, and will endeavour to get out of bed unless restrained.

Light nourishment should be given in a tedious case, but no alcohol. It is a mistake to keep a patient walking about too much. If she is tired she should lie down in bed and rest as much as possible. During this stage the bowels should be well cleared out by an enema, and everything prepared for the delivery.

In the *second stage*, the commencement of which may usually be diagnosed by the altered character of the pains without vaginal examination, chloroform may be given on a Skinner's mask with each pain, but avoiding full anæsthesia with loss of reflexes, which delays the pains and tends to produce atony of the uterus, with consequent post-partum hæmorrhage. The anæsthetic may be given more freely when the head is on the perineum, and should be eased off when delivery has occurred. If the membranes are still intact they should be ruptured with the finger during a pain, or a sterilised metal stilet or hairpin may be used. As the head comes down on the perineum the attention of the accoucheur is directed to the prevention of a rupture. Many methods have been at different times recommended to attain this desirable end, and the impartial critic who has faithfully tried them will be inclined to say that all are equally disappointing. That most in fashion at present, and as good as any, is to pass the left hand between the patient's thighs as she lies on her side and keep the tips of the fingers pressed on the child's vertex, so as to keep it in contact with the pubes and to retard its progress to some extent. The fingers of the right hand may be used at the same time to resist the progress of the

head if the pains are very violent, but no direct pressure should be put on the perineum. The mother, if conscious, should be told not to hold her breath or bear down during the final pains. When the head has been delivered the accoucheur should always ascertain whether the cord is round the child's neck, and if it is should slip it over the shoulders if a long enough loop is available, or cut and clamp it with forceps if it is very tight and unyielding. Care must be taken in the delivery of the shoulders lest a partially lacerated perineum be still further injured. The cord should not be tied until it has ceased to pulsate.

Forceps in Non-Obstructed Labour.—It should be the general rule that forceps are not to be used before the os is fully dilated. Until that stage is reached the prolongation of labour is practically unattended with risk to either mother or child. It is now recognised that a prolonged second stage is dangerous to both, and the classic indications for forceps are a rising pulse and temperature, heat and dryness of the vagina, and exhaustion of the mother, or a marked alteration in the fœtal heart or the passage of meconium. The wise obstetrician will intervene long before such symptoms appear, and, speaking generally, the question of forceps arises whenever the second stage has lasted for 2 hours and shows no signs of speedy termination. If the head is not steadily advancing; if the pains are small, weak and ineffectual; if the mother is a primipara of over 30; or if the first stage has been lengthy and trying, the timely application of forceps will save the patient from a prolonged second stage and its effects—a fatigued and more or less atonic uterus, and an exhausted nervous system which may take months to regain its normal elasticity. Added to this is the fact that delivery by forceps, skilfully conducted, is probably safest for the perineum. In applying forceps the practitioner should remember to boil the instruments, to sterilise his own hands and the patient's vulva, to pass the catheter, and to deliver very slowly and with frequent pauses so as to avoid laceration of the perineum. He may safely disregard the presence or absence of pains. I formerly douched all cases in which I had put on forceps, but for several years past I have omitted to do so, and I have never had any reason to regret it.

In everyday practice the use of forceps has been to a great extent superseded by the use of pituitrin. Every practitioner is familiar with the case which drags slowly on with weak and ineffectual pains, and it is in such a case that pituitrin is of the greatest service. It should not be given until full dilatation of the os has been reached, but if 1 c.c. of the drug is then given hypodermically into the gluteal muscles, the labour terminates as a rule with magical quickness, the whole second stage being often passed through in ten or fifteen minutes.

Third Stage.—After the delivery of the fœtus no attempt should be made to knead or compress the uterus, as the result is likely to be a partial and irregular contraction which will probably delay instead of hastening the extrusion of the placenta. The hand may rest lightly on the fundus, so that warning may be got if the organ becomes distended with blood from post-partum hæmorrhage. It is as well to roll the patient over on her

back, as in that position air embolism is even a rarer accident than in the left lateral position, and expression of the placenta is more easily carried out. While waiting for the placenta to separate it is advisable to introduce any sutures that may be necessary in the perineum. This is most easily done with a large half-circle needle, held either in the fingers or in a needle-holder and threaded with silkworm gut. The suture should pass through the skin and under the surface of the laceration, emerging in the middle line, to be reintroduced and brought out through the skin on the opposite side. Two or three such sutures suffice to unite even the most extensive lacerations. They may be tied immediately or secured with a single knot, which is completed by a second after the delivery of the placenta. The expulsion of the placenta from the uterus into the vagina is shown by the rising of the uterus higher in the abdomen, while it becomes smaller, firmer and better defined, and by the fact that on lifting it upwards the cord is not pulled on. Usually this occurs in 5 to 20 minutes after delivery of the child, but the placenta need not be treated as "retained" and manually removed unless it is still in the uterus at the end of an hour. When the placenta has left the uterus normally the fundus should be grasped firmly and pressed downwards and backwards so as to drive the placenta out through the vulva. It is received in the hand, and the membranes pulled away by gentle traction. They should not be twisted into a cord, as this is likely to result in tearing off of part of them. The expressed placenta and membranes are then examined to see that everything is complete. The vulva is sponged clean with antiseptic solution, an antiseptic pad is put in place, and the binder applied. When a laceration has been sutured the nurse should be warned to sponge the perineum with 1 in 2,000 perchloride every 4 hours for the first 3 days, every time the bowels or bladder act, and every night and morning for a fortnight. The attendant should not leave the patient's house for half an hour at least after delivery. Before leaving he should examine the uterus, and if it is not firmly contracted a drachm of Ext. Ergot. Liq. should be given or an injection of 1 c.c. of Pituitrin. If the patient's pulse is above 100 and the uterus flabby it is well to wait a further half-hour for fear of post-partum hæmorrhage.

Diet should be light and consist mainly of slops for the first 2 days. An aperient should be given on the second night, and after the bowels have acted the patient may have boiled fish, a little chicken or a lean chop, and gradually return to ordinary fare. She may rise at any time from the seventh to the fourteenth day, according to her condition; but I can see no possible advantage in forcing her to rise on the second day, as some German authorities have been advising recently. In this as in many other things it is as well not to have a hard-and-fast rule, but to be guided by the patient's condition and to some extent by her inclination.—R. J. J.

OBSTRUCTED LABOUR.

The practitioner will diagnose obstruction when strong, regular and frequent pains are present, and yet the head either refuses to engage in the

pelvic inlet, or, if it has engaged, ceases to advance. Treatment will largely depend on the diagnosis of the nature of the obstruction to its progress. If assistance can be procured it is wise to obtain it, as it is not easy to manage a case of obstructed labour single-handed.

1. *Malpresentation with a Normal Fœtus and Pelvis.*—A common cause of delay is the persistence of an occipito-posterior presentation. Rotation of the occiput forwards would probably occur in the majority of these cases if left alone, but when labour has already lasted a long time and the patient is becoming exhausted with her efforts, it is good practice to interfere. An attempt should be made under chloroform to rotate the head by means of a hand introduced into the vagina, and forceps may be applied immediately before the hand is withdrawn. Should the attempt fail, forceps may be applied and traction made downwards and backwards at first. The head may be delivered with the occiput posterior, but the perineum is very apt to suffer extensive laceration, and traction should be made as gently as possible so as to save it. As the head is brought down the normal rotation often occurs. When this has happened the forceps must be removed and reapplied.

Breech presentations are normally slower in delivery than vertex presentations, and plenty of time should be given. If it is decided to attempt to hasten matters an attempt may first be made to bring down a foot if the breech is not fixed. If it is fixed the forefingers of both hands should be hooked into the child's groins, and traction made. If this fails forceps may be applied over the trochanters. A fillet may be passed, or in the last resort the blunt hook may be used. The after-coming head often gives trouble, especially if the pelvis is rather narrow. After the arms are brought down, it is always wise to take the child by the shoulders and carry the body strongly backwards towards the mother's perineum, so as to unhitch the occiput from the pubes. When a certain amount of descent of the head has thus been gained, delivery is easily completed by carrying the body of the child forwards over the mother's abdomen.

Face presentations often cause delay through persistence of an occipito-anterior presentation. If the head is not fixed, an attempt should be made to convert this into a vertex presentation by pushing up the chin with two fingers in the vagina, while the child's breech is carried towards the chin, so as to promote flexion. If the chin cannot be dislodged plenty of time should be given, as the chin often rotates forwards quite suddenly at the last and the labour is speedily over. Failing this, an attempt may be made to rotate the head with forceps, and should this fail perforation must be done.

In brow presentations an attempt should be made to convert into a vertex or mento-anterior face presentation, whichever is easiest, if the head be not fixed, and, failing this, version should be done provided the waters have not drained away and the uterus is not retracted. If the head is fixed, an attempt at forceps delivery may be made. That failing, the only resource is perforation or symphysiotomy or Cæsarean section.

2. *Want of Normal Proportion between the Fœtus and the Passages.*—This may be due to an abnormally large or deformed fœtus, or to a narrow pelvis, and much less frequently to tumours blocking the pelvic cavity, or to stenosis of the natural passages caused by injury or disease. In the treatment of these cases it is important to recognise the cause and degree of obstruction.

If the patient is a multipara, the history of her previous labours is of importance in deciding on the proper measures to be taken. If she is a primipara, an anæsthetic should be given and the dimensions of the passages ascertained either by the aid of a pelvimeter or by the introduction of the hand into the vagina. It is hardly necessary to say that the strictest antiseptic precautions must be observed both during the examination and subsequent treatment.

The practitioner should first decide whether Cæsarean Section is indicated. The indications are—(1) A history of embryotomy in previous labours; (2) a contracted pelvis, with a true conjugate of less than $3\frac{1}{4}$ inches if the child is alive, or less than $2\frac{1}{2}$ inches if the child is dead; (3) the presence of an ovarian cyst or a myoma blocking the pelvis, or of a carcinoma of the cervix, or of dense cicatricial adhesions narrowing the vagina. When the operation has been decided upon, no further vaginal manipulations should be made, for fear of septic infection. The patient should be prepared for operation (see Operations, Treatment of). The operation may be done without an assistant other than the chloroformist. An incision is made from the umbilicus to the pubes, exposing the uterus. A 6 to 8 inch incision is then made through the uterine wall and the fœtus pulled out by the legs. The membranes and placenta are then peeled off the interior of the uterus, which is brought out through the abdominal wound for convenience in suturing. A continuous catgut suture unites the mucous membrane, and a second row of catgut sutures is employed to close the remainder of the wound. The hæmorrhage from the uterine incision is not excessive, and may be neglected, even if the placental site is opened; the sutures completely control it. The abdominal wound is then sutured with silkworm-gut; some operators recommend that these sutures should include the superficial layer of the uterus so as to fix that organ to the back of the anterior abdominal wall and prevent general peritonitis should the uterine wound become infected from the vagina. The whole operation may be completed in about 15 minutes. In favourable cases, where the patient has not been allowed to go on to the point of exhaustion, and where repeated vaginal examinations and attempts at delivery have not been made, the mortality is very low and the results very good.

The second question that the practitioner should settle is whether pubiotomy or symphysiotomy should be done. These operations are eminently useful in the type of case where contraction exists to such a degree that delivery has been previously effected through the natural passages, but at the expense of the life of the fœtus. The increase in the conjugate gained is usually enough to permit of the delivery of a living child. The operations are easy of performance, but the after-results

depend so much on the nursing that they cannot be recommended to the general practitioner, and are better left to specialists.

In the minor degrees of contraction above 3¼ inches the choice of the practitioner lies between forceps and turning. If forceps are chosen, plenty of time should be allowed for the head to mould, as many failures are due to want of this precaution. Walcher's position, with the patient on her back on a high table and the thighs hanging down over the edge of it, with the feet clear of the ground, is of great assistance. It may be used at intervals during the period of waiting to assist the head in entering the pelvis. Should the head refuse to enter, the idea of applying forceps must be abandoned and some other means of delivery adopted. Turning permits of the head moulding itself more easily to the pelvis. It exposes the child to very considerable risk, increasing enormously with the degree of obstruction, as the delivery of the after-coming head becomes more difficult and lengthy. The practitioner should be prepared to apply the forceps on the head the instant the body is delivered, as the usual methods are fairly certain to be ineffectual and only waste valuable time. Turning should not be attempted when labour has been in progress for a long time and the waters have drained away.

Finally, perforation may be called for. It should be looked on as a last resource, and a confession of failure on the part of the obstetrician. It is, of course, the best method in a contracted pelvis when the child is dead, unless the degree of contraction absolutely indicates Cæsarean Section (true conjugate under 2½ inches). It is also indicated after repeated and ineffectual attempts at forceps delivery, or when turning has been done and the head cannot be brought through the pelvis. It may be the only method open to a practitioner who is confronted with a case which he cannot deliver and who is without the necessary assistance or appliances for a Cæsarean Section. If perforation has been decided upon after a fruitless attempt at forceps delivery, it is wise to leave the forceps on the head and allow the nurse to hold them, as in this way the head is steadied and the perforation made easier. The perforator should be thrust into the most prominent part of the head, and no endeavour need be made to find a suture. The after-coming head may be perforated through the occiput or through the roof of the mouth. The brain is washed away with a stream of sterilised water, and the craniotomy forceps applied. The smaller blade goes inside the skull, the larger over the face or occiput. The blades are screwed tight and traction made. It is well to keep a finger in the vagina while this is being done, as a piece of the cranium may be pulled away and laceration of the vagina may be caused by the jagged edges unless the accident is noted.—R. J. J.

LACHRYMAL GLAND DISEASE.

This rare affection, when not due to malignant disease or syphilis, is caused by the admission of septic organisms which may cause acute suppuration of the gland requiring a free incision for the evacuation of pus. The indications for treatment are local applications for the relief

of pain—Cocaine, leeching or hot fomentations; the pus usually finds its way into the lachrymal sac, with speedy relief of the swelling of the eyelids and all tension.

The writer has met with a hitherto unrecognised acute enlargement of the lachrymal gland which pushed the eyeball downwards and forwards, causing an alarming degree of lagophthalmos without any inflammatory action. The condition occurred in a male adult soon after an attack of weeping. The gland could be easily made out by its smooth outline and firm elastic feel. Resolution suddenly set in after about 6 weeks without any treatment, and in a few days the tumour entirely disappeared. He has observed a somewhat similar condition of the salivary glands supervene in a physician who had placed a hypodermic tablet of Pilocarpine under the tongue, great enlargement of the salivary glands setting in on the day following. The sudden resolution in each case pointed to some temporary obstruction of the duct which spontaneously yielded.

Mikulicz's Disease is a rare chronic inflammatory enlargement of both lachrymal and the salivary glands on each side of the body, and yields to Iodides in full doses with Arsenic, and also to X-ray treatment.

The treatment of Dacryocystitis or inflammation of the lachrymal sac and of the deformities which arise from stricture of the nasal duct are dealt with in the article on Epiphora.

LARYNGISMUS STRIDULUS.

The primary cause—rickets, infantile convulsions, status lymphaticus, tetany, &c.—should be treated between the intermittent attacks of spasm of the glottis.

The best thing to do is to dash a little cold water against the face and chest, or to apply a hot fomentation to the neck and draw the chin forwards, and afterwards plunge the patient into a warm bath if seen during the attack, which is seldom, as the onset is alarmingly sudden and its duration exceedingly brief. A whiff of chloroform may be administered. Faradisation of the recurrent laryngeal or the forcible pulling forwards of the tongue may be resorted to if the physician should happen to be present at an attack which does not yield to a dash of cold water. Ammonia or Amyl Nitrite to the nostrils may also be tried. There is generally no time for the action of an emetic, unless in those cases where successions of attacks follow each other. Artificial respiration should be tried and persevered with in every case which does not yield to the above agents. Seldom is tracheotomy indicated.

Chloral, Bromides, Musk, Morphia, Emetics, Nitroglycerin, Succus Conii, and Belladonna internally have been recommended in recurring cases. The writer has obtained the best results from full doses of the Bromide of Ammonium, of which 2 or 3 grs. may be given every 3 hours or oftener to a child 1 year old, with ½ gr. Chloral Hydrate. Henoch speaks highly of Morphia, pushed to the extent of causing drowsiness, but this treatment cannot be free from serious dangers, especially as the disease rarely, if ever, occurs except between the fourth and twenty-fourth

month. Lancing of the gums may be tried, but there is little benefit to be expected. Antipyrine in small doses (1 gr. every hour for a child 1 year old) has been reported as successful in preventing the return of the paroxysms; Watkins administers $\frac{1}{5}$ drop of weak Tincture of Iodine every $\frac{1}{4}$ hour at first, and then every 1, 2, or 3 hours, but as a rule treatment directed to the rachitic condition meets all requirements.

LARYNGITIS.

Acute catarrhal laryngitis demands as absolute rest as possible for the larynx. The patient after a brisk saline or mercurial purge should be put to bed in a warm room (65° F.), the air of which is kept moist by the vapour of hot water from a bronchitis kettle or steam spray. Compound Tincture of Benzoin, Hemlock Juice, or a small quantity of Carbolic Acid should be added to the boiling water or to the water in the spray apparatus, so that the atmosphere in the neighbourhood of the patient's bed may be made to contain a small percentage of the volatile ingredients.

A Mustard poultice, warm fomentation, or Spongio-Piline wrung out of warm Carbolic Lotion or hot water, should be applied to the larynx—the latter is the most convenient and soothing. Cold may be tried where warmth is found to aggravate, and freezing the skin over the thyroid space where the internal laryngeal nerve enters sometimes cuts short the attack. Warm demulcent drinks should be freely administered and perspiration encouraged. The following mixture for an adult is suitable:

℞. *Liquor. Ammon. Acetatis* ℥ij.
Vini Antimonialis ♏vj.
Spt. Ætheris Nitrosi ℥j.
Succi Conii ℥j.
Aquæ Camphoræ ad ℥x. *Misce.*

Fiat mistura. Capiat cochlearium magnum quartis horis.

In the case of children an emetic of Ipecac. and the remedies mentioned under Croup should be administered.

Where pain and dyspnœa are present the soothing effects of the warm moist atmosphere may be intensified by causing the patient to hold his head over a basin of hot water to which the Friar's Balsam, Conium juice or Carbolic Acid has been added, a sheet being loosely applied so as to confine the concentrated vapour within the temporary tent so formed about his head and neck. This method is more reliable than the use of fancy inhalers, which must be placed close to the patient's mouth.

All ordinary indications are usually met by the use of a hand-spray apparatus into which the following liquid should be put:

℞. *Acidi Carbolici* ♏j.
Glycerini Boracis ♏iv.
Aquæ Rosæ ad ℥xij. *Misce.*

It is unnecessary and undesirable to place the nozzle of the spray inside the patient's mouth; it should be held a few inches from his face, and he should be directed to inspire deeply during the spraying process, which need only last for a few minutes at a time at hourly intervals. A 5 per cent. Menthol solution in liquid paraffin or paroleine used in an atomiser is also very soothing. Rarely are scarifications or caustic applications to the interior of the larynx ever justified.

Acute œdematous laryngitis demands the promptest and most energetic treatment. The patient must be surrounded by a warm atmosphere saturated with steam. The opening of the larynx should be freely scarified after cocainisation by a sharp-pointed curved bistoury, and if immediate relief be not obtained intubation should be performed or tracheotomy resorted to without delay.

A spray consisting of 1 in 2,500 Adrenalin when employed early may obviate operative interference; 5 to 10 per cent. Cocaine can be combined with it; the danger of laryngeal spasm may be minimised by a rectal dose of 2 or 3 drs. Bromide of Sodium. When active catarrhal symptoms have been combated by the above soothing remedies the patient should use a spray of 2 per cent. Tannic Acid before leaving his room.

Chronic catarrhal laryngitis shows itself in impairment of the voice and hoarseness. The treatment should be directed to the primary cause, and as this is nearly always due to excessive use of the vocal cords in public speaking or singing vocal rest is essential.

Though every constitutional disturbance or error is to be corrected by improved hygienic surroundings, including change of residence for a time to a bracing or mild atmosphere, nevertheless the most striking results are always to be obtained by local remedies when at the same time restriction is placed upon the use of the voice and tobacco and alcohol are abandoned.

Nitrate of Silver in solution (30 to 60 grs. to 1 oz.) should be applied to the interior of the larynx every 2 or 3 days. This is a very severe and painful remedy. Often a weak solution (20 grs. to 1 oz.) brushed daily over the interior of the larynx gives better results than the stronger solutions, which can only be used at considerable intervals. Chloride of Zinc (3 grs. to 1 dr.) is the best remedy when a purely astringent effect is desired.

Where the cords are thickened a 40 per cent. Lactic Acid Solution may be used, and it may be necessary to excise a portion of the hypertrophied tissue in the inter-arytenoid space. Singer's nodules may be excised, but as they are usually due to faulty voice production the best plan to pursue is to correct this after a prolonged rest to the larynx.

Strong local applications can only be made by the surgeon—a serious drawback in the treatment and management of a chronic disorder—and hence the great value of sprays and inhalations, which can be used by the patient as often as deemed desirable.

Of the astringent spray solutions the following are the best: Alum (5 grs. to 1 oz.), Tannic Acid (5 grs. to 1 oz.), Perchloride of Iron (5 to 10

mins. of the weak liquor to 1 oz.), Sulphate of Zinc (2 grs. to 1 oz.), Sulphate of Copper (½ gr. to 1 oz.), and when an alterative effect is desired weak Tincture of Iodine (5 mins. to 1 oz.), Chloride of Ammonium (10 grs. to 1 oz.). Bromide of Ammonium (5 grs. to 1 oz.), Eucalyptus Oil (2 mins. to 1 oz.), Fir-wool Oil (2 mins. to 1 oz.), Perchloride of Mercury (1/20 gr. to 1 oz.), Ipecacuanha Wine (100 mins. to 1 oz.), Sulphurous Acid (½ dr. to 1 oz.), may be employed.

In subacute cases where dysphagia, pain, and irritable cough are distressing, the spray which the writer has found most useful is that formulated upon a previous page, containing Carbolic Acid and Borax; Cocaine is often prescribed, but it tends to keep up the disorder if persisted in. Menthol, 5 per cent. in paroleine, is much better where cocaine or a markedly local analgesic effect is desired.

Inhalations are useful when a soothing effect is desired, though other actions may be obtained by using various volatile substances in this form. Conium inhalations, hot water containing Eucalyptus, Terebene, Fir-wool Oil, Creosote, Menthol, Carbolic Acid, Iodine, Benzoin or Friar's Balsam, may be each advantageously used as an inhalation. Good results may be obtained from the Chloride of Ammonium Inhaler. Pinus Pumilio Oil, 15 mins. to 1 pint water at 160° F., is a grateful inhalation.

Insufflations employed by blowing finely pulverised substances, such as mixtures of powdered Starch, Bismuth, and Morphia, are seldom followed by much relief.

The constant current, Faradisation, or static electricity may be tried with benefit in some cases of chronic laryngitis, and Cathcart attaches great value to the use of the electric vibrator combined with massage of the neck.

Inveterate or rebellious cases must be sent to a warm, equable, dry climate like that of Egypt. Mont Dore, Ems, and Aix-les-Bains have gained considerable repute, and Braemar at home suits many victims suffering from the effects of vocal strain.

Gouty and *rheumatic laryngitis* are often very intractable, and only yield when the underlying diatheses are vigorously attacked by Salicylates, Aspirin, Colchicum and Iodides combined with rest to the larynx and the use of local sprays and astringent applications. In most instances eliminatory treatment at a spa will be advisable.

Membranous laryngitis may be accepted as synonymous with diphtheritic laryngitis, the treatment of which is dealt with under Diphtheria.

Tuberculous laryngitis in the great majority of cases is secondary to tuberculosis of the lung, but this fact should not deter the physician from attempting to relieve and if possible to effect a cure of the laryngeal lesion in all cases where the pulmonary mischief is limited and not actively progressive.

Constitutional treatment is of great importance in all cases, and must be conducted upon the same lines as in other forms of tuberculosis. Open-air life is essential, and except in very rare cases the laryngeal condition is not a barrier to sanatorium treatment. A difficulty in swallowing should not

if possible be permitted to limit the amount of food, and resort to the soft rubber œsophageal tube may be justified when the dysphagia cannot be overcome by the use of anodyne or soothing sprays and other local methods of treatment.

Semi-solids or thick liquids as a rule are more easily swallowed than fluids, and Barwell recommends finely minced raw beef free from all fat and gristle mixed with egg-yolk. Often the patient can be got to follow Wolfenden's plan of lying upon his face on a sofa with his head hanging over the side, in which position he can suck up milk or thick soup through a glass or rubber tube from a vessel placed just below the level of his mouth. Sometimes dysphagia disappears whilst a bolus is being gulped down when a nurse standing behind the sitting patient presses firmly with each of her hands upon the side of the larynx.

Cod-liver Oil and Creosote, Guaiacol or Hetol internally are always beneficial. Vaccine treatment by Tuberculin injections should be tried, but it must be confessed that less is to be expected from it than in other forms of localised tuberculosis.

Local Treatment.—The most important factor in all cases is rest to the larynx, and this should be when possible absolute if ulceration of the cords has occurred, the patient being forbidden to speak except in a low whisper. In early cases where the lesion consists of a diffuse inflammatory swelling without breach of surface, laryngeal rest with the above-mentioned measures may effect a complete resolution without resorting to surgical methods when soothing sprays are judiciously employed to relieve the catarrhal symptoms.

The method of Bier, which consists in the establishment of a passive hyperæmia, has been adapted to the larynx by employing a Kuhn's mask in order to cause a negative thoracic pressure through partial obstruction of the inspiratory current passing via the nasal route.

Pain, cough and dysphagia may be relieved by the inhalation of Creosote, Menthol, Thymol and other local sedatives. In mild cases the continuous use of the common perforated zinc mask in which a few drops of a solution of creosote or menthol in spirit are sprinkled on a little cotton-wool meets all requirements, or the following formula may be used:

℞ *Creosoti Purif.* ʒj.
Acid. Carbolic. ʒij.
Spt. Chloroformi ʒij.
Thymol gr. xxx.
Aquæ Destill. ʒxv.
Spirit. Vini Rect. ad ʒiv. *Misce.*

Fiat solutio secundum artem.

Reflex cough may sometimes be prevented by sucking a Carbolic lozenge or painting the upper part of the larynx with Cocaine or Menthol solution. Some patients by the use of these remedies immediately before food are

enabled to swallow without pain. The best routine method of employing menthol is to use a 10 to 15 grs. per ounce solution in liquid paraffin sprayed by means of the atomiser. A (1 in 10) solution in olive oil may be used as a paint, and the strength may be doubled or trebled after a time when pain or dysphagia is very severe. Cocaine should be reserved for the worst cases, and an aqueous spray of 5 to 10 per cent. must be used with caution by a trained nurse a few minutes before meals. Dundas Grant relieves dysphagia by injecting Alcohol into the superior laryngeal nerve (2 grs. eucaine β to 1 oz. 80 per cent. alcohol).

Insufflations may be employed by Leduc's auto-insufflator, and the best agent for use in this manner is Orthoform, 10 grs. of which may be diffused over the ulcerated surface before attempting to swallow. Iodoform, Boric Acid, Bismuth, Iodol, Aristol, Chinosol, Resorcin, Thiocol and the innumerable host of iodoform substitutes and many other antiseptic drugs have been employed as insufflations, but orthoform is the best of all, though its analgesic properties are nil unless when applied to a breach of surface. Cocaine should never be employed in this manner, and the use of morphia or codeine is irrational.

As a preliminary to all local applications or surgical procedures, an aqueous spray of Carbolic Acid (1 in 100) or of Borax or Sodium Bicarbonate (5 grs. to 1 oz.) is advisable for cleansing purposes. Simple inhalations of steam act in the same way, and are soothing when the distress arises from a diffused catarrhal state.

Intratracheal injections are indicated where cough is incessant and a dry state of the laryngeal mucosa exists with ulceration; by their use the sputum is sterilised and the larnygeal ulcers are shielded from irritation by the currents of air passing over them in coughing and breathing. The most suitable for all purposes is the daily injection through the laryngeal aperture of 4 drs. of a warm solution of Menthol in liquid paraffin (20 per cent.) as the patient is made to take a slow and full inspiration after cocainisation; 2 per cent. Guaiacol, Creolin, Izal, Naphthalene and Eucalyptol, and a 1 per cent. Oil of Cinnamon are also employed.

Submucous injections of a few minims of a solution of the above substances or of 0·1 per cent. Perchloride of Mercury, 60 per cent. Lactic Acid, Acid Phosphate of Calcium, &c., are now seldom employed, and can only be recommended in very exceptional cases under the skill of an experienced operator.

More radical surgical procedures are, however, clearly indicated when the ulcerating process fails to respond to rest of the larynx, soothing and antiseptic applications and intratracheal injections employed every 24 to 48 hours.

The laryngeal surface having been brushed with a solution of cocaine 15 per cent. applied on cotton-wool firmly fixed upon a suitable holder, the ulcerated spot should be curetted carefully and thoroughly and the raw surface rubbed with a 60 to 75 per cent. Lactic Acid.

Many surgeons, however, content themselves with a thorough application of the pure acid without previous curetting, since this substance has

marked penetrative power and effects the destruction of all diseased cells without injury to the healthy elements in the mucosa. Formalin is employed in a similar manner (5 to 10 per cent.), and strong Carbolic Acid is sometimes used.

Barwell's caustic pigment consists of 50 per cent. Lactic Acid, 7 per cent. Formalin and 10 per cent. Carbolic Acid, and he insists upon the importance of its being well rubbed in. Protargol and other silver salts are also employed.

Various types of cutting or punch forceps are used for excision of the ulcerated spot instead of curetting. Many laryngologists prefer the galvano-cautery. This may be employed for the removal of ulcerating tissue or it may be used for the destruction of tissue before abrasion has occurred, in which case the method of procedure is to make one or two deep punctures into the indurated spot.

When the disease is limited to the upper part of the epiglottis the best procedure is to excise it by means of the punch forceps. Barwell removes the entire organ in one piece by large cutting forceps, having previously been in the habit of employing the galvano-cautery.

The operation of thyrotomy is practically never justified, and tracheotomy or laryngotomy is reserved for those cases where urgent dyspnœa immediately threatens to cut short the life of the patient.

Perichondrial abscess will require prompt incision from without, and though excision of the larynx is seldom if ever permissible, it may be found necessary to remove a portion of the diseased cartilage.

Syphilitic Laryngitis.—The treatment should consist of constitutional remedies suitable to the stage in which the syphilitic affection is existing at the time. In the later part of the *secondary* stage of syphilis rapid mercurialisation should be carried out by inunction of Mercurial Ointment and Salvarsan should be administered. Laryngeal mischief occurring during the *tertiary* stage of the disease is best met by vocal rest, perfect hygiene, nutritious food and heroic doses of Iodide of Potassium—30 grs. three times a day after meals. When the case does not respond to the iodide, and the symptoms increase in gravity, a course of mercurial inunction may be cautiously tried. The local symptoms can be best met by the various anodyne and astringent sprays and inhalations previously mentioned. A weak solution of Corrosive Sublimate (½ gr. to 1 oz.) is the best spray to use in such cases.

Orthoform, Iodol, Iodoform and the newer iodoform substitutes may be employed by insufflation, and are of the greatest use in many cases where much ulceration exists. In the late stages of the disease Menthol or Cocaine may enable the starving patient to swallow with comfort.

Nitrate of Silver (1 dr. to 1 oz.) or the solid stick or Argyrol may be freely applied to ulcerations, or a solution of Corrosive Sublimate (5 grs. to 1 oz.) may be used, with the aid of the laryngeal mirror. Sulphate of Copper (15 to 20 grs. to 1 oz.) is a local remedy of much value.

Œdema or gummatous infiltration with sprouting vegetations may at any time demand tracheotomy, and some laryngologists resort to this in order

to secure absolute rest to the larynx in intractable cases. Before, however, deciding to open the trachea or larynx it will be well to attempt curetting or excision and the application of Perchloride of Mercury solution. The cautery must be used with caution, as the danger of a permanent stenosis of the larynx must be always kept in mind.

The treatment of *chronic laryngeal stenosis* consists in the daily introduction of a Schroetter's dilator passed into the cocainised larynx through the vocal cords after incision of any webs of cicatricial tissue. The dilating tube will soon be tolerated in the stricture for half an hour at a time. O'Dwyer's tubes may be advantageously employed and worn for a month. When these measures fail tracheotomy should be performed, and the stenosis dilated from the inside or by means of instruments introduced through the tracheotomy wound.

LEAD POISONING—see Colic, Plumbism, and Poisoning.

LEPROSY.

It cannot be stated that any known drug possesses a specific action on the malady; much can be done to stay its progress and make the life of the leper tolerable. In a few cases complete resolution has been known to occur, but the cure has probably been either spontaneous or has been the result of agents which have acted by increasing the natural resistance of the tissues to the bacillus in mild forms of the disease.

Preventive measures have succeeded in stamping out the disease in various localities. These should consist in rigid isolation of all lepers and the separation of children from their leprous parents; the leper should be excluded from occupations which allow of transmission of the disease, as it is decidedly contagious.

By the judicious and persistent use of certain remedial agents the disease may be retarded, and suffering may to a very considerable extent be alleviated. Good food, moderate exercise, free ventilation, and as much pure open air as the patient's surroundings will permit, may be indulged in to advantage. Agents which improve nutrition, as tonics and Cod-Liver Oil, are always useful.

Of empiric agents there are two which have met with results which warrant their recommendation as valuable palliatives. Some affirm that in mild cases they are curative. These agents are Chaulmoogra Oil or its active principle—Gynocardic Acid and Gurjun Balsam. Both remedies are applied externally and taken internally at the same time. Both are as repulsive as copaiba, and as liable to upset the stomach.

Gynocardic Acid in doses of 2 grs. may be given in the form of pills after each meal, and the Chaulmoogra Oil may be administered in the form of capsules (10 mins. in each), two 3 times a day, or as an emulsion or mixed with fresh cream. The dose should be gradually increased till the patient can bear no further addition, after which the maximum amount may be persisted in as long as the patient remains able to swallow it without suffering diarrhœa or vomiting. 100 mins. daily may often be administered without much gastric disarrangement. 4 drs. daily by the rectum

may be employed when the stomach rebels, or it may be given hypodermically, but the long period (several years) during which its use must be persisted in almost prohibits the hypodermic method. Rogers injects hypodermically 2-4 grs. soluble Gynocardate of Sodium, and recently he has injected into the veins $\frac{1}{10}$ gr. increased to $\frac{4}{5}$ gr. twice weekly with excellent results.

The oil should also be freely and forcibly rubbed into the affected regions after being diluted with twice as much pure lard, or with an equal amount of lime water in an emulsion. The friction should be repeated several times a day for 15 or 30 minutes each time, and a cloth or dressing saturated with the ointment should be left in contact with the diseased surfaces. From the beginning of the treatment the skin should never be permitted to get free from this greasy application, except for the short time during which the patient is getting cleansed from time to time by hot soda baths.

Gurjun Balsam, Wood Oil, or Dipterocarpus Balsam as it is also called, is likewise used both externally and internally, and some Indian physicians prefer it to the chaulmoogra oil. It may be given in the form of an emulsion in doses of 15 to 30 mins., or in capsules. In India a tablespoonful of an emulsion made by shaking up 2 oz. of the oil with 6 oz. Lime Water is given twice a day.

Nastin, a crystallisable fat obtained from the leprosy bacillus or from *Streptothrix leproides*, has been employed by Deycke hypodermically, who found that it attacked the leprosy bacillus which disintegrated, an active reaction taking place similar to that which tuberculin produces in phthisis. By combining it with a 2 per cent. solution of Benzoyl Chloride the preparation known as Nastin B is obtained, which is injected into the subcutaneous fatty tissue in doses of 15 mins.

Collargol intravenously and the newer Arsenical preparations hypodermically are being tried.

Ulcerations are to be treated upon general surgical principles. Ichthyol and Resorcin Ointments (25 per cent.) are good dressings to use after applying concentrated Carbolic Acid where the ulcerated surface is limited. Iodoform gauze may be employed in some cases, but Oakum teased out carefully may make a cheap and very valuable dressing superior to all others where expense is an important object. Morris uses an ointment consisting of 30 grs. Mercury Oleate, 30 grs. Ichthyol, and 20 grs. Salicylic Acid to 1 oz. Vaseline.

Unna regards the disease as curable, and employs warm iron-ink baths to act upon the fatty substance secreted by the bacilli; he recommends an ointment containing Salicylic Acid 2, Ichthyol 5, Pyrogallol 5, and fatty basis 88 parts, and he gives Ichthyol internally, and advises excision of the tubercles and the use of Chrysophanic Acid where the skin lesions are in the early stage.

Nearly every known antiseptic and germ destroyer has been employed, and of recent years the X rays have been extolled and some cures reported after their prolonged use, and Radium emanations are also being employed with hopeful results in mild cases. Nerve stretching has been advan-

tageously employed for the relief of anæsthesia in non-tuberculous leprosy.

Serum therapy and vaccine treatment have given no definitely satisfactory results. All that can be hoped at present from the use of remedies is best obtainable by strenuous use of Chaulmoogra Oil internally and locally for a period extending over several years.

LEUCODERMIA, OR VITILIGO.

Treatment is unsuccessful in removing the anomalous distribution of the skin pigment in this disfiguring condition. An attempt may be made to diminish the dark coloration surrounding the white patches by applying a strong solution of Permanganate of Potash followed by Oxalic Acid solution, or by bleaching with Peroxide of Hydrogen or by the local use of Mercury Perchloride. To cause a deposit of pigment in the white patches, blistering with Cantharidin may be tried. A cosmetic effect may be kept up by painting the white areas with Walnut Juice daily in order to mask the marked contrast between their colour and that of the surrounding pigmentation.

5 per cent. Chrysarobin in gelatin has been recommended. W. Evans maintains that the pathology of the affection is not due to local nerve lesion, but is the result of a toxæmia originating in the intestinal tract, and he recommends as the only useful treatment the disinfection of the alimentary canal.

LEUCOPLAKIA—see under Tongue Diseases.

LEUKOPLAKIA VULVÆ—see under Vulvitis.

LEUCORRHŒA.

The term " leucorrhœa," or " whites," is often applied indiscriminately to every form of vaginal discharge not sanguineous in character. A little observation shows that these discharges fall naturally into the following groups, differing markedly in etiology and treatment:

1. A *true leucorrhœa,* or white discharge, varying in consistence from a thin milky fluid to curdy semi-solid masses, and consisting mainly of shed epithelial cells from the vagina in a watery albuminous medium. This is found often in anæmic young women living amid poor hygienic surroundings, and should be combated by better hygiene as regards food, fresh air, clothing and rest, and by drugs directed to the relief of anæmia. Local measures should be avoided if possible, but if the discharge persists in spite of general treatment a vaginal douche should be given. It is well to get a nurse to show the patient how to use the douche, which should be of the fountain type with a strong glass nozzle. 2 to 4 quarts of warm saline solution (drachm to the pint) may be used every evening before retiring to bed. If this is ineffectual the following may be tried: Boric Acid or Borax (dr. j. to O. j.), Zinc Sulphate (dr. j. to O. ij.), Tr. Iod F (Mxxx. to O. j.), Cupri Sulph. (gr. x. to O. j.). The practitioner should be on the watch for threadworms and the possibility of masturbation

should not be lost sight of. A very soothing and useful form of douche in all cases of vaginal discharge is the following:

℞. *Ol. Menth. Pip.* ℥iss.
Acid. Carbol. ℥iij.
Alum. Pulv. ℥j.
Acid. Boracici ℥iv. M. *ft. pulv.*

Signa.—" A teaspoonful in a quart of hot water to be used as a douche."

A curdy white discharge associated with intolerable itch is found sometimes in pregnant women. It may be treated by douches as suggested above. Again, a thin milky secretion is found in some women at the time of the menopause, and is due to the condition of atrophy of the vaginal mucous membrane associated with superficial loss of epithelium, known as " senile vaginitis." This condition may also be treated by douches, and if intractable by painting the reddened patches in the vagina through a speculum with Nitrate of Silver solution (gr. xx. to ℥j.), or with pure Phenol.

2. A *sero-purulent* discharge, yellowish or greenish in colour, and consisting of an albuminous fluid containing numerous leucocytes and shed epithelial cells. This discharge is usually produced by the gonococcus, commonly accompanied by a secondary infection of staphylococci or streptococci. This complaint is often very difficult to cure completely. The douches already mentioned may be tried first, repeated twice a day. It is well to supplement douching by swabbing out the cervix, which is affected in most cases, with pure carbolic acid, saturated solution of picric acid in alcohol, 40 per cent. formalin solution, or Tr. Iodi. The vagina in troublesome cases may be swabbed out with 2 per cent. solution $AgNO_3$, or with a saturated solution of Picric Acid. Tampons soaked in Boro-glyceride, Subitol (10 per cent. in glycerin) or Iodine (1 per cent. in glycerin) may be inserted overnight once or twice a week. In cases which resist these methods ionisation with a zinc salt may be tried. A purulent discharge may also be found in patients who are wearing a pessary with neglect of the usual precautions to insure cleanliness, or who have become infected through the introduction of septic matter in the course of an examination or operation. Such a discharge usually disappears on the removal of the pessary, and the institution of regular douches. If persistent, swabbing with the Nitrate of Silver solution just mentioned will quickly cure it.

3. A *watery or serous* discharge, often foul-smelling and stained blackish or brownish. Such a discharge is very suspicious, and instant measures should be taken to ascertain whether the patient is suffering from cancer of the cervix or body of the uterus. A similar discharge is sometimes noted in the case of a sloughing fibroid, and in cases of a foreign body retained in the vagina or uterus. The treatment is, of course, the removal

of the tumour causing the discharge (see under Cancer of Uterus and Uterine Fibroids).

4. A *clear mucoid* discharge like white of egg. This is almost pathognomonic of the condition commonly known as "erosion of the cervix." The treatment is the removal of the erosion by cauterisation, or better by shaving off the affected part as described under Dysmenorrhœa.

5. A *muco-purulent* discharge, consisting of stringy mucus, yellowish or whitish in colour. This is pathognomonic of inflammation of the cervical or uterine mucous membrane. The treatment is that of the inflammation (see under Endometritis, p. 267).—R. J. J.

LEUKÆMIA.

The treatment of leukæmia, leuchæmia or leucocythemia, whether of the splenic, bone-marrow, or lymphatic types, still continues to be merely palliative.

Perfect hygiene, with rest of the body and mind, an easily digested dietary and open-air life when possible should be instituted.

In the chronic splenic or spleno-medullary type of the disease life may be prolonged by the administration of Arsenic, but in the acute forms of the affection little benefit must be expected from any known method of treatment. Arsenic should be given in gradually increasing quantities till the maximum amount tolerated by the patient is reached. 5 mins. Fowler's solution thrice daily immediately after meals should be commenced with; after a few days the dose may be steadily increased till 15 mins. are reached. Occasionally, but not often, the addition of a small amount of Iron is beneficial and, as in pernicious anæmia, the arsenic course should not exceed a period of 4 to 6 weeks at a time.

Cacodylate of Sodium hypodermically often gives better results and should always be resorted to when the stomach is irritable; it may be given in 1-gr. doses by the rectum daily. The cacodylate course in $\frac{3}{4}$-gr. daily doses should not be continued for more than 10 days, to be renewed again after an interval of a week. The drug may also be administered in keratin-covered pills, each containing $\frac{1}{4}$ gr. to be given thrice daily. Many observers extol Benzol; the pure liquid may be given in capsules; up to 25 mins. thrice daily may be given in Olive Oil.

X-ray treatment of late years has proved beneficial in cases especially of the chronic myelogenous or spleno-medullary type. The acute lymphatic form of the disease should not be submitted to the Röntgen rays. Under the use of this agent the spleen has been found to rapidly decrease in size, and sometimes even to become impalpable, and the liver also is diminished in bulk. In the acute lymphatic cases, severe toxæmia may result. The rays may be applied to the splenic area when this organ is manifestly enlarged. The best method of exposure, however, is that suggested by Pancoast, in which eight or ten bone-marrow regions of the body are submitted systematically, one after the other, to the influence of the rays for a few minutes at a time every three days, dermatitis being carefully avoided. The blood during the X-ray treatment shows

remarkable changes, all the granular types of leucocytes and the myelocyte cells disappear, the lymphocytes alone remaining as before, and the red discs increase in number. It must, however, be accepted that this treatment, like the arsenical, is but palliative and not in the strict sense curative, though results in mild cases have been sometimes obtained which would apparently warrant the statement that the disease was cured; such cases, however, relapse, and the rays afterwards cease to have any good effect upon the blood or spleen. Radium emanations are also being tried with promising results, and the results are better than those obtained by the X rays, but they must be regarded as only palliative.

The tendency to hæmorrhages can be much lessened by the administration of Chloride or Lactate of Calcium, which increases the coagulable power of the blood. Blood Transfusion may be resorted to with advantage. The complications which arise, such as syncope, fever, peritonitis, pleuritis with effusion, dyspnœa, anasarca, &c., are to be treated upon the general principles detailed under the head of each condition. Removal of the spleen is certainly to be condemned.

LICHEN.

Lichen urticatus being a variety of urticaria, its treatment will be that of the primary type of disease. *L. simplex* being but the papular stage of impetigo or eczema, and *L. circumscriptus*, *L. circinatus*, or *L. serpiginosus* being a variety of seborrhœa, these conditions yield to the remedies indicated by the underlying affection. *L. pilaris* is a variety of keratosis affecting the upper part of the follicles, and *L. spinulosus* is almost certainly of the same nature, and will yield to the treatment detailed under Keratosis and Ichthyosis. *L. tropicus* is prickly heat or miliaria rubra allied to strophulus or red gum, the treatment of which will be detailed under their own headings. *L. hæmorrhagicus* and *L. lividus* are the result of minute hæmorrhages into the region of the hair follicles which yield to the remedies indicated by the blood condition—viz., purpura. There remain after the elimination of the above two cutaneous affections to which the name Lichen should be restricted—viz., *L. planus* and *L. scrofulosorum*.

The treatment of *L. planus* is always tedious and often unsatisfactory; improved hygiene, regular hours of work, rest and sleep and dieting must be insisted upon. Mental overwork and a neurotic strain being found in a considerable percentage of cases, it is obvious that the intense pruritus must be relieved at night, otherwise a severe form of insomnia develops.

Internal treatment should never be omitted. Arsenic holds the first place as in the treatment of psoriasis, and it must be given in full doses for some months, with periodical breaks in the course of about a fortnight each. In acute cases Tartarised Antimony should be administered, and when this agent fails in making a distinct impression upon the eruption of flattened purplish-red papules Mercury in the form of $\frac{1}{16}$ gr. doses of the perchloride or biniodide should be tried, but salivation must be avoided. Phosphorus has also some power, but its best effects may be procured

by $\frac{1}{30}$-gr. doses given in the intervals during which arsenic is being suspended.

Local treatment consists in Alkaline Baths and the use of Tar preparations to relieve the severe itching. When the eruption is extensive the best application is one like the following:

℞. *Liq. Carb. Detergens* ʒiv.
Liq. Plumbi Fort. ʒij.
Aquæ Destillatæ ℥xx. *Misce.*

By substituting Bicarbonate of Sodium for the lead in the above the lotion may be freely employed for long periods without the possibility of harm.

Chronic cases require stronger preparations, and the formulæ for tarry ointments are numberless; one of the best is that found so suitable in scaly eczema, consisting of 3 drs. of Liq. Carb. Deterg., 20 grs. Hyd. Ammon. Chlor., and 2 oz. Lanolin. Unna prefers Carbolic Acid to tar, and his lichen ointment consists of 30 mins. Carbolic Acid, 4 grs. Corrosive Sublimate, and 2 oz. Zinc Ointment, the different ingredients being increased or diminished according to the requirements of each case. Thus for an old but *small* indurated patch he has increased the perchloride to the strength of 10 or even 20 grs. per oz.

Salicylic Acid Ointment, 1 part to 20 of lard, may be applied in chronic cases, and Pyrogallic Acid or Chrysarobin can be used of the same strength when the lesion is limited in extent and of long standing. A good effect in the latter class of case may be obtained by covering the indurated patch with Soft Soap or with Emp. Hydrargyri or Emp. Salicylici. Some dermatologists do not hesitate to destroy small horny areas with the galvano-cautery. X rays have proved most valuable in the treatment of old indurated patches, and are more efficacious than the cautery.

Sometimes relief to the itching follows in a surprising manner. Trichloracetic Acid may be applied to small patches after thorough cleansing of the skin; Vaccine treatment is usually of no value. Some rare acute forms of lichen, in which the papules are sharp-pointed from involvement of the hair follicle as in Hebra's *Lichen ruber acuminatus* and Unna's *L. neuroticus*, are liable to end fatally, and should only be treated by soothing applications of Olive or Carron Oil. Some chronic neurotic types only respond to hydropathic treatment by Jacquet's method of forcibly projecting a douche of warm water (98° F.) against the skin on each side of the spine, followed up by a dash of cold water, and Fordyce has obtained good results from a course of sea-water baths. *L. scrofulosorum* is believed to be always of tuberculous nature. The internal administration of Cod-Liver Oil, Creosote and Iodide of Iron with Arsenic should be combined with local applications of Salicylic Acid Ointment, 2 to 5 per cent., or Creosote Ointment (B.P.), and if these fail the X rays may be employed.

LIGHTNING AND ELECTRIC-CURRENT INJURIES.

Burns and local injuries to nerve-trunks are to be treated on general principles by appropriate dressings and at a later stage by massage, &c.

The shock or collapse is to be met by the remedies already mentioned upon p. 166. Thus warmth and friction to the surface of the body with the hypodermic or rectal administration of diffusible stimulants such as Alcohol, Ether or Ammonia and the Cold and Hot douche alternately. Artificial respiration must be resorted to in all cases where unconsciousness exists, and the operation should be persisted in for at least an hour or more should the slightest sign of returning animation show itself.

Great danger exists to the rescuer in electrical-current accidents in separating the victim from the live wire with which he is in contact. The hands must be enveloped in thick woollen gloves or other dry non-conducting media, and the live wire should be cut by a properly insulated apparatus.

LITTLE'S DISEASE.

The treatment of this form of spastic paraplegia which shows itself soon after birth has been practically regarded as beyond the reach of art, but the introduction of Abbe's operation of resecting the posterior roots of several of the spinal nerves has brought it within the group of organic nerve diseases capable of being alleviated considerably by surgical means when the mental condition is not hopeless, as educative methods are to be persisted in (see under Paralysis, Spastic).

LIVER, Abscess of.

Multiple or pyæmic hepatic abscesses are always fatal.

Tropical or simple abscess of the liver is seen in this country amongst returned Anglo-Indians, and is regarded as a sequela of dysentery, though Sir Havelock Charles has proved that the suppuration is very often independent of dysenteric infection.

Preventive treatment in Europeans suffering from amœbic dysentery consists in absolute rest in bed, a mild liquid diet and the use of Ipecac. or Emetine in large doses to combat the organisms to whose presence the dysenteric symptoms are due. An important factor in all treatment is the cleansing of the alimentary canal by Saline Purgatives. Rogers maintains that the hepatitis in its presuppurative stage may be effectively dealt with by large doses of Ipecac. or Emetine, which prevents abscess formation as soon as marked leucocytosis with little or no polynuclear increase has demonstrated its presence. Some attach value to Ammonium Chloride.

Aspiration succeeds in a small percentage of cases when pus has formed. Manson's method consists in tapping with a full-sized trochar and canula and introducing through the canula a long rubber tube through which the pus is siphoned off after the withdrawal of the canula.

The danger of pus welling along the track of the aspirator needle and infecting the peritoneum is always a real one, hence most surgeons in superficial or deep abscesses recommend a free abdominal incision under strict antiseptic precautions; after the abdominal cavity has been carefully cut off by sterile gauze packing a large trochar is plunged into the abscess

and the track of the puncture seared by the Paquelin cautery and the sac washed out through a rubber tube with warm Saline or weak Quinine Solution, the tube being kept in position for drainage by gauze packing. Or the liver may be sutured to the edges of the wound made in the parietal peritoneum. Statistics afford evidence of the frequent subsequent septic infection of the abscess cavity, and the most stringent antiseptic precautions are necessary. Free incision and drainage are the best means of obviating these dangers.

Rogers after aspiration injects Emetine into the sac in all amœbic cases and gives the drug hypodermically as well. Where the abscess cannot be reached through the abdominal route the pleura must be opened, and it may be necessary to resect a portion of one or more ribs as in the operation for suppurating hydatids.

LIVER, Acute Atrophy of.

All attempts at curative treatment have hitherto failed in this rapidly fatal affection. Cases of reported cures are considered to be examples of mistaken diagnosis.

Life may be prolonged by a thorough flushing out of the intestinal tract by Saline Purgatives preceded by Calomel in small doses to disinfect the intestinal contents and to minimise or counteract the effects of any toxin generated within the bowel.

Intravenous injections of Saline or large amounts administered hypodermically in several areas, together with hot packs to stimulate the sweat-glands as in uræmic conditions, may be tried when coma or stupor threatens.

LIVER, Amyloid Disease of.

The primary cause should always be dealt with, and any focus of suppuration must be surgically treated unless the serious condition of the patient's health and the presence of some incurable malady prohibits operative procedures. Even after marked signs of amyloid degeneration have appeared in the kidney, liver and spleen, resolution may be expected if diseased bone can be removed or a chronic abscess can be obliterated by operation.

In phthisical cases with extensive cavities obviously little improvement can be expected, but remedies—Creosote internally and antiseptic inhalations, &c.—which diminish pus formation, will retard the progress of the amyloid process.

Iodide of Potassium in large doses for long periods should be given in syphilitic cases, and Iron Iodide is valuable when the anæmia is severe. (See also under Bright's Disease.)

In such hopeless cases as those occurring during bronchiectasis, chronic empyema, &c., life may be prolonged by a residence in a dry, bracing, elevated region near the coast; a long sea voyage is sometimes beneficial or a sojourn at a spa where natural Iodine Waters may be freely used.

LIVER, Cancer of.

Treatment in most cases can only be palliative. Thus pain is to be relieved by Opium, constipation by enemata or mild cathartics, vomiting by Ice, Morphia Perules ($\frac{1}{16}$ gr. each) and counter-irritation, and the collection of fluid in the peritoneal cavity must be removed by tapping when the symptoms become urgent.

As the growth is seldom primary and not often seen till considerably advanced, operative procedures are rarely indicated. Many cases are now on record where small and circumscribed malignant deposits in the liver associated with gall-stones have been successfully removed during operations commenced for the relief of other symptoms. For the various forms of treatment suitable to inoperable cancers, see under Cancer.

The frequency with which cancer of the gall-bladder is found associated with the presence of calculi in the viscus is a strong argument for early operative procedures, especially since the total mortality in all gall-bladder operations has been reduced to about 1 per cent.

LIVER, Cirrhosis of.

A history of spirit-drinking is obtainable in nearly all cases, and if the disease is detected in the preliminary stage of enlargement a confident hope may be expressed that permanent cure will follow upon the removal of the exciting cause.

Change of occupation is necessary in dealing with cirrhosis in publicans, barmen and waiters. It is almost impossible for such men to abstain once they have become enslaved to alcohol unless a new sphere of labour be opened up to them.

Active open-air exercise or labour is of great importance, and the diet should be plain and nutritious. Attention should be paid to the amount of liquids imbibed. Where there is as yet no sign of effusion into the peritoneal cavity a liberal allowance of liquid food is very desirable. Milk may be taken in large amount mixed with an equal quantity of aerated water, and the best diet is a liberal fish dinner and breakfast. A few months of vegetarian living often give excellent results. In Ireland buttermilk or the home-made Koumiss mentioned upon p. 19 affords a most valuable dietary. Koumiss or Buttermilk mixed with Kali Water and Kali Water with milk are invaluable as an aid in overcoming the desire for alcoholic drink.

The bowels must be kept in the healthiest state possible. Purgatives are useful at all stages of cirrhosis, and saline cathartics as Epsom or Carlsbad Salts and the various purgative mineral waters are the best. Where the patient's means permit, a sojourn at Carlsbad, Vichy or any alkaline spa is very valuable. By an occasional dose of Blue Pill given at bed-time, followed by a morning saline, the portal system is very powerfully influenced. Mercurials must be used with great caution where there is any renal mischief associated with the hepatic lesion. Podophyllin or Iridin may then be employed in such cases advantageously. A full dose of any natural purgative water every morning with an occasional

mercurial or podophyllin pill given the night before soon tells upon the hepatic enlargement and induration.

Mercury may also be given for about a month in small doses, alternating with large doses of Iodide of Potassium administered for a similar period. This latter drug is of great value in syphilitic cases; syphilis and malaria are the cause of cirrhosis in a small percentage of cases, and every case of cirrhosis, whether in the stage of enlargement or contraction, where a history of indulgence in concentrated spirits is absent should get the benefit of a course of large doses of Iodides on the possibility of a syphilitic foundation being the primary factor in the disease. The Wassermann test should never be omitted.

When malaria is suspected Quinine and Arsenic should be persisted in.

Murchison attached importance to the action of the Chloride of Ammonium and Green Iodide of Mercury in ordinary alcoholic cirrhosis (½ to 1 gr. three times a day). These remedies in the great majority of cases cannot be pushed with safety, especially as most of the victims of cirrhosis are suffering from gastric troubles. Many of them are debilitated from want of common food, having long since ceased to live with regularity and prudence. In such cases there is no remedy so frequently applicable as the Diluted Nitro-Hydrochloric Acid in full doses, combined with a vegetable bitter in small amount. It may, moreover, be given at the earliest, and is often grateful during the later stages of the disease. The Nitro-Hydrochloric Acid bath is prepared by mixing 1 oz. of strong Nitric and 2 oz. of Hydrochloric Acid in 2 gallons of warm water. A local pack may be administered by soaking flannel cloths in this mixture and applying them to the abdomen and lower part of the chest. The writer, however, prefers to apply the acid mixture in the above strength upon spongiopiline worn under a bandage over the entire hepatic region. As soon as any eruption appears the acid may be discontinued, but in some cases the mild counter-irritation produced by covering the acid lotion with an impervious tissue is productive of benefit.

The following is a good combination; it acts directly upon the liver, and at the same time tends to relieve the craving for alcoholic stimulants:

℞. *Acidi Nit.-Hyd. Dil.* ʒss.
Succi Taraxaci ʒij.
Tinct. Nuc. Vomicæ ʒvj.
Extract. Cinchonæ Liq. ʒiiiss.
Infus. Chiratæ ad ʒxij. *Misce.*

Fiat mistura. Signa.—*" A tablespoonful in a wineglassful of water to be taken four times a day before food."*

In a few cases Chloride of Gold has been credited with causing absorption of the new fibrous growth, and injections of Fibrolysin have been recommended.

Castaigne advocates opotherapy by feeding on fresh pork liver, and

recommends the injection of Adrenalin into the peritoneal cavity. Methylene Blue has been used in the same manner; it is rapidly absorbed and eliminated by the urine.

When ascites sets in notwithstanding the change in the patient's habits and the use of the above remedies, these should be continued. Cure is still not absolutely beyond hope, and the writer has a few times seen recovery follow where tapping had been deemed necessary.

The treatment of ascites will be found fully detailed under its own heading, where surgical methods and the Talma-Morrison operation of omentopexy or epiplopexy for the cure of cirrhosis are referred to—*i.e.*, the suturing of the liver and omentum to the abdominal wall with the view of readjusting the circulation through the new vessels formed in the resulting adhesions.

In hypertrophic cirrhosis (Hanot's Disease), alcoholic abuse plays no causal part; little can be done save the administration of palliatives to relieve the symptoms which are common to it and to atrophic cirrhosis. Porto-caval anastomosis has been recommended. Removal of the spleen has been successful in some cases. Cumston, believing that some cases of hepatic cirrhosis are caused by infection of the biliary tract from the intestine, recommends that the gall-bladder should be drained by cholecystostomy in all cases of hypertrophic cirrhosis with jaundice not yielding to medical treatment.

Vomiting may be met by counter-irritation over the gastric region, with Ice and effervescing mixtures internally. Bismuth, Alkalies, Hydrocyanic Acid, Creosote Capsules and Morphia Perules ($\frac{1}{16}$ gr. in each) may be tried. Papain or Pepsin is useful in some cases, and peptonised food often may be very valuable when the condition of the gastric membrane is much deranged. Hæmorrhage from the bowels, hæmorrhoids, diarrhœa, and other complications are to be regarded as more or less conservative, and not to be interfered with too soon; the only available treatment when the loss of blood is serious is to administer Calcium Chloride or Lactate in full doses.

Hæmatemesis will often yield to large rectal doses of the Calcium salts in combination with Adrenalin by the mouth in urgent cases, but death may take place from the rupture of a dilated œsophageal vein near the stomach in spite of all treatment.

LIVER, Congestion or Inflammation of.

The treatment of the *passive* congestion caused by valvular disease will be found mentioned under Heart Disease.

Active hepatic congestion is usually the result of indiscretion in eating, the error being most frequently the indulgence in too much highly seasoned food, over-spiced curries, along with alcoholic liquors when little exercise is taken, especially during tropical heat where chills are common.

Preventive and curative treatment consists in the removal of the casual factors; the use of a simple spare diet of diluted milk or weak vegetable soups, and the avoidance of all forms of alcohol. Calomel in

a series of small doses or one large dose, followed by a brisk Saline Cathartic every morning to relieve portal stasis, and 10 to 20 mins. Diluted Nitro-Hydrochloric Acid thrice daily constitute the best routine. The pain of the swollen liver may be relieved by leeching, cold local packs, warm poultices or counter-irritation. When the affection has followed the habitual bleeding from piles which has suddenly stopped, leeches may be applied to the perineum and the bites should be encouraged to bleed by the application of a warm antiseptic poultice. Any accompanying catarrh of the stomach usually yields to Calomel, Podophyllin or Euonymin followed by saline purgatives; if not, Bismuth Carbonate in 20-gr. doses or a simple effervescing mixture may be ordered.

In chronic cases the diluted N.-H. acid is the best agent, alternating with short courses of 10 grs. Ammonium Chloride, or in tropical cases with Ipecacuanha in doses short of producing nausea. A local pack of the diluted acid is also very efficacious, alone or combined with more energetic hydropathic measures as cold douching, etc., and the administration of Quinine in malarial cases. A course of Carlsbad treatment is advantageous in all chronic forms of portal congestion.

LIVER, Fatty Disease of.

The treatment of *fatty degeneration* need hardly be considered, since this condition is beyond the reach of drugs save in those rare cases due to poisons, such as phosphorus, picric acid, arsenic or antimony, in which the degenerative change will slowly pass off when the poison has been eliminated by the bowel or kidneys.

Fatty infiltration is usually a part of the obesity due to over-feeding by farinaceous and fatty foods in conjunction with absence of exercise and indulgence in alcohol. The treatment is that of obesity, and consists in the regulation of the diet, which should contain a moderate amount of lean animal food administered at regular hours, with abundant open-air exercises and only a necessary amount of sleep. Saline purgatives are always indicated. The fatty infiltration which sometimes accompanies pulmonary phthisis and profound cachexias demands attention to the primary condition and a readjustment of the dietary and measures which improve the aeration of the blood and the deficient metabolic processes by which the fats and carbohydrates of the food or of the tissues are transferred to the liver.

LIVER, Functional Affections of.

The treatment of the condition known popularly as "sluggish liver" or "biliousness" is that of a mild active congestion of the organ. It consists in a strict regulation of the amount and quality of the food to be administered, active open-air life, and the avoidance of alcohol. The intimate relationship of functional hepatic derangement to the condition recognised as lithæmia was insisted upon by Murchison. Whether the hepatic insufficiency be the result of errors in diet or of the production of toxins generated in the stomach, bowel or elsewhere, the treatment

should be directed to eliminatory measures which stimulate peristalsis, relieve portal congestion and increase the activity of the kidneys. Occasional doses of Calomel, Podophyllin or Euonymin and a brisk morning saline purge should be steadily administered. Salicylates as in the true gouty condition are always useful, alcohol and excess of carbohydrates must be forbidden, and a free open-air life with abundance of active exercises should be insisted upon. A course of hydropathic and spa treatment, as at Harrogate or Carlsbad, which is so valuable in the treatment of chronic hepatic congestion, may be advantageously recommended.

LIVER, Inflammation of.

Perihepatitis is often the result of syphilis, cirrhosis, or is part of an adhesive peritonitis arising from gall-bladder troubles. The treatment of the primary condition in this affection is of secondary importance, since the mechanical impediment to the circulation cannot be removed by drugs.

Ascites being the chief sign calling for relief, tapping is clearly indicated, and when alcoholic cirrhosis does not complicate the case this procedure may prolong life indefinitely through repeated operations, in marked contrast to the results obtainable by tapping in cirrhosis.

Omentopexy may be resorted to with a fair hope of diverting the circulation in selected cases where there is no evidence that a cirrhotic state of the kidney coexists even though mediastino-pericardial adhesion be present. (See under Ascites.)

LIVER, Injuries and Rupture of.

The shock and collapse should be met by absolute rest in the horizontal position, and it is wise to abstain from Morphia till the diagnosis of a rupture or laceration of the liver can be made certain where there has been no penetrating wound. As soon as evidence of hepatic injury has been rendered probable by the symptoms morphia should then be given and the abdomen should be opened without delay. Hæmorrhage should be promptly controlled by clamping the portal vessel between the fingers while all clots are being removed. Wounds in the hepatic substance should be ligatured by catgut sutures of the mattress type passed deeply into the hepatic tissue and drawn tightly so as to stop hæmorrhage even should the gland substance be partially cut by them. Where a ragged rent continues to bleed after deep suturing, the best procedure is to firmly pack the chasm with sterile gauze and bring the tail of the packing into the parietal wound, if the main bleeding trunk cannot be seized and ligatured separately. The peritoneal sac should be sponged with gauze swabs moistened with saline solution.

Penetrating wounds are treated upon the same lines, and after the passage of deep mattress sutures to arrest hæmorrhage the rent in the capsule should be closed by superficial stitches. Van Buren Knott's liver suture is designed to avoid tearing of the hepatic tissue, and may be employed as a preliminary to the removal of a portion of liver tissue containing a tumour.

Bayonet or dagger wounds involving the liver through the diaphragm should be dealt with through the pleural route and the thoracic cavity isolated by suturing the diaphragmatic wound to the lips of the intercostal incision.

LIVER, Syphilitic Disease of.

When the Wassermann test is positive treatment such as is indicated in late syphilis should be commenced—*i.e.*, Mercury and Iodide of Potassium, the latter in large doses. Complications as pain, peritonitis, jaundice, vomiting, or ascites are to be dealt with upon the principles already mentioned. Under exceptional circumstances gummata may be excised, as when they are pedunculated and have resisted iodides, etc.

LOCOMOTOR ATAXIA.

The demonstration of active *Spirochæta pallida* in the central nervous system in parasyphilitic cases has opened up a field for the activity of physicians where formerly all such cases were regarded as hopeless. The trypanosomes entrench themselves in the cerebro-spinal fluid, where they cannot be reached by specific agents such as salvarsan or mercury because the cells covering the choroid plexus do not permit these substances to pass out into the spinal fluid. Hence their failure formerly to make any change in the clinical symptoms of this type of parenchymatous syphilis. But by the administration of the specific drugs through a lumbar puncture the therapeutic results are greatly intensified, and various plans have been devised for carrying this out. Thus it is established that if we wish to get the best result from Salvarsan it should be given both by the spine and by the veins, and this is true also of Mercury. Salvarsan, however, cannot be injected into the spinal canal without certain precautions being taken. The patient receives intravenously 0·45 grm. neosalvarsan. One hour later blood is allowed to flow out of a vein and 15 c.c. of the serum of this blood is injected in the lumbar region. The serum may be injected undiluted or mixed with half its bulk of saline solution; it has been demonstrated to be powerfully spirochæticidal, and may be repeated weekly for six or more times. The injection of salvarsan direct into the spinal subarachnoid has been followed by grave symptoms, hence the substitution of it by auto-salvarsanised serum. Ogilvie simplifies the method by mixing the salvarsan *in vitro* with human blood-serum before injecting.

Mercury is used in the same way; the serum of the mercurialised patient is injected into the spinal subarachnoid alone or with the addition of $\frac{1}{50}$ gr. mercuric chloride. Good results have also followed the spinal injection of Benzoate of Mercury mixed with human serum. Under this treatment in many cases all the symptoms have improved, lightning pains have disappeared, ataxia rapidly improved and anæsthesia diminished. The injection of the salvarsanised serum may be carried out whilst mercury is being administered by the veins, mouth or skin. Early cases have been reported in which not merely arrest but cure of the disease has been achieved. Suspension treatment is now abandoned.

Whilst spinal and oral treatment is being carried out the older methods of procedure should be persisted in; improved hygiene, sexual excess, abstinence from alcohol, business worries and high pressure of all kinds and as much muscular rest as possible should be duly considered.

Of drugs employed with the view of diminishing the tendency towards the sclerotic changes in the cord, alteratives like Arsenic, Chloride of Aluminium or of Barium, Phosphorus, Chloride of Gold and Sodium and Nitrate of Silver have been from time to time extolled. The latest addition to the list is Fibrolysin administered hypodermically.

Gowers recommended arsenic and aluminium chloride; the latter drug may be given in 3-gr. doses alone or in combination with Fowler's solution, but alternating courses of about a month each are preferable. The discoloration of the skin liable to follow nitrate of silver administration is a serious drawback, and if the drug is employed at all it should only be for short courses in doses of not more than $\frac{1}{4}$ gr.

Strychnine is a commonly prescribed drug; any beneficial action which it possesses is probably due to its general tonic action. In full doses it is liable to aggravate the crises and lightning pains, but it certainly is useful when bladder troubles are present. Erb's tonic pill contains 1 gr. Lactate of Iron, $1\frac{1}{2}$ grs. Extract of Cinchona and $\frac{1}{5}$ gr. Ext. Nux Vomica. Iodides to be of value should be given in full doses and in courses not exceeding a month at a time.

Symptomatic Treatment.—The main hope in helping the tabetic patient must lie in the skilful use of agents and drugs to be employed upon generally accepted principles for the relief of the various symptoms present in each individual case, thus:

Ataxia can be greatly improved by the method introduced by Fraenkel in which by a careful education or retraining of the muscles the incoordination may be greatly lessened. The first step in this plan of treatment is to teach the patient to ignore or forget the old movement memories of his former healthy state and to turn to advantage a new series of memories which he can only learn by means of exercising his muscle groups with patient and persevering efforts at first guided by his eyes. Many afferent neurons have already perished, and the impressions which he receives through the surviving ones convey to him wrong sensations causing inco-ordination. He begins to practise standing between two nurses with his feet apart, and gradually narrowing his base he soon learns to maintain himself in the erect posture with his feet close together, after which he learns to stand upon one foot, and practises the placing of the suspended foot slowly and accurately down till he becomes able to stand upon his toes while his eyes are shut.

Walking with one foot upon a straight line or with both feet between two lines 12 inches apart chalked on the uncarpeted floor is to be practised several times a day for $\frac{1}{4}$ to $\frac{1}{2}$ hour at a time, stopping before physical or mental fatigue is induced. Afterwards curved lines are employed, and finally complicated figures should be practised with numerous turning-points. Before getting up and after retiring to rest various muscular

movements may be practised whilst he lies upon his back in bed, such as touching with each toe some object suspended above the bottom of the bed, or slowly and accurately flexing his leg first and next his thigh he steadily extends the elevated foot and leg till his toe touches the object, after which the limb is gradually brought again to the horizontal position. No new exercise should be tried till the former one has been accomplished with accuracy and comparative ease or alacrity. At various times during the day he should practise slowly sitting down and steadily rising up, commencing this exercise in an armchair with long arms. Climbing an easy stair with an attendant upon one side without hauling himself up by means of his arms on the handrail should be daily practised.

Massage and Electricity are always of use when the muscles are wasted and flabby, especially in long-standing cases where exercise has been neglected.

The continuous current is the most satisfactory for all purposes. One pole may be placed upon the upper part of the spine in the cervical region and the other one over the lower lumbar spines, and the current from fifteen to twenty Leclanché elements should be allowed to pass for about 5 minutes twice daily. A current from three to four cells should also be passed through the brain for a few minutes. A very good method is to place the positive pole upon the upper spines, and drop the negative into a warm or tepid foot-bath, in which both lower extremities are immersed for 5 or 10 minutes. Where the continuous current fails to afford any signs of improvement in the patient's condition, Faradic and static electricity have also been employed.

Radium Emanations applied to the spine have been reported upon by Fabre and Max to have produced remarkable improvement in all the symptoms of the affection, lessening pains, spasticity, &c.

A course of hydropathy is of use in some cases, and may be carried out in conjunction with massage or Fraenkel's method. Cold packs, the combination of douche and massage, or spray and needle baths, with frictions and manipulations applied to the spine and lower extremities, may be employed. Hot baths must be forbidden, though Leyden recommends the free use of baths at 86° to 95° F., and also of brine baths, and Luke recommends the peat and fango baths.

Counter-irritation applied to the spine is only indicated in those cases which exhibit marked spinal tenderness or where the ataxic symptoms have rapidly followed after a fall or concussion.

Bladder Troubles.—These are the most serious of all the symptoms of tabes, since they very often cause death from retention, cystitis and secondary kidney infection. The irritability of the bladder in the early stages of the disease, as evidenced by frequent attempts at micturition, passes at a later period into retention or the constant dribbling from a distended bladder, or ends in a purulent cystitis with a large amount of residual urine. It is the duty of the physician in every case to look closely after the state of the bladder, and if any doubt exists about the patient's ability to completely empty the viscus the catheter should be

passed after micturition in order to ascertain the amount of residual urine. As the main source of the mischief lies in the insensibility to stimuli from the distended bladder, preventive treatment is important, and should consist in compelling the patient to make water every couple of hours and to insure that the last drops are voided. Where any amount of residual urine is detected the patient must enter upon catheter life, the most scrupulous care in sterilisation of the instrument being exercised. The plan of waiting till a purulent cystitis develops before resorting to catheterisation is a mistake. When decomposed urine is voided or drawn off, the bladder should be freely irrigated with warm Boric Acid solution, a portion of which should be left behind after each washing. Internal antiseptics are clearly indicated in every such case; 5 mins. Creosote in a capsule twice daily is a valuable method for keeping the urine sterile, or 5 grs. Urotropin may be given in 1 dr. of Sanmetto. The tone of the bladder may be improved by full doses of Strychnine provided lightning pains are not present, and it may be further increased by a weak continuous current passed from the pubes to the sacrum, but the most efficient means of all to restore lost tone is to prevent dilatation or distension by repeated catheterisation.

Lightning Pains.—Rest in bed is essential, and the new analgesics for the relief of pain should be employed in preference to narcotics on account of the danger of establishing a drug habit. Antipyrine 15 grs., Phenacetin 20 grs., Aspirin 20 grs., Methylene Blue 4 grs., Pyramidon 10 grs., Antifebrin 5 grs., Salicylate of Soda 30 grs., Exalgin 3 grs., may be accepted as maximum doses. Morphia hypodermically and Cocaine should only be resorted to under most exceptional circumstances. Gowers recommended 3-gr. doses of Chloride of Aluminium thrice daily to prevent recurrence, and Müller has reported permanent relief from Fibrolysin injections. When the pain is superficial it may be relieved sometimes by smart counter-irritation, a spray of Ethyl Chloride or Ether, Chloroform liniment, Menthol or warm packs.

The Continuous, Faradic, Static and High-frequency currents have all proved of some value in relieving severe lightning pains. Nitroglycerin and Amyl Nitrite are occasionally useful, but they need only be tried when the arterial pressure is high.

Crises.—When these are only moderately severe the agents useful for the relief of lightning pains should be tried, but severe attacks will require morphia hypodermically. Amyl inhalations sometimes relieve any form of visceral crisis when the tension is high. Gastric crisis demands rectal feeding, smart counter-irritation, or a hot poultice over the stomach, and small doses of $\frac{1}{8}$ gr. Cocaine with Bismuth or 3-min. capsules of Creosote. Obstinate gastric crises have within the last 2 or 3 years been treated successfully by operative measures after the failure of all medicinal agents. The resection of the posterior nerve-roots from the seventh to the tenth on each side in order to interrupt the reflex nervous arc upon the integrity of which the symptoms depend has afforded relief.

Laryngeal crisis may be first treated by Amyl inhalation or a whiff of Chloroform or the upper part of the larynx may be brushed over with a solution of Cocaine. Bladder and rectal crises yield to Morphine alone or with Belladonna in suppository form.

Joint Troubles.—Little can be expected from treatment once acute symptoms of Charcot's trophic change have manifested themselves, and these may appear with almost incredible swiftness ending in rapid disintegration of all the arthritic tissues. Absolute rest to the affected articulation is necessary, and the application of carefully padded splints to minimise the dangers of dislocation. Sometimes incision and irrigation of the joint have done good when loose bodies and irregular masses of new bone have formed around the margins of the articular cavity.

Perforating Ulcers.—These are common in the foot about the head of the metatarsal bones of the great and little toes. The best treatment is rest, and the careful scraping away of any diseased bone, and the paring down of thickened skin and granulations. The writer has frequently seen complete healing follow the patient application of a weak continuous current, one pole being applied over the thigh and the other dropped into a warm salt-water foot-bath in which the affected limb is immersed for ½ hour at a time two or three times daily. As soon as the patient is able to move about pressure should be taken off the skin over the affected area by the use of a thick insole of spongio-piline perforated opposite the site of the lesion.

Hyperæsthesia is much less common in various skin areas than the opposite condition; sometimes it shows itself by a well-marked girdle sensation. The best routine in such cases is to administer Antipyrine and to apply a weak continuous current to the spine. The actual cautery with a light touch and at a dull red heat has been successfully employed for the relief of spinal pain, but the dangers of sloughing must not be lost sight of.

LUMBAGO.

Rest in bed between blankets should be at once insisted upon: dry warmth when applied immediately may abort the attack. The best form for the application of heat is the india-rubber bag only partially filled with as hot water as can be borne and laid across the back. This is much better than hot poultices, which should be avoided. In the absence of the rubber bag or between the periods for its refilling a single layer of coarse brown paper being laid upon the seat of the pain, the part may be smoothed or firmly pressed with a hot smoothing-iron, such an appliance as is used in laundry-work answering well. This meets every requirement which can be achieved by the actual cautery, and does not produce severe smarting.

Acupuncture by driving several needles deeply into the affected muscles often gives speedy relief.

Aquapuncture may be tried, the muscles being deeply punctured by a stout hollow needle and a few drops of sterilised water inserted before

withdrawing the needle after each stab. This method may be advantageously combined with Cocaine or Morphia injections if these substances are added to the water as in the writer's plan of treating severe sciatica. Antipyrine, Amyl Nitrite, Carbolic Acid and other drugs may be employed in the same way, but their use is followed by severe pain.

Haig's manipulative treatment consists in making deep pressure with the thumbs on the lumbar muscles close to the spine, whilst with the upper part of the trunk the patient is made to perform acute flexion, rotatory and lateral movements, the lower part of the spinal column being kept immovable.

Of local anodyne applications there is no end; the most popular of these are liniments or plasters which contain Belladonna, but they should be used with caution. The following application may be applied upon lint covered in with oiled silk, but its effects must be closely watched:

℞. *Liniment. Belladonnæ* ʒij.
Liniment. Aconiti ʒiss.
Liniment. Chloroformi ad ʒvj. *Misce.*

The Chloroform of Belladonna (*Squire*) is a powerful local anodyne. For routine use the Emp. Menthol is safer than that of belladonna. The variety spread upon perforated felt may be applied over a large surface or the ordinary rubber adhesive plaster may be applied so as to partially fix the spine. In very acute cases severe pain may be relieved by the spray of Ethyl Chloride or of Ether; cold applications are to be avoided.

Counter-irritation is more suitable for chronic or recurring cases when these do not yield to anodynes or to a thick layer of Antiphlogistine or of Cataplasma Kaolini (U.S.P.) covered in with mackintosh sheeting.

The Cautery, Blisters, Chili paste, Capsicum, Thermogene or Calorific Wool, Dry Cupping, Croton Oil Liniment, Tartar Emetic Ointment, Strong Iodine, &c., have all been highly recommended in chronic cases. One of the best counter-irritating liniments is the Lin. Camph. Ammon. or the Lin. Tereb. Acetic.

In very chronic cases a flannel binder sprinkled with Sublimed Sulphur may be continuously worn around the loins, and the use of the various appliances for producing rapid vibration are often very beneficial.

In obstinate cases where the attack has originally followed sprains or injuries of the lumbar muscles it may be necessary under Chloroform to forcibly flex and extend the spinal column with the pelvic and the thigh muscles in order to break down adhesions the result of the long-standing fibrositis.

Electrical treatment is of considerable value in lumbago. Occasionally speedy disappearance of all pain has been found to follow the early application of a moderately strong continuous current. It is the best routine treatment in chronic or recurring cases when combined with massage and the judicious use of douches and hydropathic measures at resorts like Bath, Droitwich, Nantwich, Matlock and Harrogate. Static and high-

frequency currents and Faradism are also valuable, and X-ray and Radium emanations have been extolled.

Internal treatment, though mentioned last, is of equal importance, and is to be carried out concurrently with local measures. It is to be pursued upon antirheumatic and eliminatory principles.

Salicylates are the most frequently employed of all internal remedies. Before resorting to them the writer's routine in all severe cases is to administer a wineglassful of unsweetened Gin made into hot punch after the patient has been put into a warm bed between blankets; this dose sometimes succeeds in cutting short the attack with promptitude. 20 grs. Sodium Salicylate, 15 grs. Aspirin, 10 grs. Salol, 10 mins. Methyl Salicylate, 15 grs. Salicylic Acid, 20 grs. Salicin, 15 grs. Salacetol, 10 grs. Salophen, or 10 grs. Novaspirin may be given thrice daily.

Rarely will Morphia internally be necessary to combat pain, and before resorting to it local anodynes and the coal-tar analgesics should be tried. When urgently indicated 15 grs. Dover's Powder or ¼ gr. of the hydrochloride hypodermically may be administered.

Diaphoretics and diuretics are always useful, but as all the salicylates act in these ways other emunctories are seldom employed. Mindererus Spirit, Citrate of Potassium in large doses with Spirits of Nitre or small doses (5 grs.) of Nitrate of Potassium may be used alternating with the doses of salicylates, or the hot-air or thermo-electric bath may be resorted to in order to excite free skin action.

Colchicum in combination with full doses of Iodides is most valuable in gouty subjects; Dr. S. B. Coates has obtained excellent and speedy results in the ordinary rheumatic type of lumbago by administering Tincture of Iodine, and many physicians still adhere to the use of 30-min. doses Tincture of Actæa Racemosa.

In chronic cases Guaiacum still holds its place, and a course of the Chelsea Pensioner which contains Sulphur and Nitre in addition is a favourite remedy. Arsenic occasionally does good, and Quinine Salicylate in debilitated subjects may be advantageously employed.

The bowels will require free purgation by salines with an occasional previous dose of Calomel or Blue Pill, and the diet should be such as is suitable for gouty and rheumatic subjects with a sparing allowance of red meats and purins. Active but not fatiguing muscular exercises should be regularly indulged in after convalescence to minimise recurrence of attacks.

LUNG, Abscess of.

The management of the case should be that suitable for pulmonary phthisis or lung gangrene, as improved feeding, open-air life, &c., and the administration of volatile antiseptics by the stomach and by inhalation in order to diminish the tendency towards secondary septic infection from germs in the respired air.

Surgical procedures are available in a considerable percentage of cases, and where the abscess is situated near to the lung surface a satisfactory

result may be achieved by pneumonotomy. After localising the abscess cavity by X rays, bronchoscopy and by the insertion of an exploring needle a free incision is made under local anæsthesia; portions of the overlying ribs having been excised, the lung is fully exposed. When complete adhesions shutting off the pleural cavity are found present it is only necessary to incise the lung substance with a scalpel or to open the abscess cavity with the thermo-cautery and after evacuation of the pus to insert a large drainage-tube without any attempt at irrigation, as in empyema. But in the absence of adhesions the pulmonary and parietal pleuræ must be carefully stitched together by a ring of sutures introduced through the lung tissue before opening the abscess.

Some surgeons operate in the air-tight chamber of Sauerbruch under a negative pressure of 10 milligrammes Mercury with the head of the patient projecting through an aperture in the wall of the cabinet, whilst others raise the atmospheric pressure in the lung by pumping in air through a helmet apparatus applied to the patient's face in order to prevent collapse of the lung by air entering the pleural sac. Neither of these precautions are necessary if the suturing of the two pleural layers be accomplished with thoroughness. It is advisable, however, to perform the operation in two stages; the wound after suturing the parietal pleura to the lung having been carefully plugged with gauze, the abscess cavity may be opened after 48 hours with the aspirator, by inserting a trochar and canula, incising with the knife or entering with the thermo-cautery and leaving in a drainage-tube.

Some surgeons have achieved occasional success by making an artificial pneumothorax. Pneumonotomy is not admissible for the treatment of tuberculous cavities, but is clearly indicted in those cases of pulmonary abscess following pneumonia and hepatic suppuration.

LUNG, Collapse of.

This condition is a complication of acute bronchitis in children, and its treatment is detailed under Bronchitis (p. 108).

The pulmonary collapse liable to supervene in operations and injuries to the pleura may be prevented by the methods of operating under differential pressure referred to under Abscess and Wounds of the Lung. See also under Pneumothorax.

W. Pasteur has shown that massive collapse of the lung may occur from muscular paralysis after diphtheria and abdominal operations. In such cases Strychnine hypodermically and artificial respiration are the best measures.

LUNG, Congestion of.

In active engorgement of the pulmonary substance the treatment should be directed to the primary cause, and in all urgent cases relief must be given to the distended state of the right heart by opening a vein and letting out at least 15 oz. blood.

The treatment of passive or mechanical congestion is that of the

valvular disease and failing compensation which cause it, as detailed under Heart Diseases. The form of pulmonary congestion recognised as hypostatic and met with in prolonged fevers and in old bedridden patients who have long remained in an unchanged physical posture, producing a gravitation hyperæmia, is a serious condition. It should be always prevented and (once it has appeared) treated by promptly altering the patient's position in bed and maintaining a constant succession of such changes by turning him over from side to side, sponging or douching the chest with cold water, compelling him to take deep inspirations, and in urgent cases performing artificial respiration by Schäfer's method. Strychnine hypodermically may be resorted to in all cases, and a diluted oxygen atmosphere may be inhaled with advantage. Smart counter-irritation of the chest wall is usually beneficial.

The congestion which follows gas poisoning caused by high explosives and exposure to barbarous asphyxiating shell fire are fortunately experiences never to be again witnessed.

LUNG, Diseases of—see Phthisis, Emphysema, Pneumonia, Asthma, Hydatids, Bronchitis, etc.

LUNG, Gangrene of.

The treatment is identical almost with that of bronchiectasis detailed upon p. 103. Thus whilst every means is being employed to keep up the patient's strength and to improve the state of his nutrition, measures should be taken to diminish, as far as possible, the decomposition of the bronchial secretion and the fœtor or stench which surrounds him. This may be attempted by the administration of volatile antiseptics internally, and by the saturation of the surrounding atmosphere with similar agents. Creosote in doses of 2 to 5 mins., in an emulsion or in capsular form, is the best. Turpentine, Myrtol, Oil of Santal or of Eucalyptus or of Peppermint, are also useful. Carbolic Acid cannot be given internally for any considerable period of time with safety in doses sufficiently large for this purpose. Sulpho-carbolates have been found to diminish the abominable odour from the perspiration. Berliner injects into the gluteal region 5 c.c. every 7 days of a 25 per cent. solution of Eucalyptol in Castor Oil.

The Creosote Chamber, if available, is the best of all methods for disinfecting directly the decomposing pulmonary tissue; in its absence the air of the room may be kept saturated with Oil of Turpentine. This may be accomplished by periodically pouring some of the oil upon the surface of very hot or boiling water, but the rapid evaporation or vaporisation of the turpentine soon ceases, as the temperature of the water falls. The writer's plan is to use metallic trays or pans half full of dry pine sawdust, upon which the oil is to be freely sprinkled from time to time. A uniform degree of evaporation may be thus obtained. A good method which he has also tried with satisfactory results is to make a muslin or gauze coverlet and fill it with freshly teased-out oakum. This may be kept upon the patient's bed, and the oakum can be easily renewed, or sprinkled over

from time to time with Turpentine, Eucalyptus Oil, or other volatile antiseptic.

Chlorinated Lime, Creolin, Sulphurous Acid, Commercial Terebene, Sanitas, or any of the innumerable cheap disinfectants may be used for the same purpose, and a spray apparatus may be employed to diffuse the disinfectant through the atmosphere.

The use of antiseptics by the ordinary earthenware inhalers is not to be relied upon. Where a very thorough disinfectant action is required, the volatile ingredient may be poured upon boiling water contained in a large wash-basin, as the patient holds his head over it, whilst a linen sheet is thrown loosely over him, so as to extemporise a tent, under which the concentrated vapour may be freely breathed at intervals of a few hours during the day. During the rest of the day and night he will be breathing the more diluted antiseptic atmosphere, unless when in bright warm sunshine he can be permitted to go into the open air.

Oxygen inhalation is often very serviceable, but to be of use it must be employed for long periods.

Atomisers containing Menthol, Eucalyptol, &c., in oily solution may be employed, and sprays are of considerable use, and are less troublesome, though of less efficacy, than the steaming under a sheet; by their use particles of a solution containing non-volatile ingredients may be projected in a state of minute subdivision, so that they may come into contact with putrefying secretions about the naso-pharynx, larynx, and larger air-tubes. The following solutions may be used:

5 per cent. solutions of Chlorinated Soda or Lime, or Sulphurous Acid, about 1 in 20; Bichloride of Mercury, 1 to 2 grs. in 10 oz.; Creosote or Carbolic Acid, 1 dr. in 10 oz.; Biniodide of Mercury, 1 to 2 grs. dissolved with KI, in 10 oz. water; Creolin, 1 to 5 per cent. solutions in water.

Yeo's perforated Zinc oro-nasal respirator may be worn for considerable portions of the day, the wool being kept moistened by diluted solutions of Carbolic Acid, Iodine, Creosote, Terpinol, Terpine, Terebene, Eucalyptus, Iodoform, Thymol, Menthol, &c., as in the following:

℞ *Menthol* ʒij.
Creosoti Purificati ʒiij.
Thymol ʒss.
Spirit. Vini Rect. ad ʒiv. *Misce.*

Intralaryngeal injections of Menthol, as mentioned upon p. 493, may be tried. The injection of antiseptics through the chest wall into the gangrenous cavity has not been satisfactory.

The expectoration should be passed directly into a spittoon, containing some powerful disinfectant and deodoriser like Turpentine, Eucalyptus, Chlorinated Lime, or Permanganate of Potassium in strong solution. It is only by rigid attention to these details that the abominable fœtor can be so diminished as to permit the nurse and attendant to approach the patient closely.

When the physical signs, aided by the use of the X rays, bronchoscopy and the exploring needle, reveal a gangrenous abscess cavity, the operation of cutting down upon it, performing pneumonotomy with the galvano-cautery or scalpel, evacuating its contents and establishing free drainage, as described in a preceding article, gives excellent results, and may be performed without resorting to the method of operating under differential pressure.

LUNG, Œdema of.

This is secondary to valvular disease of the heart, arterio-sclerosis, or to Bright's disease, or merely as a local result of a general anasarca, and its treatment is detailed under the name of the primary affection. The chief indication in the majority of cases is to stimulate the heart with Strychnine and Digitalis. As much as 10 mins. of the B.P. Liquor of Strychnine may be injected in a desperate case. In the acute form associated with dilatation of the right ventricle a large vein should be opened and 15 oz. blood removed, or wet cupping over the back of the chest if rapidly carried out may save life in apparently hopeless cases. Nothnagel advocated one *large* blister, and the hypodermic injection of Camphorated Oil. This may be administered in 15-min. doses *ter die* of a 20 per cent. solution in Olive Oil, but in all urgent cases a vein should be opened.

LUNG, Syphilis of.

The primary cause, obviously, must give the key-note to the treatment in this rare condition. Mercury is, however, seldom indicated owing to the late period at which the tertiary pulmonary implication appears, but it may be given as in other cases when the history that mercurialisation had been previously omitted during the secondary stage of the syphilis. Main reliance must be placed in large doses of the Iodides administered for periods of several months. These drugs always assist in the bringing up of the muco-purulent expectoration caused by the accompanying bronchitis. In many cases the clinical picture is that produced by bronchiectasis, and it may be complicated by the presence of tubercle. Volatile antiseptics, the Creosote Chamber, antiseptic inhalations, open-air treatment with over-feeding, and the exhibition of remedies indicated in pulmonary phthisis will then be clearly indicated.

Recently the Wassermann test for syphilis has demonstrated that a very considerable percentage of cases of phthisis are complicated with or induced by syphilis, and Potter urges the routine administration of Salvarsan in all such.

LUNG, Wounds of.

Perfect rest in an easy position, with the patient lying upon the wounded side or propped up in bed, is essential, together with the administration of such stimulants or restoratives as will combat the accompanying symptoms of shock. Where blood is present in the pleural cavity the procedures detailed in the article on Hæmothorax are to be carried out,

and where air has been admitted the treatment described under Pneumothorax is indicated. Surgical emphysema will demand little interference; its management is detailed under Emphysema (General).

The recent advances made in thoracic surgery by the introduction of the differential pressure methods as carried out by the Sauerbruch negative pressure, and Brauer's positive pressure cabinets enable the surgeon to open the cavity of the chest without the dangers of pulmonary collapse. By these methods he is now able to deal directly with wounds of the lung substance after demonstrating the exact site of the lesion by the stream of air issuing from the wounded spot under the altered pressure; the suction of the air from the cellular tissue under the negative pressure speedily reduces general emphysema. The cabinet also renders operation as safe in dealing with wounds of the heart and great vessels as in cases of lung wounds, foreign bodies in the bronchi and bullets lodged in the pulmonary substance or mediastina.

LUPUS ERYTHEMATOSUS.

The treatment of this affection is most tedious and unsatisfactory, and must remain so as long as its pathology is unsolved.

Oral and intestinal sepsis have been suspected. Any departure from the healthy standard is to be carefully remedied and every means utilised whereby the general nutrition of the body is to be improved.

Internal drugs are useless as curative agents. Arsenic, Salicin, Phosphorus, Ichthyol, Quinine, Iodides, Ergot, Iron, Mercury and a host of alterative and antiseptic substances have been from time to time vaunted as remedies.

Probably the best results have been achieved by Quinine and Ichthyol, and these should be given in combination with Cod-Liver Oil, which always is useful as a nutrient. In acute cases accompanied by much erythema Chloride or Lactate of Calcium may be tried in order to increase the coagulability of the blood and check the accompanying hyperæmia.

The local treatment is a difficult subject to discuss in the limited space of a short article like the present, especially as a survey of its literature would almost lead one to conclude that nearly every known inorganic remedy had been recommended for its destruction at some time or other.

This is the more remarkable as the affection is a comparatively rare one. Another inherent difficulty, apart from the extraordinary multiplicity of so-called remedies, is the task of giving a clear idea of the agents indicated at the different stages and variations of the disease without a minute description of these stages, which vary in almost every instance. The treatment of erythematous lupus is that of the milder forms of lupus vulgaris, stimulating or soothing applications generally taking the place of caustics, cautery or the curette.

Soothing lotions or ointments are indicated to relieve congestion and pain in the early or erythematous stage. Speaking generally, cases at this period of the disease may receive the treatment most useful in acute eczema. Thus a bland, unirritating ointment, such as the B.P. Ungt.

Zinci, to which Liq. Plumbi Fort. (1 in 20) is added, or a cream or paste made by rubbing up the Oxide of Zinc with Olive Oil, may be smeared over the parts with a brush several times a day. A weak Lead lotion (1 in 20), and Calamine or Zinc Oxide lotion (1 in 25) containing a little Alcohol may be applied and allowed to evaporate. Adrenalin in weak solution may be painted over congested areas.

The best routine local application for the relief of hyperæmia and itching is Ichthyol made into a cream or paste (1 in 3) with lanoline, but before this can become efficacious it will be necessary to remove the scales, especially in the seborrhœic type of the affection, by the application of a solution of Soft Soap in Alcohol (1 in 2).

Flexile Collodion painted constantly over the part and permitted to dry causes compression of the vessels, and, provided one layer be added before the peeling of the former one renders its action void, a continuous action may be kept up which, with great care and patience, may starve out the small-celled growth and promote absorption of effused inflammatory products.

Stimulating applications at a later stage may be tried, but in this sometimes a difficulty presents itself, one part of the patch being distinctly erythematous, whilst the other shows infiltration or scarring. Tarry compounds are valuable, and, if employed with skill and caution at this stage, may give good results. The most suitable is an ointment varying in strength from ½ to 2 drs. of the Liquor Carbonis Detergens to 1 oz. of Lanoline. When this fails the next best method of treatment will consist in the application of the B.P. Unguentum Hydrargyri, or a 10 per cent. ointment of the Oleate of Mercury upon lint, which should be kept in contact with the part constantly.

Caustics must be used with great discrimination, and are only admissible for very limited patches, and deep corrosives like Chloride of Zinc must be avoided, but a superficial caustic like pure Carbolic or Lactic Acid may be cautiously applied to a circumscribed area. Pyrogallic Acid applied in the form of a 10 per cent. ointment for 3 or 4 days till the brown eschar forms, after the separation of which Iodoform ointment and gauze are used, is advocated by Veiel. MacLeod recommends the painting on of a spirituous solution of Resorcin 1 in 10.

Carbonic Snow has given excellent results when employed by MacLeod's method of collecting the snow in a small vulcanite funnel and pressing it upon the part to be acted upon by a piston introduced into the funnel. Liquid Air has been employed by Crocker.

Good effects were formerly obtained by Squire's linear multiple scarifications made by a suitable instrument. With great care these incisions may be made with the point of a fine, very sharp scalpel or tenotomy knife, so as to leave the healthy skin untouched. The object is to cause destruction of new vessels, and so starve out the growth and cause its absorption. The punctures should not exceed $\frac{1}{5}$ inch in depth, and they should be as close together as possible. The previous hypodermic injection of Adrenalin with Eucaine renders the operation painless and blood-

less; afterwards a strong Iodoform ointment should be rubbed in or Iodoform gauze applied under slight pressure.

Cataphoresis or Ionisation has given the best results in the hands of Graham Little and others in dealing with small patches of the disease.

Ultra-violet light, X rays and Finsen-Light treatment, High-Frequency currents and Radium emanations are still being employed, but Cataphoresis promises to supersede them, as the ions from zinc sulphate or chloride, having the power of penetrating the diseased cells, effect resolution without scarring; this method may in suitable cases be combined with linear scarification or photo-therapy.

LUPUS VULGARIS.

Constitutional treatment is indicated, as the disease in all its types is due to the presence of the tubercle bacillus in the cells of the skin. This should proceed upon the lines indicated in phthisis—as overfeeding, cod-liver oil, open-air life and improved hygiene.

Vaccine treatment is useful, though very rarely, if ever, curative when used alone. In conjunction with various plans of local treatment it is often invaluable, and in a considerable number of cases which have resisted all local methods, cure can only be achieved by the judicious employment of tuberculin in combination with these, so that, notwithstanding the popularity of light treatment, vaccine therapy in lupus must always be recognised as an agent of unquestionable value.

Thyroid feeding in some cases appears to act in a similar manner, but in less satisfactory degree, and is also well worthy of a trial where from any reasons tuberculin injections are inadmissible. For similar reasons the internal use of such agents as Iron, Arsenic, Phosphorus, Creosote, Iodine or Iodoform, Hetol and Cinnamylic Acid occasionally proves a useful adjunct to local treatment by strengthening the depressed vital resistance of the tissues.

Iodoform has been employed with success by Dewar, who injects 15 mins. intravenously of an ethereal solution with liquid paraffin every second day, the local ulcerating lesions being simultaneously treated by Hydrogen Peroxide.

The writer, before the introduction of photo-therapy, witnessed striking results in the hands of Fournier and Richet from the injection of the blood-serum of healthy dogs.

Sea-water injections have been extolled by Robert-Simon, who states that he has observed cure follow after the failure of all other constitutional and local treatments.

Local Treatment.—This will vary with the site, type of the affection, amount of irritation or ulceration present, activity of the disease, &c. A destructive agent may be indicated at one part of the lupus patch, whilst a soothing ointment may be indicated at another part.

Light Treatment.—Finsen's light is the most reliable routine method of treating lupus of the face, and the best results are obtainable in nodular and ulcerating lupus. The great advantage over the older surgical

methods lies in the final cosmetic effects produced, as scarring is entirely prevented or reduced to a minimum. Unfortunately the method is most expensive and tedious, requiring the skilful supervision of the professional expert and a complicated apparatus, together with the services of experienced nurses, and cannot possibly be carried out at the house of the patient. Installation places are usually provided with lamps arranged so that several patients can be treated at the same time by the light proceeding from a single lamp.

A powerful electric arc lamp is employed and the heat rays are intercepted by passing them through rock crystal lenses and a solution of copper sulphate, which does not stop the blue rays. The heating effects are still further minimised by causing the rays to pass through cylinders of water placed between the concentrating crystal lenses. A small area only can be submitted to the action of the concentrated light at each sitting, which should last for about one hour, and in order to permit the actinic rays to penetrate the lupoid nodules it is necessary to compress the area operated upon by a flat transparent substance in order to render the part bloodless. The best compressor for this purpose consists of two layers of quartz, with a space between filled with water, which can be kept cool by continuous circulation to still further minimise the heat effects of the red rays which have escaped through the copper solution; by the use of such a compressor the copper filter may sometimes be entirely dispensed with.

The best procedure in nodular lupus is to commence at the circumferential part of the patch, leaving the centre to be attacked last. Upon the termination of each hourly sitting the part should be covered by lint smeared over with vaseline, and a soothing ointment or lotion may be afterwards necessary to remove the vesication or œdematous redness which usually follows some hours after the application of the concentrated light. Thus one portion of the patch will require the soothing treatment suitable for lupus erythematosus whilst recovering from the reaction caused by the lights when a new area is being submitted to exposure. From time to time the old areas are to be examined under the compressor in order to determine whether the apple-jelly nodules have all been dissipated, and re-exposure of every portion must be resorted to as long as any nodules can be discerned.

As many months are necessary for a cure, various methods have been introduced in order to hasten the process; one of the most effective of these is to puncture each nodule with a pointed piece of wood or a gooseberry-thorn dipped in pure Carbolic Acid. Another is to resort to vaccine therapy by Tuberculin in minute doses.

Direct concentrated sunlight in the tropics or subtropical countries has been tried with excellent results.

X-Ray Treatment.—This in some cases is even more reliable than Finsen light, especially in the hypertrophic and ulcerative types of lupus, but it is decidedly less valuable in the nodular form of the disease. The sittings are shorter and are much less painful, and much larger areas can

be operated upon each time at longer intervals, and it possesses the great advantage of penetrating to the diseased nasal membrane, which Rankin has emphasised as being almost invariably affected in facial lupus. There are great practical difficulties in the way of submitting the nasal mucosa to Finsen light, so that when this latter method of treatment is persisted in it is always necessary to resort to the galvano-cautery, curetting or caustics. Many observers point to the danger of cancer supervening after prolonged X-ray treatment, and some highly recommend alternating courses with Finsen light; during the intervals tuberculin injections may be also employed.

Radium Treatment.—Emanations of radium have hitherto failed to produce results comparable to Finsen light and X rays. Injections of water submitted to the emanations of this marvellous agent, Wickham's method of injecting solutions of radium and the application of radium ointment are all being tested. Thorium Paste is extolled by Bulkley, who states that its radio-active properties reinforce its caustic action.

Electricity has been employed in the form of the static brush by Suchier's method, and excellent results have been recorded. The application of Hot Air (300°) by Hollander's method under anæsthesia has few adherents.

Cataphoresis, or Ionisation (using Zinc solutions), after linear scarification, has recently become a favourite method with some dermatologists, but this line of treatment is better suited to the erythematous type of lupus. Reyn has reported successful cases treated by Iodine ionisation.

Surgical Treatment.—Excision of the patch of lupoid tissue and the supplying of the lost skin by grafting afford the most rapid and complete means of getting rid of the disease, but this method of treatment is manifestly inadmissible where the face is affected and where any considerable patch on the body or limbs is present, especially as the incisions must be carried far outside the active margin of the disease. It is really only applicable to the smallest patches outside the face and neck, and therefore needs but to be mentioned.

Curetting or scraping is a futile procedure in most cases, but nevertheless it is often a valuable adjuvant to light, X-ray, radium or caustic treatment by preparing the diseased surface for the reception of these powerful agents.

The Galvano- or Thermo-cautery is more reliable when thoroughly employed, but the great objection to its use lies in the disfiguring results following cicatrisation. It is, however, a most valuable method of dealing with lupus of the nasal mucosa, which should be treated by numerous fine punctures made by the galvano-cautery, and this latter method may still be advantageously employed in selected cases in conjunction with the light treatment where the nodules in the ulcerated surface are obstinate, each nodule being separately dealt with by a fine-pointed terminal.

Scarification by linear incisions, as in lupus erythematosus, is sometimes resorted to in conjunction with the application of caustics and other methods, but it has a very limited range of usefulness.

Caustics.—Every known form of chemical destructive substance has been employed in the treatment of lupus, and though these agents have been largely discarded since the introduction of the light and X-ray methods, nevertheless in selected cases, when skilfully employed, excellent results may be obtained, especially when they are used in conjunction with photo-therapy in face lupus.

Arsenic is the most powerful, but it should never be employed on the face.

Lupus on the hands, body or feet may be treated by Hebra's Paste:—

℞. *Acid. Arsenios.* *gr.* xv.
Hydrg. Sulphid. Rub. *gr.* xlv.
Ungt. Rosæ ℥vj. *Misce.*

This spread on lint may be applied for 48 hours to the patch.

Salicylic Acid is invaluable as a caustic in *verrucose* or warty lupus, and may be applied as a paste, 1 dr. to 1 oz. Glycerin, when large surfaces are involved. For small patches a paste consisting of equal parts Salicylic Acid and Creosote may be applied, or preferably Unna's Salicylic Acid and Creosote Plaster Mull may be laid on the patch twice daily after brushing it with cocaine, till the nodules are converted into small whitish sloughs. Another convenient method is to apply the acid in the form of an ointment—Creosote 2, Salicylic Acid 1, simple ointment 2—which should be spread upon lint and covered with oiled silk. This must be applied for a considerable period, according to the evidence of its destructive action on the nodules, but the physician and patient must reconcile themselves to the slowness of the process and to a considerable amount of painful smarting after the acid has been able to penetrate the lupoid tissue, but the resulting scar will repay the exercise of patience, since it is much less unsightly than that following surgical procedures.

Pure Lactic Acid acts in a similar manner, and exercises its selective action upon the diseased cells. It is most suitable in the ulcerating stage and may be used in various forms; that of a paste, consisting of about equal quantities of the syrupy acid and kaolin, is the method most recommended. It is also painted on with a brush or injected hypodermically (1 in 2) into the tissue in the diseased area. The simple method devised by the writer, and from which he has never seen any ill-effects, is the following:—After previous cleansing, paint the ulcerated surface over with a 15 per cent. Cocaine solution before applying the acid, and wipe it quite dry with absorbent wool immediately before the acid is brought into contact with it. Make a little map of the ulcerated surface, so as to cut out neatly and accurately a folded piece of lint (2 plies) of the same size and shape as the patch. These should be soaked for some minutes in the pure concentrated acid, the surplus acid being removed by gentle pressure before being accurately applied to the patch with a pair of forceps; the margin of healthy skin around the ulcerated patch should be smeared over with lanoline before applying the acid.

The pain is often severe, and lasts some hours. The lint may be covered with oiled silk, but the writer does not do so. He applies some more acid to it with a brush after a few hours, without disturbing its position. It may be left in contact for about four hours. Authorities differ, some directing an application of 15 minutes, and others recommending one of 10 hours, after which Spirit Lotion on lint may be applied under oiled silk. The number of applications required in any given case can only be determined by the effect. After three or four days the surface should be very minutely examined, and any suspicious portions subjected from time to time to the action of the acid, applied upon little circular islands of lint, for 6, 8, or 10 hours. The treatment will extend over several weeks or months, and as parts of the original patch become healed, others may be discovered in which the diseased action is in full swing.

Lactic Acid is one of the most reliable agents for the destruction of lupus in the nose and palate. The syrupy acid may be applied with a brush after carefully drying the cleansed part with cotton-wool. Both these acids may be advantageously employed in conjunction with light and X-ray treatment when the patient's means will not admit of continuous attendance at a hospital far from home for long periods.

Pyrogallic Acid has like selective action on the diseased tissue, and may be applied as a 25 per cent. plaster, but it is an agent not free from danger. Veiel uses Pyrogallol diluted with 9 parts of vaseline.

Zinc Chloride should be confined in its application to cases where scraping or curetting has been performed, and Vienna Paste should never be used at all on the face.

Carbolic Acid, though very superficial in its action, is a most efficient caustic when skilfully applied. It may be employed by two different methods. Dreuw, after freezing the patch with Ethyl Chloride spray or Carbonic Acid Gas, rubs in the strong acid most thoroughly over the whole surface of the patch by means of a stout stick whose extremity is covered over with cotton-wool. The cauterised surface is dressed with dry Euguform. Carbolic Acid applied in this manner is not free from danger, as it seems possible that a large slough might follow which would cause serious deformity.

A thoroughly legitimate method of using this caustic has been already mentioned—*i.e.*, by thrusting a piece of pointed matchwood dipped in the acid into each nodule and turning it round so as to well apply the caustic to the lupoid tissue. Hutchinson employs the Liq. Hydrg. Pernit. in the same manner, and these may be used to expedite the light or X-ray treatments.

Permanganate of Potassium may be employed like the carbolic acid; thus the dry powdered salt may be sprinkled over an extensive patch after this has been cleansed and lightly scraped, or a crystal may be thrust into each nodule after puncturing with a finely pointed piece of wood.

Perchloride of Mercury is applied by Unna to each punctured nodule

in the following solution:—Perchloride 60 grs., Creosote 4 drs., Spirit. Rectif. 2½ oz.

Iodine Paste, prepared by triturating equal quantities of pure metallic iodine and tincture of iodine together, and adding to the mixture an equal amount of glycerin, is a manageable and efficient caustic in the ulcerating stage, and effectually destroys secondary infective organisms. A minute quantity may be also thrust deeply into each punctured nodule.

Nitrate of Silver was a favourite remedy with Hebra. It may be used as a solution (60 grs. to 1 oz.), or as the solid stick, which is better. This may be thrust into the papular or tubercular elevations after puncture with a lancet, and, though terribly painful, it is very efficacious.

Chromic Acid has been recommended to be used in the same manner, but it should never be employed about the face, as it often penetrates deeply, and may cause very unsightly scars.

Iodoform rubbed in deeply after linear scarification is still employed with success by some dermatologists, who report that the resulting cicatrix is very satisfactory.

Ethylate of Sodium Solution is an excellent caustic where there is little tissue calling for destruction. It may be daily brushed over the diseased patch (which should be dried with blotting-paper) by means of a glass brush till a scab forms, which falls off in a few days, after which the applications are to be renewed. If pain is severe, a drop of Chloroform may be applied. This converts the Ethylate into Ether and Chloride of Sodium. The scarring is comparatively slight.

Carbonic Acid Snow, though more useful in lupus erythematosus, has been reported as giving satisfactory results in ordinary lupus also, the resulting scar being flexible and of good colour.

The various treatments for lupus may be summarised in the following list in the order of their value:

1. Finsen Light.

2. X Rays, Radium Emanations and Ultra-Violet Rays.

3. A combination of these methods used alternately, especially when the nasal mucous membrane is deeply involved. In the ulcerative stage the Finsen light may be employed for the periphery and the X rays for the centre of the patch.

4. Vaccine Therapy in all cases not readily yielding to above, if employed in conjunction with their continuance, but of little value when used alone.

5. Excision when the patch is small and is situated upon any part except on the face and neck.

6. Scraping, Thermo- or Galvano-Cautery and Scarification or Multiple Puncture, when combined with the former methods or used in conjunction with caustic treatment, or alone when employed for the disease in mucous membranes.

7. Cataphoresis or Electrolysis when the diseased action is very superficial.

8. Caustics (1) when the disease is located in the mucous membrane,

scraping having been previously resorted to; (2) when the patches are not on the face; and (3) in lupus verrucosus; (4) in conjunction with light, X-ray, radium, and vaccine therapy, to expedite these methods, the caustic being applied to each nodule separately or more extensively to a freely ulcerating surface on the face.

In a simple case of nodular or ulcerating lupus on the face there is no necessity to resort to any form of treatment save Finsen light when the opsonic index is not low, and when the patient's means permit of a prolonged sojourn at the place of installation. It should be regarded as the most efficient routine and the only one which is absolutely free from all danger of making the patient's case worse even in those rare cases which are refractory.

Scrofulodermia is to be treated upon the same lines as lupus verrucosus; the epithelial casing of the patch being first removed by Salicylic paste, the underlying lupoid tissue may be attacked by Finsen light, X rays, caustics or the cautery; small patches may be excised. Verruca necrogenica is to be treated upon the same principles; excision is preferable to caustics.

LYMPHADENITIS.

Acute and *subacute* lymphadenitis being almost always due to the introduction of septic organisms through a wound or abrasion, the cocci finding their way along the lymph stream till blocked by the nearest glands, the first indication for treatment will be found in the disinfection of the wound and the relief of pain and pyrexia. Endeavour should be made to *prevent suppuration;* the part containing the acutely inflamed gland must be put into a state of rest as complete or absolute as possible. The best routine application to the gland is a warmed antiseptic solution, as Carbolic lotion (1 in 40), Saturated Boric Acid solution or Spirit lotion (1 in 4), and these should be covered over with oiled silk and bandaged lightly under wool, the idea being to give the region all the advantages of an internal part and so increase the natural resistance by diminishing tension and bringing a fuller blood-supply to the inflamed gland. Upon the same principles Bier's method of inducing passive hyperæmia by the pressure of an elastic bandage or by Klapp's suction-bell is employed by some surgeons.

Various old-fashioned methods appear to act in a similar manner, such as counter-irritation by Iodine or Iodised Phenol, strong Nitrate of Silver, Pernitrate of Mercury, and even by blistering, but no application necessitating friction or rubbing should ever be employed. Some surgeons prefer to employ counter-irritation in the form of the thermo-cautery passed lightly over the skin in order to prevent suppuration.

The plan of injecting a few minims of Carbolic Acid or Tincture of Iodine, Benzoate of Mercury, &c., into the gland and surrounding tissue is advocated, and may be employed where the infection is a dangerous one as in bubonic plague, but suppuration is more liable to be determined than prevented by such measures.

Strong Iodine Tincture applied in a broad line over the inflamed

lymphatic vessels between the wound and the gland always gives satisfactory results, and frequently relieves pain in a marked manner and diminishes the lymphangitis.

The best abortive remedy is a cream made of Ichthyol or Green Extract of Belladonna and Glycerin. (See also under Abscess and Bubo.)

Hot and cold applications have each their advocates, and the same result—*i.e.*, resolution without suppuration—may be secured by either. By ice, evaporating lotions, cold compresses, or Leiter's tubes the tension and arterial supply are soon markedly lessened, and the inflammation as evidenced by pain, heat, redness and swelling soon diminishes or disappears. When hot or warm compresses or poultices are applied, the capillaries of the collateral circulation are dilated and the current is diverted from the inflamed vessels. Up to a certain point both methods of treatment tend to prevent suppuration; and the writer has satisfied himself that, contrary to the popular notion, warm poultices prevent suppuration by reducing the tension of an inflamed gland if applied at an early stage, the general relaxation of the tissues sometimes speedily relieving the tension which is fatal to the life of the organ. At a later stage, by keeping up a continuous moist warmth and reducing the tension of the skin, poultices hasten the pointing of the abscess.

Compresses at a very high temperature are recommended by Nasiloff. He drops several plies of linen into boiling water, squeezes them out quickly, and applies them directly over the inflamed gland and envelops the part for 15 minutes in a thick pad of cotton-wool. A large sponge squeezed out of very hot water and covered with mackintosh makes a good application. The best guide to the selection of hot or cold applications is the sensation of comfort or pain produced, the application from which the patient derives the greatest ease being always preferred.

Once the pus has formed there should be no delay in its evacuation. If the collection of matter is large, as when a group of glands and their loose surrounding tissue are converted into an abscess, a free incision should be made and the blades of a dressing forceps inserted deeply and opened to secure free evacuation without the danger of wounding large vessels as in the axilla or neck (Hilton's method). Warmed spirit lotion or boric compresses may be applied to the open wound.

A free incision usually does away with the necessity of inserting a drainage-tube, but where a *small* wound is necessary to avoid visible scarring, as when the adenitis follows some irritation about the jaws, the incision should be as limited as possible compatible with evacuation, and a fine drainage-tube or a few shreds of carbolised tow or horsehair will establish the removal of all pus as it is secreted. (See under Abscess, where the aseptic treatment of acute abscesses is detailed.) After the free removal of pus and the application of spirit lotion under oiled silk, the cavity may be syringed out with weak Sublimate Solution from time to time as it heals up from the bottom, or it may be packed with sterilised gauze.

Some surgeons prefer to aspirate and inject the abscess cavity with

Iodoform Emulsion, but this is more suitable for chronic cases. Whilst others make an incision just large enough to admit a fine spoon, with which they scoop out any remaining portion of the gland which has not become converted into pus. Curettage is, however, not a safe proceeding in acute inflammations.

Upon the whole, the best routine for glands about the neck is to make a small incision with a tenotomy knife and then to apply a Klapp's suction-bell over the wound. The bell may be used 2 or 3 times a day till the cavity is thoroughly cleansed, the wound being dressed every 3 hours with Boracic Fomentations; healing is rapid under this treatment, and the scar is small.

In recurring septic lymphadenitis Vaccine treatment should be resorted to.

TUBERCULOUS ADENITIS.

Chronic inflammation of lymphatic glands may for all practical purposes be regarded as of tuberculous origin. The writer has endeavoured to show in his Cavendish Lecture for 1908 that the main source of the tubercle invasion is through the lymphatics and vessels of the intestine, the glands being ultimately reached by the main stream, and he has been able to eradicate the disease and successfully to protect the inmates of a large industrial school where tuberculous adenitis was always rife by a simple process of sterilising the milk-supply. Though protection of the intestinal route is of primary and vital importance, the physician will be wise before dealing with cervical lymphadenitis to examine the mouth for carious teeth, the middle ear for suppurative disease, and the pharynx for enlarged tonsils and adenoids. These conditions must first be remedied by surgical measures, and in a considerable percentage of cases resolution of the swollen glands may be expected. The infection under such circumstances is probably of a dual nature, and will subside upon removal of one of the infective agents. The constitutional treatment indicated in tuberculosis must be followed out. Where the cervical glands remain indolent with no tendency towards suppuration, various local procedures have been advocated.

The plan of applying a strong solution of Iodine (equal parts of the weak and strong tinctures) has still some advocates, and though now condemned by most surgeons it never can do any real harm, and in conjunction with other methods may well have a prolonged trial. The Lin. Pot. Iod. c. Sapone is not open to the objection of producing unsightly discoloration. Rest to the head and neck should as far as possible be secured. Injection into the glands of antiseptic solutions and pure Carbolic Acid should be avoided, as little benefit can follow and often suppuration results.

Vaccine treatment by minute doses of Tuberculin affords unquestionably the best routine in all such cases, and it should be patiently employed in conjunction with the internal administration of Iodide of Iron and Cod-Liver Oil with open-air life and improved hygiene. Treatment by tuberculin has almost abolished from surgical practice that most disagree-

able of all operations—removal of tuberculous lymphatic glands of the neck. The writer accepts entirely Dr. Nathan Raw's view that surgical tuberculosis is the result of infection by the bovine bacillus, and hence Koch's Tuberculin R. (human) should be employed commencing with very small doses slowly increasing up to a maximum dose of 1 milligramme.

The writer has had very extensive experience of the results of excision carried out in the most skilful and thorough manner, and he has kept in touch with at least 100 cases where the operation has been faultlessly performed, and he has become convinced that the ultimate results are worse than have yet been realised by surgeons, who often lose sight of the patients after the immediately successful operation.

It cannot be denied that the danger to life occasioned by the presence of indolent tuberculous glands is a trifling one. The percentage of cases in which phthisis and bone involvement follow is very small. A somewhat parallel condition is observed in the graver condition of hip-joint disease, which is followed (when not treated by excision) by an astonishingly small percentage of lung involvement. The same holds true, but in a more remarkable degree, when the natural course of lupus is studied. 75 per cent. *at least* of all cases of excision of the cervical glands which the writer has watched over a period of 7 years has succumbed to pulmonary tuberculosis, and he believes that the time has come when this formidable operation should be abandoned unless under very exceptional conditions.

The only permanently successful cures which he has witnessed have occurred in cases where the tuberculous adenitis was of a very circumscribed nature, and where the disease was of very long standing. Under these conditions, combined with a high degree of unsightly deformity, there need be little hesitation in recommending a radical operation, but where the entire glands of the neck are enlarged on both sides, and especially where there is axillary adenitis in conjunction with them, the operation should never be undertaken. Partial operations should also never be attempted; once the operation is commenced, every enlarged gland found present should be excised.

When suppuration occurs there can be no room for differences of opinion regarding the necessity for surgical interference. To wait till the abscess spontaneously perforates the skin is certain to lead to the infection of the cutaneous tissues and the abscess cavity with pyogenic organisms introduced from without.

As the contents of these abscesses are often sterile there is ample scope for successful aseptic surgical measures. Various procedures are followed, and in the main these are such as have already been detailed in the articles on Abscess and Hip-Joint Disease. The common situation of the suppurating glands at the angle of the jaw or anterior aspect of the neck introduces the problem of cosmetic effect, and the surgeon's endeavour should be to evacuate the contents and leave as small a scar as possible.

The skin having been sterilised, an incision is made with a tenotomy knife and an endeavour made to remove the abscess cavity intact. This will usually fail, and then a curette is introduced to scrape the walls of

the abscess cavity in such a way as to leave no tags of infected tissue. If the surgeon has succeeded in this he may close the wound completely, providing only for escape of blood within the first 24 hours after operation.

The plan of applying a Klapp's suction-bell over a small incision as in the treatment of acute septic lymphadenitis is sometimes resorted to.

Any of the methods described under Abscess may be followed. When the skin has already become involved the best procedure is to pack the cavity with Iodoform gauze after scraping with the sharp spoon. It may be necessary to clip away the infected overlying skin margins.

Sinuses may be most satisfactorily healed by injecting Beck's Bismuth Paste (warmed) into the openings, but this preparation should not be used for filling the abscess cavity before sealing up the wound in the skin.

Tuberculous lymphadenitis is rare in the groin glands, but many years ago before excision was introduced the writer successfully dissected out a mass of chronically inflamed glands in the interior of which was a large calcareous deposit. This had led to the case being regarded for years as one of disease of the femur, since a probe introduced through any of the numerous sinuses struck upon the calcareous mass.

Lymphadenitis involving the mediastinal glands is as a rule only to be dealt with by open-air life and improved hygiene combined with minute doses of Tuberculin. Mesenteric Gland Disease is referred to under its own heading.

The acute non-suppurative cervical lymphadenitis of Dawson Williams, like that present in German Measles, requires no active interference, as spontaneous resolution always occurs.

LYMPHADENOMA.

This peculiar enlargement of the lymphatic glands is also known under a variety of names, as Hodgkin's Disease, Pseudo-Leukæmia, Lymphatic Anæmia, Lymphadenia, &c.

There is still considerable reservation in accepting the bacillus discovered by Fraenkel and Much as the casual agent; and that it is not is probable from the failure of vaccine treatment.

The local treatment has up to the present proved most unsatisfactory. The few cases in which early excision of the glandular mass was followed by cure are suspected of being cases of mistaken diagnosis, and it cannot be doubted that in the later stages of the disease removal of the enlarged glands is worse than useless, and should be attempted only when by their mechanical pressure on vital parts life is seriously threatened. The injection of the glands by antiseptic solutions has not led to any benefit.

X rays have been much extolled; they certainly possess remarkable power in reducing the bulk of the tumours, and therefore have been prematurely pronounced upon as a curative agent. But careful observation has demonstrated that this treatment is powerless to prevent the extension of the disease to the liver and spleen even when the glands shrink greatly in size under its influence. Better results have been obtained from Radium emanations.

Arsenic internally is the best routine in all cases, and it can be employed in conjunction with Radium or X rays. The drug may be given hypodermically in the form of Cacodylate of Soda or by the mouth as Fowler's Solution; in either case the dose must be increased till physiological effects are elicited. Less than 15 mins. of the liquor arsenicalis thrice daily need not be expected to make any impression upon the glandular enlargements.

Vaccine therapy with minute doses of Tuberculin has proved curative in several cases which have obviously been of tuberculous nature, and not instances of true lymphadenoma or Hodgkin's disease. Likewise early excision is the only hope in those almost clinically identical examples of true lympho-sarcoma starting in an accessible lymphatic gland.

LYMPHANGIECTASIS.

The treatment of dilated or varicose conditions of the lymphatic vessels is detailed under Chyluria and Elephantiasis. When the diseased area is a small one it may be met by excision, as in the cord, groin or scrotum. Sometimes Handley's operation of lymphangioplasty may be resorted to when extensive areas of tissue are involved, but to be of any use the operation must be preceded by Vaccine treatment to free the tissues of whatever infective organisms (staphylococci) are present.

Lymphangiomata (cystic or cavernous) should be dealt with on the same principles as are utilised in the treatment of the somewhat similar condition affecting the bloodvessels and constituting nævi. When the growth is small and circumscribed complete excision is indicated. The larger cystic lymphangiomata constituting hydrocele of the neck are better left alone, as they are often so large as to be difficult of removal, and it is said they sometimes spontaneously disappear. When by their mechanical pressure they interfere with respiration an attempt must be made at excision. Should the contents become purulent from secondary infection the hydrocele should be treated by free incision and drainage.

LYMPHANGITIS, OR ANGEIOLEUCITIS.

Inflammation of peripheral lymphatic vessels is always septic, and must be treated upon the lines followed in acute adenitis or lymphadenitis. Attention should be at once directed to any injury or wound which has been the starting-point of the affection. This should be treated by antiseptic poultices (Spirit or Boric under oiled silk), and the free evacuation of any collection of pus by proper incisions. Where the lymphangitis is superficial, and the red, tender, painful and swollen lymphatic vessels can be discerned extending from the wound in the direction of the lymphatic glands, benefit can be got by painting over the inflamed area with strong Tincture of Iodine, and prescribing absolute rest to the affected limb. Extract of Belladonna and Glycerin may be employed when the pain is very severe, followed afterwards by an evaporating or a warm spirit lotion. Where tension and pain are prominent, a large hot poultice may afford relief and even diminish the chance of suppuration, but the moment signs

of pus make their appearance, incision must be resorted to to allow the escape of pus or to lower tension.

Bier's elastic ligature or Klapp's suction-bell sometimes cuts short the inflammatory action by bringing about an increased blood-supply and flushing the part with a healthy lymph stream bearing increased amounts of the natural antitoxins.

In chronic and recurring lymphangitis a vaccine prepared from a culture of the causal micro-organism should be resorted to.

The remote result of a severe lymphangitis sometimes shows itself in the presence of a permanent solid or brawny œdema owing to obliteration of the peripheral lymphatic vessels. This condition may be successfully met by the operation introduced by Handley, which consists in the introduction of sterilised thick silken threads which are made to traverse the œdematous region, being embedded permanently in the tissue of a contiguous region whose lymphatic channels are healthy. The strands of silk drain the affected area by capillary attraction, and thus act as new lymphatic vessels, and will withstand absorption for many years.

Lymphangioplasty has also been employed with success in elephantiasis in conjunction with vaccine therapy, and in the great œdema which sometimes follows the operation of total excision of the breast.

LYMPHATISM, OR STATUS LYMPHATICUS.

Till there be some means of diagnosing this serious condition of the thymus and entire lymphatic system the discussion of treatment is futile, since the affection is only recognised by the sudden death which it causes. Moreover, its pathology is unknown. Some cases of so-called "thymic asthma" have been dealt with by tracheotomy and a few cases have been successfully treated by X rays and a few have been treated by thymectomy.

Cameron describes an external configuration of the child in which a characteristic physiognomy with an appearance of fatness and wateriness of the tissues is evident. His description reminds one of the so-called "scrofulous temperament" described by former observers: it includes adenoids, subnormal intelligence and violence of temper, &c. He associates its causation with heredity and abnormal excess of starchy food. If the latter conclusion be correct it gives some clue to treatment, which should obviously consist in the correction of all dietetic errors.

MADURA FOOT, OR MYCETOMA.

This affection is common in some parts of India where the natives employed in agriculture work in the fields with bare feet. No known drug exercises any specific action upon the fungus, which gains admission to the deeper tissues through some slight cutaneous abrasion usually caused by treading on millet stubble. Iodides, so valuable in the allied condition of actinomycosis, are useless. The only treatment of any value must be surgical, and if the affection be radically dealt with in its early stages by free excision of the fungus-invaded tissues, thorough

scraping or curetting and the free application of caustics, the disease may be arrested.

Amputation of the foot above the ankle-joint is the only procedure in neglected cases, and sometimes the hand will also have to be sacrificed when the fungus has gained an entry in order to prevent marasmus and death from necrosis of bones and prolonged suppuration.

In this connection much interest has been aroused by the researches of Raymond and Parisot, who have succeeded in isolating the same fungus in cases of Trench-Foot occurring in the late world-war. The peripheral neuritis and swelling rapidly disappeared under rigid cleansing with mild antiseptics of the Boric Acid and Camphor type.

MALARIA.

Prophylaxis.—The most important and efficient of all methods of stamping out the disease consists in the destruction of the stagnant pools of the swamps which form the breeding-ground of the mosquito. Improved drainage, by levelling and planting the soil with trees in the neighbourhood of dwellings and the covering over of all collections of water by a film of kerosene or tarry liquid, cause the suffocation of their larvæ.

Those suffering from malaria should be isolated by fine netting in order to prevent the insects becoming infected with the parasites, and the healthy can effectually protect themselves with similar netting from the bites of the insects, since Anopheles is always nocturnal in its feeding habits in bright weather.

As their range of flight is limited, a high degree of protection can be obtained by sleeping as far above the level of the ground as possible. Minor aids may be employed, as smearing the skin over with Eucalyptus, Peppermint Oil or Tincture of Pyrethrum, which prevents the insect biting, and also the burning of aromatic substances in the sleeping apartments once the mosquitoes have obtained admission.

Quinine internally will often entirely protect the healthy individual for long periods from malaria, though bitten by infected insects, but less than a daily dose of 5 grs. cannot be relied upon. Plehn's method of "double prophylaxis" consists in the administration of 8 grs. every fourth and fifth or every fifth and sixth day. Koch's plan was to give 15 to 24 grs. upon two consecutive days at intervals of 8 to 10 days, and is known as the "long-interval prophylaxis." When employed as a prophylactic the insoluble Sulphate should be used, but when quinine is administered as a curative agent the Acid Hydrochloride should be selected. Chundra saturates the system with Calcium Sulphide.

Once an attack of malaria has shown itself the patient should immediately be put to bed, and hot-water bottles and warm clothing freely supplied. Hot drinks or warmed stimulants are useful. Nitrite of Amyl and other nitrites very often stop the chill promptly, but do not appear to influence the succeeding stages. Pilocarpine hypodermically and a full dose of Chloroform by the mouth act in the same way. The hypodermic injection of Morphia often gives great relief at this stage. Moderate

purgation should generally be prescribed, as it undoubtedly increases the efficacy of the remedies to be afterwards given in the later stages.

In the hot stage considerable relief may be obtained by removal of the extra clothing and the free sponging of the skin with cold or tepid water. Cold compresses are grateful. Coma and hyperpyrexia should be met by the cold bath or cold pack as in sunstroke.

In the sweating stage gentle friction with hot towels and changes of underclothing may give some relief. After this stage is over, the patient may be permitted to get up and move about in the regular forms of intermittent malaria.

For the treatment of malaria in all its forms and types Quinine is the sovereign remedy, and should always be resorted to. Much interest has been taken in its action upon the parasite in the blood, and we now perhaps know more about the therapeutic action of this drug than is known of almost any other internal remedy employed in disease. By withdrawing small quantities of blood at different stages of the malarial attack it has been determined that the young brood, when showered free into the circulating plasma, are much more susceptible to its lethal influence than are the intracorpuscular forms. A single large dose (15 grs.) when given shortly before a paroxysm of the benign intermittent fevers will effect the destruction of the great majority of the young parasites, but the rigor is not prevented by this treatment, though another attack may not occur.

The parasites causing the malignant types of malaria are still less susceptible to quinine when in the intracorpuscular stage of existence. Though there cannot be any doubt about the ideal time for the full therapeutic action of the drug being 3 to 5 hours before the rigor, this should not dominate the situation. Quinine in all cases should be given as soon as the patient comes under observation, without waiting for the advent of any particular stage in the parasite's cycle of development. The object should be to saturate the patient's blood with the drug at once and to continue its administration for 3 or 4 weeks in smaller doses.

For the *regular intermittent* types of the disease (tertian and quartan ague) 15 grs. Quinine Hydrochloride should be given by the mouth, though often a smaller dose is sufficient, and 5 grs. twice a day afterwards meet the indications in all cases.

The *irregular intermittent*, the *remittent*, the *continuous* and *pernicious* types will require a more prompt and thorough saturation of the blood. 15 grs. of the Acid Hydrochloride should be injected deeply into the buttock, or, better still, into a vein, and 5 grs. given by the mouth every 4 hours after. Rarely is it necessary even in the worst cases to exceed a daily dose of 45 grs. A man of 140 lbs. weight who has received an intravenous injection of 15 grs. will have sufficient quinine in his blood to correspond to a solution of 1 in 5,000, and 1 in 50,000 is quite sufficient to destroy the allied amœboid organisms in hay infusion.

When even double the above amounts of the insoluble sulphate of quinine are administered by the mouth they are slowly absorbed by the gastric mucosa, and the constant elimination of the drug by the kidneys

prevents any high degree of saturation of the blood by the drug, so that it is quite possible for the victim of pernicious malaria to perish with a large amount of unabsorbed quinine in his stomach; hence the necessity in all grave and urgent cases to place the whole dose at once in his circulating fluid.

Quinine has apparently no influence over the gametocytes, but as these bodies only appear after the asexual forms have reproduced themselves in the blood, it is probable that early resort to treatment diminishes the chance of their formation and tends to prevent the spread of the disease by the mosquito.

Cohen advocates the deep injection of 15 grs. Quinine-Urea, which, like the acid hydrochloride, is soluble in its own weight of water, and he states that after a single injection there is an apyrexial period of either six and a half or thirteen days, which is of important diagnostic significance.

Upon the whole the best injection for intravenous use is the following formula:

℞ *Quininæ Hydrochlor. Acidi* gr. xv.
Sodii Chloridi gr. j.
Aquæ Destillatæ ʒiij.

For intramuscular or deep injection, 15 grs. of the acid hydrochloride should be dissolved in 1 dr. water and administered after the solution has been sterilised by boiling in a test-tube.

The "Koch" treatment of malaria is carried out by commencing with a preliminary dose of 5 grs. Calomel, followed by a saline purge in 6 hours. If a blood-film shows parasites 15 grs. sulphate of quinine are given by the mouth, and this dose is repeated each morning for 5 days. 15 grs. are given on the tenth, eleventh and twelfth day, and repeated every tenth day for a period of 13 weeks.

Whichever method or plan of employing the drug is to be accepted, the guiding principle should be to produce a rapid saturation of the blood and to keep up the effect till all traces of the parasites have disappeared from blood-films taken periodically. When this latter technique has to be dispensed with in practice, the drug should be continued for long periods, since its administration can do no harm save in some cases of Blackwater fever (which see).

It is useless to print the long list of drugs which have been, and still are, recommended for the treatment of malaria. The action of quinine must be regarded as of the nature of a true specific. Enesol or Salicyl-Arsenate of Mercury, Methylene Blue, Tartar Emetic, Arsenic, Salvarsan, various Cinchonine salts, and the Cacodylates and Warburg's Tincture may be tried when from any reason quinine cannot be tolerated.

In the treatment of the so-called *Malarial Cachexia* Quinine is often of little use if given alone; Arsenic and Iron are always indicated, but they should be combined with quinine. A pill containing the following answers most cases, whether of enlarged spleen, anæmia, neuralgia, or cardiac weakness supervening upon old attacks of malaria:

℞. *Ferri Arsenatis gr.* $\frac{1}{8}$.
Ferri Redacti gr. j.
Ext. Nuc. Vomicæ gr. ss.
Quininæ Sulphatis gr. iij. *Misce.*

Fiat pil. St. unam ter in die post cibum.

The splenic enlargement, like most of the other sequelæ, often resists every form of treatment till the patient is removed from the malarious district. A long sea-voyage or a sojourn at a spa where hydropathic measures may be employed with the internal use of a weak arsenical water, as at Bourboule, Vals, Mont Doré, and Plombières, or at Woodhall in Lincolnshire.

MALIGNANT PUSTULE AND WOOLSORTER'S DISEASE.

The first name is a synonym for Charbon, or Cutaneous Anthrax, whilst Woolsorter's Disease is the title given to the pulmonary type of anthrax.

The treatment of the pustule should be prompt and radical; excision, cutting wide of the infected tissue, is advisable, after which the wounded surfaces should be thoroughly disinfected by Perchloride of Mercury solution, Carbolic Acid or the cautery. The injection of a few minims of a 1 in 15 solution of Carbolic Acid or 2 per cent. Iodine at several spots around the basis of the swelling should be performed whether excision be done or not. Some surgeons recommend powerful caustics as Chloride of Zinc, Nitric Acid, Caustic Lime or Potash; but Braem discards all surgical procedures, and treats the local lesion by applying a 1 in 50 solution of Acetate of Aluminium on lint, whilst the part is elevated and the patient ordered to bed. It is claimed by several authorities that excision is liable to lead to the introduction of the spores or bacilli into the blood; hence when operative measures are resorted to strong antiseptics should always be freely used locally.

Owing to the danger of the bacillus entering the blood, serum therapy should always be resorted to. The extent of the local lesion and the mildness of the constitutional symptoms give no indications of the gravity of the case. Sclavo's Serum is prepared by immunising asses by injections of attenuated virus gradually increased in quantity and virulence. 30 c.c. should be injected intravenously or hypodermically in all cases and repeated several times during the three weeks necessary for recovery. Carbolic Acid in full doses is advocated by the mouth.

It is worth remembering as an important point in prophylaxis and local treatment that though the anthrax bacillus is speedily destroyed by most antiseptics, when the organisms are allowed to dry up by the evaporation of the blood or serum containing them, spores form in the presence of atmospheric oxygen, and these are practically indestructible.

Woolsorter's Disease occurs in operatives employed in woollen factories, the dried spores finding their way into the lungs from the dried fleeces which are employed in the manufacture of mohair, alpaca, &c.; hence prophylaxis

should consist in the thorough disinfection of the hair or wool coming from all foreign countries where splenic fever is endemic. Once the symptoms have shown themselves the only hope lies in the intravenous injection of 30 c.c. Sclavo's Serum. This preparation preserves its efficacy unimpaired for 2 years when kept in sealed tubes in the dark.

The cardiac failure, high fever and dyspnœa will also require the prompt use of such agents as Strychnine hypodermically, Ammonia and Whiskey along with Oxygen inhalations. Pleuritis and œdema of the glottis must be met by appropriate agents.

The rare intestinal type of anthrax is to be treated on the same lines, the poison in these cases reaching the alimentary canal through contaminated milk or food or by swallowing the saliva which has become infected by the accumulation of the spores in the naso-pharynx. Muskett strongly recommends large doses of Ipecacuanha as in the treatment of tropical dysentery, and he employs this drug as a dressing for malignant pustule. A paste made with Quinine and Turpentine appears to possess the same antibacterial properties.

MALTA OR MEDITERRANEAN FEVER.

Prophylaxis is easily secured by boiling the milk of the goat, as the disease is always caused by the micrococcus found in this liquid, if it be not transmitted by a carrier as in typhoid fever.

Once the agglutination test has revealed the presence of the disease in any chronic obscure febrile attack, the patient should be ordered to bed, and the general routine indicated in typhoid fever must be patiently carried out. Thus a purely liquid diet is essential, ulceration of the intestine being frequently present. No known antiseptic drug exercises any specific action upon the causal coccus; hence the treatment, as in typhoid fever, must be purely symptomatic. Fever must be reduced by cold packs, sponging and occasional doses of Quinine or full amounts of Spt. Æther. Nit. Diarrhœa, cardiac weakness, constipation, joint pains, neuralgic symptoms, cephalalgia and anæmia in the later stage must be met by the remedies indicated and employed upon rational principles.

Vaccine therapy has been successfully employed, and though inadmissible as a rule in the acute and severe pyrexial forms of the disease, it has achieved marked success in the chronic type of the affection. The importance of the success of vaccine treatment in a disease which may linger on unchecked for a period of 12 months is obvious.

The best effects are obtained by injections of repeated doses of 6 to 7 million, which bring the temperature down speedily and increase the agglutinins in the blood.

MAMMARY GLAND, Inflammation of.

Acute inflammation of the mammary gland may be regarded practically as a disease of nursing women, and in nearly every case its cause will be found to be infection through a cracked nipple. The wise practitioner will therefore make it his business to see that any complaint of pain while

℞. *Ferri Arsenatis gr.* $\frac{1}{8}$.
Ferri Redacti gr. j.
Ext. Nuc. Vomicæ gr. ss.
Quininæ Sulphatis gr. iij. *Misce.*

Fiat pil. St. unam ter in die post cibum.

The splenic enlargement, like most of the other sequelæ, often resists every form of treatment till the patient is removed from the malarious district. A long sea-voyage or a sojourn at a spa where hydropathic measures may be employed with the internal use of a weak arsenical water, as at Bourboule, Vals, Mont Doré, and Plombières, or at Woodhall in Lincolnshire.

MALIGNANT PUSTULE AND WOOLSORTER'S DISEASE.

The first name is a synonym for Charbon, or Cutaneous Anthrax, whilst Woolsorter's Disease is the title given to the pulmonary type of anthrax.

The treatment of the pustule should be prompt and radical; excision, cutting wide of the infected tissue, is advisable, after which the wounded surfaces should be thoroughly disinfected by Perchloride of Mercury solution, Carbolic Acid or the cautery. The injection of a few minims of a 1 in 15 solution of Carbolic Acid or 2 per cent. Iodine at several spots around the basis of the swelling should be performed whether excision be done or not. Some surgeons recommend powerful caustics as Chloride of Zinc, Nitric Acid, Caustic Lime or Potash; but Braem discards all surgical procedures, and treats the local lesion by applying a 1 in 50 solution of Acetate of Aluminium on lint, whilst the part is elevated and the patient ordered to bed. It is claimed by several authorities that excision is liable to lead to the introduction of the spores or bacilli into the blood; hence when operative measures are resorted to strong antiseptics should always be freely used locally.

Owing to the danger of the bacillus entering the blood, serum therapy should always be resorted to. The extent of the local lesion and the mildness of the constitutional symptoms give no indications of the gravity of the case. Sclavo's Serum is prepared by immunising asses by injections of attenuated virus gradually increased in quantity and virulence. 30 c.c. should be injected intravenously or hypodermically in all cases and repeated several times during the three weeks necessary for recovery. Carbolic Acid in full doses is advocated by the mouth.

It is worth remembering as an important point in prophylaxis and local treatment that though the anthrax bacillus is speedily destroyed by most antiseptics, when the organisms are allowed to dry up by the evaporation of the blood or serum containing them, spores form in the presence of atmospheric oxygen, and these are practically indestructible.

Woolsorter's Disease occurs in operatives employed in woollen factories, the dried spores finding their way into the lungs from the dried fleeces which are employed in the manufacture of mohair, alpaca, &c.; hence prophylaxis

should consist in the thorough disinfection of the hair or wool coming from all foreign countries where splenic fever is endemic. Once the symptoms have shown themselves the only hope lies in the intravenous injection of 30 c.c. Sclavo's Serum. This preparation preserves its efficacy unimpaired for 2 years when kept in sealed tubes in the dark.

The cardiac failure, high fever and dyspnœa will also require the prompt use of such agents as Strychnine hypodermically, Ammonia and Whiskey along with Oxygen inhalations. Pleuritis and œdema of the glottis must be met by appropriate agents.

The rare intestinal type of anthrax is to be treated on the same lines, the poison in these cases reaching the alimentary canal through contaminated milk or food or by swallowing the saliva which has become infected by the accumulation of the spores in the naso-pharynx. Muskett strongly recommends large doses of Ipecacuanha as in the treatment of tropical dysentery, and he employs this drug as a dressing for malignant pustule. A paste made with Quinine and Turpentine appears to possess the same antibacterial properties.

MALTA OR MEDITERRANEAN FEVER.

Prophylaxis is easily secured by boiling the milk of the goat, as the disease is always caused by the micrococcus found in this liquid, if it be not transmitted by a carrier as in typhoid fever.

Once the agglutination test has revealed the presence of the disease in any chronic obscure febrile attack, the patient should be ordered to bed, and the general routine indicated in typhoid fever must be patiently carried out. Thus a purely liquid diet is essential, ulceration of the intestine being frequently present. No known antiseptic drug exercises any specific action upon the causal coccus; hence the treatment, as in typhoid fever, must be purely symptomatic. Fever must be reduced by cold packs, sponging and occasional doses of Quinine or full amounts of Spt. Æther. Nit. Diarrhœa, cardiac weakness, constipation, joint pains, neuralgic symptoms, cephalalgia and anæmia in the later stage must be met by the remedies indicated and employed upon rational principles.

Vaccine therapy has been successfully employed, and though inadmissible as a rule in the acute and severe pyrexial forms of the disease, it has achieved marked success in the chronic type of the affection. The importance of the success of vaccine treatment in a disease which may linger on unchecked for a period of 12 months is obvious.

The best effects are obtained by injections of repeated doses of 6 to 7 million, which bring the temperature down speedily and increase the agglutinins in the blood.

MAMMARY GLAND, Inflammation of.

Acute inflammation of the mammary gland may be regarded practically as a disease of nursing women, and in nearly every case its cause will be found to be infection through a cracked nipple. The wise practitioner will therefore make it his business to see that any complaint of pain while

the child is sucking is followed by a careful examination of the nipples and by the proper treatment of any crack, fissure, or abrasion that may be present (see Nipples). Unless he is confident of the ability of the nurse to carry out that treatment, he should insist on a dress rehearsal of it being carried out under his own eye.

It is common to find about the third day after delivery a condition of engorgement of the breasts, which are hard, swollen and tender, and there is often some rise of temperature and pulse. If the baby can suck vigorously, this condition quickly yields to its efforts, but if the proper emptying of the breast is not attained, owing to ineffectual attempts by the suckling, measures should be taken to relieve the congestion, as if it is allowed to persist some degree of mastitis will probably be the result. In these cases a good breast-pump is very useful, and its use should be accompanied by the application of a binder around the breasts, which may be covered with a layer of Gamgee tissue or cotton-wool so as to equalise pressure and give some elasticity. In this way the breasts are supported and engorgement is prevented. Instead of the breast-pump the nurse may be directed to massage the breasts. This operation should be performed, for the first time at least, under the eye of the physician, as nurses are prone to massage too vigorously, and in this way are likely to do harm rather than good. The nurse should anoint her hands with olive oil, and should make stroking movements, commencing from the periphery and working towards the nipple. The strength may be gently increased as the massage goes on. Pain felt by the patient is a sign that too much force is being used, and the operation should be accompanied by a sensation of relief and by the evacuation of a considerable amount of milk.

Should the congestion of the breast be followed by the development of a firm, hard, tender wedge-shaped area in the gland, corresponding to a lobule, with reddening of the skin over the area, the practitioner will recognise that he has to deal with a mastitis of mild form. The breast must be emptied periodically by the pump, as it is unwise to allow sucking of the affected breast for fear of the infant becoming infected. After emptying, a thick layer of cotton-wool is placed over the gland and a firm binder or bandage applied. The external application of poultices, lotions and ointments in such a condition is useless. Under the treatment recommended nearly every case of simple mastitis of this nature will get well in a day or two, and suckling may then be resumed.

In the few cases of this class which do not resolve under treatment, and in the more serious class of cases which result from infection through cracked nipples, and which seldom develop until a week or more after delivery, the inflammatory process attacks not only the gland tissue itself, but the connective tissue between and around the lobules also, and the tendency of the process is towards the formation of abscesses. The inflammation is not limited to a wedge-shaped lobule, but a more or less rounded area of infiltration, which may involve the whole organ in bad cases, is to be made out. This area is firm and exquisitely tender; the whole breast is enlarged and tends to hang down; the skin is reddened,

and when pus has formed becomes œdematous and pits on pressure. The baby should be at once taken off the inflamed breast and engorgement with milk relieved by a breast-pump.

Weaning need not be resorted to unless both breasts are affected, unless suckling with the sound breast causes great pain and engorgement in the inflamed one, or unless suppuration persists for a long time in spite of treatment. Any cracks or fissures about the nipple should be treated at once by painting with cocaine solution and then with Tr. Benzoin. Co., Nitrate of Silver (gr. x. to ℥j.), or pure Carbolic Acid. To the breast itself warm applications are soothing, and may do good by promoting the flushing of the part with blood. Cold applications and evaporating lotions should be avoided. A poultice of lint wrung out of hot saturated boracic acid solution, with a few drops of laudanum sprinkled on it and covered by oiled silk, makes a very good application. Warm lead and spirit lotion under oiled silk may be used. Linseed or bran poultices are not to be recommended, as they are too heavy and bulky, and rapidly lose heat. The most instant cry of the inflamed breast, however, is for support, and this should be given by covering thickly with cotton wadding and bandaging or applying a binder firmly. The wadding may be put on over the poultice, and will assist in retaining heat; or the breast may be painted with Glycerin of Ichthyol (10 per cent.), or with Liniment of Chloroform and Lin. Belladonna equal parts, and the cotton-wool then applied. Quite a satisfactory method is to warm the wool in the oven and apply it thickly over the breast with a firm binder over it, using no medicaments at all. Antiphlogistine warmed and spread thickly over the inflamed area is recommended. Bier's hyperæmic treatment applied by the aid of a special large-sized cupping-glass to include the entire breast has been very well spoken of. Constitutional treatment should not be neglected. A smart saline purge (Magnesium Sulphate or Rochelle Salt in warm water or lemonade in the morning on a fasting stomach) should be given. The diet should be light but nourishing, and fluids should be restricted to prevent too copious a secretion of milk. If there is much pain and sleeplessness a small dose of morphia may be required.

Whatever method be adopted, the practitioner should make a careful daily examination of the breast for the œdema and pitting of the skin which warn him that pus has formed, and one drawback to the use of coloured ointments and applications is that they more or less hide the skin and may prevent the early detection of this important sign. As soon as pus has formed it is neither kind nor fair to the patient to delay incision. There is no hope of its becoming absorbed, and if tempted to allow evidence of pointing of the abscess to present itself before an incision is made, the practitioner should remember that while the suppurative process is approaching the skin surface it is spreading at an even more rapid rate through the less resistant tissues in the depths of the gland, so that an originally small pocket of pus is being converted into a large branching and loculated cavity which may take in healing weeks or even months in place of a few days.

A suppurating breast should always be opened under an anæsthetic and with strict antiseptic precautions. The incision should be an inch to an inch and a half long, and should lay the abscess cavity open and not merely puncture it. It should run radially from the nipple, and be placed preferably at the most circumferential part of the abscess. The finger should be introduced through the incision and should break down any septa that are found so as to throw the cavities into one. If there is extensive suppuration it is more satisfactory to make two or three openings rather than to attempt to drain the whole area through one incision, no matter how large or how favourably placed. The cavity should be washed clear of pus and débris with 1 in 2,000 Perchloride or drachm to the pint Lysol, or Creolin solution delivered from a douche can through an ordinary vaginal nozzle into the cavity. When this has run off, the whole of the cavity and its recesses should be loosely packed with iodoform or double cyanide gauze wrung out of antiseptic solution, a thick layer of cotton-wool put on over the entire breast, and a firm binder or bandage applied. The packing should be removed next day and a fresh one inserted, and this should be repeated until the cavity has granulated up, a process which takes place in a wonderfully short time as a rule. Sometimes the breast itself escapes infection, but an abscess forms behind the gland. This should be incised early along the lower border of the breast, otherwise its spread in the loose retromammary tissue will be very rapid.

Chronic mastitis is found occasionally as the result of injury. More commonly it arises in women who have nursed children, probably as a late result of an indolent infection during lactation. The breast is hard, knotty and tender, and the axillary glands are usually enlarged. The condition may be confounded with scirrhus, but on compressing the breast between the flat hand and the chest wall it is evident that a true tumour is not present. The most satisfactory treatment is to strap the breast either with adhesive plaster or with a mercurial plaster. This usually effects a cure if persisted in for a few weeks. The plaster should be removed and the breast restrapped at least once a week.

A tuberculous mastitis is sometimes observed, and such cases seldom recover without amputation of the breast. It is always worth while, however, to try the effects of small doses of tuberculin (say $\frac{1}{20000}$ mg.), coupled with the usual hygienic treatment adapted to tuberculous lesions.

In some cases of chronic mastitis occlusion of one or more ducts takes place with the subsequent development of a cystic swelling (galactocele). If the cyst does not subside under strapping, it should be punctured, or a piece of its wall excised and the cavity packed.

MANIA.

The treatment of the different forms of mental disease, as mentioned under Insanity, can only be carried out in special institutions possessing the numerous requirements which are now considered necessary for the successful management of the insane. This remark applies also to ordinary acute mania, but it will be necessary to briefly refer to the management of

acute delirious mania, a serious and often fatal disease coming on with surprising suddenness, and requiring treatment before the necessary removal to an appropriate asylum can be determined upon or carried out.

The first point in the management of such cases after isolation from friends and relatives is to look closely to the feeding, and as the patient almost always refuses food, forced feeding should be commenced without delay, and steadily insisted upon in spite of all obstacles every third or fourth hour during the day and night. Strong broths, beef essences, milk and eggs, and a small quantity of stimulant in most instances should be introduced into the stomach by means of the India-rubber tube. Nutrient enemata should be also given.

Sleep and quiet must be secured, and Sulphonal, Trional, Paraldehyde, Bromide of Potassium, Hyoscine or Veronal is called for. Hydrobromide of Hyoscine subcutaneously in doses of $\frac{1}{200}$ gr. every hour for three doses is relied upon by Savage in severe cases. Opium is to be avoided, unless other hypnotics fail. Chloral is the favourite drug, and with many specialists the treatment of this affection is summed up in the words "feeding and chloral." Peterson advocates the use of the hot wet pack as the best sedative in this condition, and the patient (who often falls asleep) may be kept in it for hours.

W. Graham recommends the warm bath (96° to 98°) in acute mania, the patient being immersed for several hours at a time, during which food may be administered. There can hardly be a doubt about the advisability of removing this class of patient to a properly equipped asylum as soon as arrangements for his admission and conveyance can be completed. The danger of sending such cases on a sea-voyage as soon as the first outbreak of delirium or impulsive excitement has subsided is obvious, though in ordinary acute hysterical mania in its later stages a change of scene under the skilful control and close attendance of a trained nurse is often advantageous.

MARASMUS.

This condition must be regarded as a symptom and not as a disease. Only the infantile form need be considered. The primary cause of the error in nutrition should be carefully sought for before treatment upon rational grounds can be commenced; thus the malnutrition or marasmus accompanying congenital syphilis on being recognised will yield speedily as a rule to the administration of Mercury.

Pyloric obstruction (congenital) is another primary cause which yields to operative treatment, and obstinate constipation, whether functional or organic, is of the same order. Disease of the mesenteric glands following the ingestion of tubercle-infected milk and congenital heart lesions are causes not to be lost sight of.

In the great majority of cases, however, infantile marasmus and malnutrition are due to catarrhal or other states of the alimentary canal, the result of improper feeding. The unsuitable food in the first instance sets up diarrhœa and gastritis, and the irritated mucosa is still further

outraged by a continuance of the improper feeding. The infant may perish from starvation with abundance of food in the stomach or intestines, which no longer are able to digest proteids, fats or carbohydrates.

The condition is very frequently the result of feeding with cow's milk, in which case the child's napkins will reveal tough, putty-like masses of curd which shake off easily almost without soiling the linen. Few therapeutic results are more striking than that which may be witnessed by placing the wasted infant at the breast of a healthy wet nurse, and when such an aid is procurable the problem is at once solved, but in the absence of the natural nourishment the complex question of artificial feeding must be faced.

The mischief may be caused by giving the milk undiluted or over-diluted; thus 1 part of cow's milk to 2 of water or barley water, which is suitable for new-born infants, may produce marasmus if continued till the child is 9 months old; by that age a child fed on cow's milk should be getting the liquid diluted with not more than one-fourth part of its bulk with water.

The addition of Sodium Citrate, 1 to 2 grs. to each oz., permits of cow's milk being given in an undiluted form to wasted children who cannot otherwise digest milk proteids, and if cow's milk is to be given this should be added to it after Pasteurisation at a temperature of 140° F. for 20 minutes, and this food is often digested when weak boiled cow's milk cannot be assimilated. Sterilisation by boiling is unnecesssary under ordinary circumstances, and often is objectionable.

When the marasmus is due to inability of the infant to digest fat, the curds found in the motions will be small and soft, and consist of saponified fats. Under these circumstances the milk must be skimmed before use. Marasmus may be the direct outcome of feeding with cream, especially when the cream is separated by centrifugalisation and contains any preservative like boric acid or salicylates. It is a common mistake to add cream to the milk used for feeding as soon as the child is observed to be wasting, the wasting being sometimes due to the already high percentage of fat contained in the milk. More than 3 per cent. of fat is, as a rule, injurious. Ass's milk is sometimes resorted to when cow's milk cannot be tolerated. Buttermilk, when scrupulously prepared, meets all requirements in such cases, and is decidedly preferable to the innumerable new-fangled lactic acid compounds in which various strains of the bacillus are added to cow's milk. Carpenter's method of procuring pure buttermilk for infant feeding is simple and easily carried out. A quantity of fresh clean milk is permitted to stand for 24 hours in a glass vessel at 70° F.; the cream is skimmed off and the sour milk churned for 15 minutes, after which it should be kept on ice. To each pint of this buttermilk ½ teaspoonful of wheaten flour and 2 tablespoonfuls of granulated sugar are added before the mixture is brought to the boiling-point.

Where milk proteids cannot be digested, beef-juice, clear soup or veal broth thickened with barley may be substituted till the gastro-intestinal catarrh is combated, after which peptonisation of the milk with a pan-

creatic preparation, or the addition of ½ gr. Papain to each bottleful of cow's milk diluted with barley water, may be commenced. Desiccated milk food, Benger's, unsweetened condensed milk, Mellin's, Allen and Hanbury's No. 1, Clay Paget's and Vacca milk may be tried. Starchy compounds should as a rule be withheld till after the sixth month, though barley water as a diluent may be employed at all stages of infantile life. The writer believes that one of the most valuable methods of improving the nutrition of the body in infantile marasmus is inunction with Cod-Liver Oil and the application of a binder saturated with this drug and covered with mackintosh sheeting, as described in the treatment of Mesenteric Diseases.

Drugs are admissible only in as far as they may be useful to combat the gastro-intestinal catarrh, and Grey Powder in minute doses occasionally is a valuable intestinal disinfectant. Thyroid Extract has been extolled, but its *modus operandi* has not been made clear. Lavage of the stomach and colon has been employed in some cases with advantage, but as a rule it is impracticable as a routine. Diarrhœa will call for the exhibition of Tannalbin, or minute doses of Calomel and the various agents mentioned under Diarrhœa.

Sea-water injected hypodermically has proved of great value in the hands of Robert-Simon of Paris, who states that after a single injection the child may be able to retain and digest a normal meal of cow's milk. Other observers state that ordinary saline injections are equally valuable.

MASTOID CELLS, Suppuration of—see Ear, Diseases of.

MASTURBATION.

The physician's advice is often sought for by parents who have detected their children in the act of practising this degrading habit. A careful examination of the genitals should be made, and any source of irritation removed if possible. Thus an adherent prepuce is a common cause which should be remedied by forcibly drawing back the foreskin so as to expose the glans thoroughly. A pinhole prepuce should be dilated or slit, and a long prepuce will demand circumcision. The operation removes a constant source of suggestive irritation, and, moreover, makes a long break in the habit, which should be followed up by close supervision and moral treatment.

In girls any unhealthy condition of the genital organs may lead to the establishment of the habit, and absolute cleanliness, with close supervision, may lead to a removal of the trouble. With older girls, who have been educated by others into the practice, only moral treatment will be of use. These cases are most unsatisfactory, as too often the habit of masturbation gets hold of those in whom the moral sense is but feebly developed.

It is sometimes a symptom of mental deficiency or the first indication of some psychical disturbance, and has too often been regarded even by specialists as the *cause* instead of the *result* of insanity.

Where moral treatment fails, resort to mechanical methods of preventing the act may be tried by tying the hands after undressing at bed-time,

and by arranging that the patient shall not sleep alone, or when the habit is practised during dreaming, by causing the patient to sleep with a hard body like an empty cotton-reel fastened over the spine, so that when he turns upon his back during sleep its pressure awakes him. The plan of blistering the penis or labia is a severe and almost brutal method, open to serious objection, and not even likely to be followed by any permanent benefit.

The regular emptying of the rectum by laxatives and the removal of threadworms or anal irritation from whatever cause are not to be overlooked. The habit has been known to arise from the irritation caused by the presence of a stone in the bladder.

Precocious sexual excitement is to be minimised by the avoidance of bad companions and indulgence in filthy conversation and impure literature. Free open-air exercise, pushed to the extent of inducing fatigue before bed-time, plain, unstimulating food, change of scene, of amusements and of surroundings, and attention to every measure calculated to improve the physical tone, should be advised.

Drugs are not to be depended upon when moral treatment fails, but where there is a continual struggle between an unhealthy, precocious, sexual appetite, and a weakened will, victory may be won for the latter occasionally by the administration of Bromides in conjunction with cold baths. Blistering over the occiput and upper cervical spines is occasionally useful in allaying the excitability of the sexual centres.

The physician is often consulted by physically healthy patients who have practised the habit of masturbation for a time during boyhood, and who become hypochondriacal or almost insane after the perusal of some sample of pernicious quack literature on the subject. In such cases the firm assurance of the physician that the habit has left no injury behind it generally restores the patient's mind to a healthy state.

Regarding preventive treatment, it is a debatable question whether boys should be warned against the evils of a practice of which they may know nothing, and there cannot be a doubt but that in some few cases such warning may produce the opposite effect, though many authorities who have had considerable experience of the training of boys follow the practice of sounding an alarm as a matter of routine. To be free from objections such warning must be most judiciously administered to innocent and sensitive youths.

For the cure of masturbation in insane patients, Clarke has successfully performed neurectomy, removing $\frac{1}{2}$ inch of each of the nerves on the dorsum of the penis through a transverse incision $\frac{1}{2}$ inch from the root of the organ.

MEASLES.

The general hygiene, nursing and feeding are practically identical with those indicated in the management of the other exanthematous fevers—scarlatina, rötheln, typhoid, typhus and variola.

Prophylaxis is of vital importance; the infectiousness of the disease is

intense before the rash appears, hence the importance of the recognition of measles at the earliest possible period. The diagnosis will be helped by the presence of Koplik's spots on the buccal membrane, and these must be always sought for. Rigid isolation should be carried out at the earliest moment.

No convalescent patient should be permitted to mix with the healthy till a period of 21 days.

As soon as the attack declares itself the child should be put to bed. A wire spring-mattress, upon the top of which a thin, hard hair-mattress is placed, and a moderate amount of bedclothes should be provided. The temperature of the sick-room should not be allowed to exceed 60° F. Certainly, in the absence of special reasons, such as laryngeal complications, the atmospheric temperature should not exceed 65° F. Thorough ventilation should be secured, and a continuous supply of pure warm air is essential. Owing to the irritability of the respiratory mucosa it will generally be found necessary to have some arrangements for moistening the air; the ordinary bronchitis kettle answers all requirements. Where the physician has the choice of rooms for the treatment of any of the exanthemata, he should select a large, airy apartment, with an open grate, and, when possible, with a ventilator opening into a flue. The bed can be surrounded by a couple of screens in a large room; this will enable the most thorough ventilation to be carried out without subjecting the patient to draughts of cold air. It is very desirable to have two beds in the sick room, one for the day and the other for the night, and, when possible, it is an even better plan to have one bed for the night in an adjoining room which communicates directly by a door with the day-room. When two children are to be treated, they should each have a separate bed, and the ventilation of the room must be most thorough.

In a case of measles it is customary to have the light subdued by partially drawing the blinds, but the complete darkness so often insisted upon is unnecessary, and the patient's own feelings may be taken as a guide in this matter. Bright sunlight should, when possible, be admitted into the room and be allowed to flood every part of its atmosphere save that in the immediate neighbourhood of the patient's eyes, which may be shaded by a curtain, screen or by the drapery of the bed; but the fewer bed hangings the better.

Every unnecessary article of furniture should be cleared out of the room, and nothing must be left in it which afterwards cannot be submitted to thorough fumigation or destruction. In treating infectious diseases in the patient's home, it is a good plan to place a large vessel filled with water and Condy's Fluid (about 1 in 50) outside the door of the sick-room. Into this vessel all articles leaving the room may be dipped. In the case of scarlatina and smallpox, a sheet moistened occasionally in a solution of Carbolic Acid (1 in 80) or Chlorinated Lime (1 in 200) may be suspended outside the door, in order to more effectually cut off the room from the other parts of the house; the same plan should be carried out in measles when other children are residing in the household. Urine and fæces

should be passed into vessels containing a small quantity of some disinfecting or deodorising substance. Terebene, Eucalyptus, Carbolic Acid, or other volatile antiseptic may be diffused through the atmosphere occasionally by a spray apparatus.

The treatment must be entirely symptomatic; no known drug exercises any specific action over the causal morbific agent.

The following old-fashioned mixture can do no harm, and often affords some relief by encouraging the action of the skin; it may be administered till the decline of the eruption in doses of a teaspoonful every 2 or 3 hours to a child 2 to 5 years old.

℞ *Spiritus Æther. Nitrosi* ℥ij.
Liquor. Ammon. Acetat. ℥j.
Syrupi Croci ℥j.
Aquæ Destillatæ ad ℥iv. *Misce.*

There is no difficulty as regards diet when the patient can take milk freely, as milk alone or diluted with half its amount of Lime-water, or aerated water may be given in any quantity. Where the patient has a natural dislike to milk, weak soups, beef tea or any liquid nourishment may be given. It is, however, a mistake to force nourishment under these circumstances. Often a child who refuses milk can be tempted to take tea, and this may consist chiefly of milk flavoured with a little tea. In this biscuit may be soaked, or toast may be added.

Thirst increases with the temperature, and diluent drinks may be freely given; it is wrong to refuse cold water when the patient craves for it. It should only be temporarily withheld in those instances where it is taking the place of nourishment. Weak barley water, to which lemon-juice and a littl esugar have been added, or home-made lemonade may be freely given. When thirst is very great, ice may be administered in small quantities.

Very high temperature must be checked, and, as there is a strong objection to the cold bath before the appearance of the eruption, when the thermometer remains above 104° an antipyretic should be administered. Quinine is the safest and best of these, and may be given in doses of about ½ gr. for each year of the child's life every 4 or 6 hours; higher temperatures will require doses of double the above.

The newer antipyretics may be employed, but only for short periods. 1 gr. Antipyrine may be given every 3 hours to a child from one to two years old. When hyperpyrexia occurs after the rash has come well out, and where the temperature reaches 106° or more, a tepid bath or cold pack should be at once given, and the patient kept in it till the temperature falls to normal. With a good nurse, sponging of the body in detachments answers most requirements, and the water at first may be tepid and afterwards cooled down. The bowels should receive one moderately smart clearing out by a saline purgative; further purgation is unnecessary unless constipation set in. Diarrhœa, if present, should not be interfered with unless it threaten to exhaust the patient's strength.

Coryza requires little interference, as it rapidly subsides upon the decline of the eruption, and is generally relieved by cutting off the supply of bright light. If congestion of the conjunctiva remains a 3 grs. per oz. Boric eye-wash may be used.

Cough is often severe, and in some cases almost alarming, and is liable to resist drugs till the eruption begins to fade. The diffusion of steam through the air or an inhalation of Hemlock Juice or a very weak Carbolic spray to the fauces, and Ipecacuanha Wine internally and warm poultices externally, generally afford relief. In adult patients Tartar Emetic (20 mins. of the wine, with 5 mins. of Liquor Morphiæ) may be given with advantage to loosen the expectoration, but drenching with nauseating expectorants must be avoided when possible.

Laryngeal irritation, like the bronchial mischief, is best treated by warm inhalations.

Severe cephalalgia should be met by a small dose of Antipyrine and a sinapism to the nucha. A smart purge is indicated for the relief of this symptom if the bowels have not been already well moved.

Vomiting is relieved by mustard to the gastric region, small quantities of iced soda-water, and peptonisation of the milk.

Itching, when the eruption is well out, may be a troublesome symptom. It is generally relieved by sponging the limbs and face with a warm or tepid solution of Bicarbonate of Soda, and by anointing the skin with weak Carbolic or Eucalyptus Oil (1 in 40).

In the early stage, should convulsions occur, or where stupor with marked exhaustion is observed before the appearance of the eruption over the entire body, especially when traces of it have been observable for one or two days about the head, a *hot* bath should be given, with the view of causing a smart determination of blood to the cutaneous surface, and when in the bath cold affusion to the head is very valuable. After such a bath the body should be properly rubbed dry with warm towels, and the patient wrapped up in flannels and put to bed before the possibility of a chill occurs.

Delirium in the early stage is due to the intensity of the fever, and yields to antipyretic treatment; at a later stage it may indicate meningeal trouble, and should be treated by closely clipping the hair and applying the ice-cap.

Convulsions at a later stage, like delirium, generally indicate the onset of some serious complication, such as pneumonia or meningitis, which is to be met by the administration of such remedies as are indicated in these affections.

The onset of any serious symptom, if accompanied by the sudden fading or recession of the rash, may be met by a brief immersion of the child's body in a hot bath containing mustard, but if this treatment is adopted cold should be applied to the head during the bathing.

Pneumonia is a most serious complication, usually taking on the type of capillary bronchitis or broncho-pneumonia; it often runs a slow course, and must be met by poultices and stimulating expectorants, as Ammonia, &c., described in the article on p. 108. Strychnine for symptoms of heart

failure may be indicated, along with small doses of Alcohol, and Oxygen inhalations should be resorted to if cyanosis supervene. As the pneumonia of measles, like that of influenza, is infectious, a child suffering from this complication should not be treated in the same room with other measles patients.

Troubles in the middle or internal ear, ophthalmia, adenitis and other complications are to be met by the remedies mentioned under the names of these affections, and since the microbes which cause many of the complications of measles are always to be found in the mouth, Dawson Williams points out the necessity of disinfecting mouth-washes and sprays. These latter are of great value in preventing otitis, and they may be supplemented by careful syringing or washing out of the naso-pharynx, immediately after which gentle Politzerisation may be occasionally carried out.

Alcoholic stimulants are seldom necessary in ordinary uncomplicated cases, but where serious complications as those just mentioned are present they must be judiciously administered. Wine whey is the best form for the administration of alcohol, and it is usually readily taken by children. A wineglassful of Sherry added to a pint of boiling milk causes curdling, and the curd should be strained out or permitted to settle down.

In the presence of whooping-cough as a complication of measles stimulation is usually necessary. Any suspicion of a diphtheritic membrane on the throat should be immediately met by serum-therapy.

The exhaustion and serious drain made upon the system by a severe attack of measles often lead to a fatal issue, notwithstanding the popular notion that the disease is generally a trivial ailment; hence, after the decline of the eruption, every care must be taken to keep up the general strength by large quantities of easily digested and easily assimilated food.

The after-treatment is sometimes of much greater importance than the management of the case prior to the decline of the fever. Tonics may be needed to improve the appetite, and Iron to combat the anæmia which often results. These objects may be accomplished at the same time by giving a mixture containing Quinine, with small doses of the Tincture of Iron. Cod-Liver Oil is very valuable at a later stage.

As branny desquamation sets in the skin may be anointed, after a warm bath and drying, by Olive Oil containing 5 per cent. Eucalyptus Oil; this relieves all itching and tends to diminish the spread of the disease to others.

The patient may generally be permitted to leave his bed, in the absence of complications, though still to remain in his room, after the lapse of a week. It is difficult to keep those who have just passed through a mild attack of measles from exposing themselves to the variations of temperature outdoors. The children of the poorer class run about in the open air often before the eruption has entirely faded, and the result is that numbers of them perish from secondary bronchial or pneumonic troubles. The dangers of exposure should be insisted upon to parents, and the body should be well enveloped in flannels, even in the summer-time. In winter, a child should not be permitted to take open-air exercise for at least a

month after the seizure. Drives should not be permitted till the patient has been allowed to move about.

To all who have had much experience in the extern department of a children's hospital, it is evident how numerous are the cases of phthisis and severe visceral and bone affections, whose origin can be traced to the shattered state of health following measles, which depresses the natural resistance to the omnipresent tubercle bacillus, and permits of its unopposed progress. These grave sequelæ are certainly more common after measles than after the other members of the exanthemata, and this consideration points to the real necessity for prolonged careful feeding by highly nourishing food and by milk, sterilised or Pasteurised, together with every form of improved hygiene possible.

MEGRIM, MIGRAINE, OR HEMICRANIA.

Upon the first approach of a seizure, even before the advent of pain, when the eye symptoms give warning of an attack, 20 grs. Phenacetin or 10 grs. Antipyrine in solution should be given. Sometimes this treatment prevents the headache coming on and cuts short the attack; more frequently it results in so minimising the severity of the pain that, though conscious of its presence, the patient will be able to move about and attend to his ordinary duties. A second dose in 30 minutes will usually suffice to dispel it altogether.

As these large amounts are not free from the danger of depressing the heart it is advisable to have a routine pain-reliever which can be administered without hesitation as soon as the warnings of an attack are felt, or immediately after the patient awakes in the morning with a severe headache. The following is a good combination:

℞ *Phenazoni* gr. x.
Caffeinæ Cit. gr. vj. *Misce.*

Ft. pulv. s.s. et rept. secundis horis.

5 grs. Hydrobromide of Quinine may be added to each powder, which sometimes prolongs the analgesic effect.

Difference of opinion exists regarding the relative pain-relieving power of the different coal-tar derivatives, as the analgesic which best relieves one patient may possess little influence over another. There cannot be a doubt that each one of them gradually loses its effect when frequently resorted to; the writer believes that for all purposes the combination of Antipyrine and Caffeine is the best routine. It is, however, absolutely necessary in treating severe and oft-recurring attacks of megrim to change from one drug to another from time to time to obtain the best results and to prevent the most suitable drug or combination of drugs from losing its effects.

The physician has the choice of the following series in their approximate doses: Antipyrine, 10 to 15 grs.; Acetanilide or Antifebrin, 4 grs.: Pulv. Acetanilidi Co. (Antifebrin, 7; Caffeine, 1; Bicarbonate of Soda, 2), 5 to

6 grs.; Ammonol, 10 grs.; Antinervin, 10 grs.; Phenalgin, 15 grs.; Exalgin, 2 grs.; Lactophenin, 15 grs.; Phenacetin, 15 grs.; Citrophen, 5 to 8 grs.; Acetopyrin, 12 grs.; Migrainine, 15 grs.; Migralin, 15 grs.; Aspirin, Salacetin, Saletin, Acetysal or Xaxa, 15 grs.; Novaspirin, 12 grs.; Salophen, 12 grs.; Apolysin, 20 grs.; Aspirophen, 15 grs.; Methylene Blue, 3 grs.; Guranine or Caffeine, 5 grs.; Euphorine, 5 grs.; Triphenin, 15 grs.; Salicylate of Soda, 25 grs.; Phenocoll Hydrochloride, 10 grs.; Phenosal, 8 grs.; Salocoll, 15 grs.; Neurodin, 10 grs.; Cryofin, 10 grs.; Phesin, 20 grs.; Pyramidon, 5 grs.; Tolypyrin (Tolylantipyrin) and Tolypyrin Salicylate, 15 grs.; Salipyrin, 20 grs.

Morphia should never be employed for the relief of migraine, and the common practice of heroic purgation by calomel and large doses of salines produces no good results either in relieving the pain or in preventing the attacks. In gouty and rheumatic subjects Aspirin or the Salicylates are decidedly advantageous.

Cannabis Indica in ¼ to ½-gr. doses of the extract is of value for the relief of the continuous headache of mild degree which sometimes remains between the acute seizures.

Nitroglycerin is useless in the ordinary type of the disease, but in a small number of cases where the attacks are closely associated with high blood-pressure it is a valuable preventive, and succeeds when all the analgesics fail even during the acute seizure. Amyl Nitrite may be tried.

Bromides are useless for the relief of the acute attack, but where the attacks become almost continuous—*i.e.*, in the so-called "status hemicranialis"—bromides are of great use. They may be advantageously combined with antipyrine.

℞ *Potassii Bromidi* ʒvj.
Phenazoni ʒij.
Caffeinæ Citratis ʒj.
Spiritus Chloroformi ʒij.
Aquæ Camphoræ ad ʒx. *Misce.*

Fiat mistura. Signa.—"A large tablespoonful for a dose when the attack of headache comes on, and a dessert-spoonful every morning and evening between the attacks."

In most intractable cases where analgesics had lost their effects and life had become unendurable, Whitehead states that he never failed to secure perfect relief by the introduction of an ordinary tape seton into the tissues at the back of the neck. The skin is transfixed by a scalpel, and into the wound is inserted 9 inches of household tape (½ inch wide); the free ends are tied, and the seton is moved a little every day and worn uninterruptedly for a period of 3 months.

The treatment in the intervals between the attacks is an important duty. That there is a strong hereditary or congenital factor in most cases which establishes what may be regarded as a migrainous diathesis is beyond

doubt. This permanent condition in the absence of an exciting cause may rarely or never manifest itself, hence it is of the greatest consequence that in every case a close investigation of the exciting cause of the seizures should be made. When this is discovered and remedied the attacks may be entirely prevented, and never return unless some other severe unavoidable stimulus be brought into operation.

Eye-strain due to errors of refraction (astigmatism, &c.) is a very common exciting cause, and when by suitable glasses these are corrected complete relief follows; but a violent emotional disturbance such as a sudden outburst of passion or grief, or a prolonged mental strain, will precipitate a seizure. Deprivation of sleep and physical exhaustion act like anxiety and grief, and when possible should be avoided. All reflex sources of irritation in the mouth, naso-pharynx, ovaries and intestinal tract should be dealt with. An open-air life with free exercise, and the avoidance of heated, ill-ventilated rooms and irregular hours for rest, must be insisted upon.

Dietetic errors should be corrected, but the part played by the intestinal tract in megrim has been greatly exaggerated. Every migrainous subject discovers that the attacks are as liable to supervene when the bowels are actively working as when constipation exists; nevertheless constipation should be avoided for general hygienic reasons. The toxic effects of certain articles of diet, when not imaginary, must be ascribed to idiosyncrasy, as one migrainous subject can live upon a dietary which another considers to be most injurious. Eggs are an example of this, and it is not unusual for a patient to affirm that this article of diet invariably brings on an attack, whilst investigation elicits the fact from her relatives that the patient often partakes freely, without knowing it, of puddings and dishes containing eggs in large amount, and no harm results.

Strong coffee as a beverage is always useful, and many patients unaccustomed to its use are enabled to ward off mild attacks by drinking a large cupful of the strong infusion on awaking in the morning with premonitory symptoms of a seizure. The diet during the seizure is a simple matter, as the patient is usually unable to take any kind of food; a cup of weak tea may be permitted.

Insomnia between the attacks should be guarded against, as a sleepless night is almost certain in migrainous subjects to be followed by an attack of severe headache next day. A large dose of Bromide with 15 grs. Chloral Hydrate is the most suitable hypnotic; caffeine should not be prescribed for this class of patient unless it be administered early in the morning.

No drug is known which exercises a specific preventive action, but many authorities regard Arsenic in $\frac{1}{15}$-gr. doses as of value. It may be given in pill in combination with $\frac{1}{6}$ gr. Extract of Indian Hemp, and Little adds to each $\frac{1}{3}$ gr. Ext. Belladonna and 2 grs. Valerianate of Zinc.

One of the best routine methods of treating megrim between the attacks is to administer 30 grs. Bromide and 20 grs. Salicylate of Soda every night before retiring to bed.

Electricity in every form has been vaunted in static, galvanic, Faradic and high-frequency currents; the writer has observed good effects by passing a weak continuous current through the head, using 3 or 4 Leclanché cells with one moistened pole over the occiput and the other on the forehead.

In some cases a complete change of environment, with a long holiday in a bracing, mountainous district or a sea voyage may be necessary.

MELÆNA.

The first step is to find out the cause of the bleeding and to remove this when possible. Under Hæmatemesis the agents indicated in bleeding from the stomach are enumerated.

The melæna of duodenal ulcer is a clear indication for surgical procedures, and very copious and repeated gastric hæmorrhages should be also met by gastro-enterostomy.

The drenching of the patient with tannin, vegetable and mineral astringents, turpentine, ergot, &c., is useless, and should never be resorted to in intestinal hæmorrhage. The only resource is to rapidly saturate the patient's blood with Chloride of Calcium by the mouth or rectum, and this is also the best procedure in purpuric conditions.

In gastric or duodenal hæmorrhage Adrenalin solution often proves useful by its local action, but for bleeding low down in the bowel it is worse than useless, since increase of blood-pressure favours the escape of the blood from the opened vessel. Gelatin by the mouth is always admissible in internal bleeding, and the hypodermic administration of Normal Saline solution to make up for the bulk of the blood lost. A small quantity of Calcium Chloride can be added to the serum injected.

The black motions due to iron, bismuth and manganese and those sometimes occurring in a raw-meat dietary and after eating spinach should be distinguished from true melæna.

Melæna neonatorum is a serious and often fatal form of intestinal hæmorrhage which usually occurs within 2 or 3 days after birth, and is due either to microbic causes or to the result of ligature of the cord inducing hepatic or intestinal hyperæmia. Chloride or Lactate of Calcium should be administered in small quantities (2 to 5 grs.) in milk, and external warmth employed to counteract shock. Hypodermic injection of Normal Horse and Rabbit Serum and direct blood transfusion have all been successfully employed. A less formidable and equally reliable method of treatment in this serious emergency is the hypodermic injection of carefully sterilised Gelatin solution, by which Engelmann saved 40 out of 43 cases of this affection.

MELANCHOLIA—**see Insanity and Hypochondriasis.**

MÉNIÈRE'S DISEASE—**see p. 245, and under Tinnitus.**

MENINGITIS, Acute Cerebral, of Childhood.

Confining this title to the simple non-suppurative inflammation of the pia-arachnoid involving chiefly the base of the brain, which is synonymous

with Posterior Basic Occlusive Meningitis, the treatment indicated is that common to all forms of cerebral leptomeningitis.

Absolute rest in a cool, darkened and thickly carpeted room shut off from noise and all source of vibrations is essential. The child may be nursed on the lap with the head kept slightly elevated, when rest in bed is not tolerated. An ice-cap or Leiter's tubes should be continuously applied to the scalp.

Diet is of more importance in the management of this type of cerebral meningitis than in the other varieties, since the affection often runs a chronic course, and the maintenance of life may ultimately depend upon the successful administration of food from the onset. Hence small quantities of diluted milk or suitable infant food should be assiduously administered at short intervals, and resort to early rectal feeding may be required if the stomach is irritable, but soups or animal food in any form should be prohibited.

A smart purge, 1 gr. Calomel or 2 grs. Hyd. cum Creta given in a teaspoonful of Syrup of Senna, may be administered in order to thoroughly evacuate the bowels.

The treatment must be mainly symptomatic; cephalalgia and restlessness may be relieved by Bromides, with 1 or 2 grs. Antipyrine added to each dose. Leeching of the temples and a mustard poultice to the nucha often afford considerable relief.

Vomiting may be controlled by rectal feeding and a sinapism over the epigastric region; though the latter agent is more suitable for the relief of vomiting of gastric origin, it occasionally answers in cerebral irritation.

High temperature must be treated by patient tepid or cold sponging, and sleeplessness which does not yield to bromides should be relieved by a small dose of Chloral.

Lumbar puncture is a valuable agent for the relief of most of the urgent head symptoms, but it is more clearly indicated in the later stages when accumulation of effused inflammatory products is causing increased cerebral pressure.

Though simple acute basic meningitis is widely accepted as being a sporadic form of epidemic cerebro-spinal meningitis, and due to the presence of the *Diplococcus intracellularis*, information is still lacking of the value of intraspinal injections of Flexner's serum in the simple type. In the opinion of the writer the serum should always have a fair trial in every sporadic case where the diagnosis of tubercle can be excluded, especially as it cannot do harm if the cerebro-spinal fluid be first permitted to drain away through the needle before injection.

As the accumulation of the inflammatory fluid in the cerebral ventricles leads to their distension owing to blocking of the iter and the openings from the fourth ventricles, hydrocephalus is liable to supervene. Lumbar puncture is clearly indicated at this stage, though its effects are usually but temporary.

Incision of the tympanic membrane on both sides sometimes affords

marked relief to pressure symptoms, and it should always be resorted to where there is any otitis present.

Mercury unquestionably is of great value in aiding the absorption of the effused liquid, but it must be pushed by inunction till its physiological effects show themselves. This should be resorted to in every case of simple meningitis. The writer has so many times witnessed most striking recoveries from full doses of the metal by the skin after profound coma had almost obliterated all hope of improvement that he believes it to be unjustifiable to abandon the patient to his fate without resorting to vigorous treatment by this drug.

Iodides may be employed alone or in conjunction with mercurial treatment.

Where chronic hydrocephalus follows and the case does not yield to lumbar puncture, the measures discussed under Hydrocephalus must be followed.

The term *chronic* meningitis is sometimes applied to the cases of simple basic meningitis which run a slow course of months, and these are identical with those somewhat rare examples of cerebro-spinal meningitis where the same obstructive factors are at work in inducing acquired hydrocephalus by obliterating the passages between the ventricles and the posterior lymph cistern. The only treatment from which any permanent benefit can be expected after the failure of mercury and iodides lies in the drainage of the ventricles.

The *acute idiopathic internal hydrocephalus of Quincke,* being due to a chronic inflammatory condition of the lining membrane of the ventricle with serous accumulation and no blocking of the iter, yields to lumbar puncture in conjunction with mercurial treatment.

MENINGITIS, Cerebro-Spinal (Epidemic).

Prophylaxis.—Much light has been thrown on the spread of this epidemic disease by a culture of the coccus from swabs taken from persons lately in contact with a victim; these carriers, though in good health, nevertheless harbour the germ of the disease in their naso-pharynx; these carriers may also convey the micrococcus to other carriers who have not been in contact with a person suffering from the disease. Both these kinds of carriers as well as patients in the acute and convalescing stages of the malady spread the disease amongst the members of the community. By the serum test the potentiality of a carrier may be determined, and by the use of antiseptic sprays, Chlorinated Soda, Zinc Sulphate, Carbolic Acid, &c., an attempt should be made to sterilise his throat after he has been isolated. Vaccine methods of dealing with the carrier's infective powers cannot yet be said to have proved successful.

The treatment of a patient suffering from the disease is to be conducted upon the lines laid down for the management of simple basic meningitis. Rest in a darkened room, with the head elevated and ice applied to the shaven scalp, are clearly indicated. The cerebral symptoms—cephalalgia, restlessness, insomnia, &c.—call for palliatives as Bromides, Antipyrine,

and an occasional dose of Chloral or Trional. Leeching behind the ears or over the occiput may be employed; mustard to the nucha or the application of the ice-bag to the spine may afford relief to the acute spinal symptoms. Blistering over occiput or nucha should never be employed owing to the danger of sloughing. Morphia, though generally contra-indicated in other forms of meningitis, may be safely employed to relieve violent spinal pain, and is especially indicated hypodermically, when the vomiting is uncontrollable by other methods. Fever should be reduced by continuous cold sponging, or in the case of children by tepid bathing.

No antiseptic drug possesses any specific action upon the growth and development of the *Diplococcus*. The only hope lies in Lumbar Puncture, which should be immediately resorted to, and after about 30 c.c. of fluid has been drawn off the same amount of Flexner's polyvalent serum should be injected by gravity. The injection should be repeated in 6 or 8 hours if the spinal fluid has been noticed to be turbid; a dose every day or every second day for 6 or 7 times may be necessary in severe cases if the turbidity returns. Mild cases will be met by 1 or 2 injections. Acute fulminating examples of the disease terminate sometimes in a few hours, and will probably prove invulnerable to the serum, but when possible they should have the advantage which the serum alone holds forth.

Some authorities rely upon lumbar puncture alone repeated every day till the fluid loses all traces of turbidity. There is also difference of opinion about the relative values of the different sera, but Robb, who has had much experience in two epidemics, insists upon the great superiority of Flexner's. The theory of the necessity of an autogenous serum is certainly true, but before such can be prepared the patient is beyond the reach of treatment, as the time element is a vital factor in every case. Halahan after puncture washes out the spinal canal with ½ per cent. Carbolic Solution before injecting the serum.

Vaccine treatment by living and sterilised cultures has yet to be proved of any real value; most of the cases hitherto so treated have also been subjected to repeated tappings.

The suggestion of tilting up the foot of the bed so that the patient's cerebral vessels become congested (a modified Bier's Method) has been tried; it is useless unless combined with puncture and serum treatment.

Where acquired hydrocephalus has commenced to manifest its presence through blocking of the communications between the interior of the ventricles and the posterior lymph cistern, lumbar puncture cannot be expected to exert any but the most temporary relief. At this period, after the cessation of fever and toxæmia, a trial of Mercury and Iodides is clearly indicated, and as in the hydrocephalus which follows simple basic meningitis, when these agents fail, resort to drainage of the ventricles as described under Hydrocephalus should be gravely considered.

MENINGITIS, Cerebral (Purulent).

The treatment is in the first place that of the primary condition causing it. Wounds of the scalp, injuries and disease of the cranial bones, ery-

sipelas of the face and scalp, admit of easy access of the pus-forming organisms through the veins of the diploë. General infective processes as typhoid fever, pneumonia and smallpox, ulcerative endocarditis, pyæmia, &c., may bring the pyogenic microbes to the meninges through the blood-stream. But the great proportion of cases of purulent meningitis is caused by otitis media, caries of the petrous bone, sinus phlebitis, disease of the mastoid cells, nasal fossæ or naso-pharynx, frontal sinus or orbit, in which cases the infective meningeal inflammation is liable to be complicated by cerebral abscess.

From the consideration of the above causes the solution of the problem of *prevention* is obvious. Free evacuation of all purulent collections in connection with the scalp, bones, ear, frontal sinuses and orbit should be promptly executed. Trephining of the mastoid cells and incision of the tympanic membrane will secure immunity when practised early. The rigid disinfection of all scalp wounds and the establishment of efficient drainage once pus has shown its presence is essential, and this is equally imperative in erysipelas when the signs indicate that suppuration beneath the aponeurosis has supervened.

Once the meninges have become involved the treatment must be mainly symptomatic and carried out on the lines indicated in the other types of acute cerebral meningitis.

A smart cathartic—Calomel followed by a saline or 1 min. Croton Oil—should be administered. The patient should be placed in bed with the head elevated, and ice applied to the shaven scalp and leeches applied behind the ears. Fever, cephalalgia, vomiting, delirium, restlessness, insomnia, &c., are to be treated by agents employed on recognised principles. The presence of any of the primary causes above enumerated should be carefully sought for and promptly dealt with if this has been previously overlooked. Depressed bone should be elevated or removed and subdural abscesses evacuated by trephining. Mastoid trephining or gouging, incision of the tympanum, and the surgical procedures detailed under Ear Diseases are to be carried out when the signs indicate otitis media. When localising symptoms are present the methods of opening the skull for the relief of cerebral abscess or sinus phlebitis are clearly indicated.

Lumbar puncture may be resorted to in all cases where the cerebral pressure is high, and the spinal fluid may be allowed to flow till the rate of its exit through the needle demonstrates that the pressure has been reduced to the normal, and the operation may be repeated from time to time with advantage. Where lumbar puncture fails to relieve the high cerebral pressure, some surgeons recommend even in the absence of localising symptoms that the vault of the cranium should be trephined and the dura mater freely incised, as has been done with temporary advantage in rapidly growing cerebral tumours to reduce the tension.

Mercurialisation by inunction should be resorted to in all cases where operative procedures are not indicated, in order to give the comatose patient any benefit which may possibly be obtained by hastening the

absorption of effused fluid outside the cerebrum or in the interior of the ventricles. Occasionally life may be saved by this procedure.

Autogenous Vaccine may be tried in cases running a slow course uninfluenced by surgical measures.

MENINGITIS, Cerebral (Syphilitic).

This is a chronic ailment affecting the membranes usually at the base of the brain, and since it forms the chief feature in the clinical picture recognised as Syphilis of the Brain the term is usually accepted as a synonym for brain syphilis.

The treatment will depend upon the length of the interval which has elapsed between the primary symptoms of the original syphilis and the advent of the cerebral signs. When the latter appear towards the end of the secondary stage or soon afterwards, vigorous mercurial treatment will very probably cause complete resolution of the small-celled inflammatory growth infiltrating the pia mater and extending along the arteries. Inunction should be commenced promptly. 1 dr. of the B.P. Ungt. Hyd. should be rubbed in daily till the effect of the metal upon the gums becomes evident, after which the inunctions should be suspended for several days, to be again renewed as soon as the signs of salivation fade. Salvarsan is clearly indicated in such cases, or Bacelli's intravenous method of introducing the Cyanide of Mercury into the circulation should be resorted to; 15 mins. of a 1 per cent. solution should be injected, and the effects kept up by inunction with mercurial ointment for a period of 8 weeks or by the intravenous administration of mercurialised serum.

As the disease shows a constant tendency to relapse, mercurial treatment must be renewed in short courses every 6 to 12 months; during the intervals Iodides in large doses should be steadily administered.

When meningeal signs and ocular paralyses, &c., manifest themselves in the tertiary stage, Mercury should also be employed, as spirochetæ have been found in the brain lesions even after the lapse of several years from the primary attack. It cannot, however, be pushed as fearlessly as in the early cases, and reliance must be placed on large doses of the Iodides, which to be of use must be given boldly and for long periods.

Much advance has been made by the new method of administering Salvarsan or its substitutes and Mercurial salts by the spinal canal route. These have been enumerated under Locomotor Ataxy, where the technique of Auto-Salvarsanised Serum administration has been described. The danger of salvarsan in the presence of advanced degenerative changes in the kidney, heart or brain must not be forgotten, but when the symptoms and signs become grave even in syphilitic meningitis it should have a trial, but always in conjunction with mercury and iodides.

In a case under the writer's care, where a well-marked early attack of cerebral tumour 15 years previously yielded to inunctions of mercury, a grave seizure occurred accompanied by hemiplegic symptoms with aphasia and followed by coma of several days' duration. As the power of swallowing was lost, 40 grs. Iodide of Sodium dissolved in 2 oz. water were admin-

istered by the rectum every 8 hours for a month, more than ½ lb. of the salt being injected and retained. The rectal injections were continued after swallowing power returned because they gave rise to no irritation; the patient's condition steadily improved and the paralysis and aphasia gradually disappeared.

Even in the most chronic cases a short course of mercurial inunction is always clearly indicated, though the iodides must be persevered with as long as there is any possibility of gummatous formations being left unresolved. While gummata may remain quiescent in the periosteum of the long or flat bones and in other structures, their pressure is destructive to the delicate tissue of the brain, and treatment must be prompt, vigorous and long-continued.

MENINGITIS, Cerebral (Tuberculous).

Prophylaxis.—There cannot be a doubt that primary cases of tuberculous meningitis often arise in children fed upon the milk of infected cows, but this source of infection is more likely to operate at a later date through infection from the mesenteric glands. The fine meshwork of these glands in very young children filter out the bacilli and protect the blood-stream for an indefinite period, till some softening or breaking-down of the gland tissue causes a secondary infection which may suddenly manifest itself in the meninges or in an attack of acute general tuberculosis. Hence the importance of sterilisation of the milk supply of children brought up mainly upon this food as detailed under Mesenteric Gland Disease.

The disease occasionally shows itself after partial surgical measures for the relief of lupus, bone and gland disease: such operations should be condemned unless complete removal of the tuberculous foci can be carried out. When once the cerebral symptoms have shown themselves, the treatment must be entirely symptomatic and palliative. Vaccine therapy is powerless owing to the rapidity of the progress of the disease, and if the meningitis is but a local manifestation of a general invasion this form of therapy only precipitates the final issue. Rest in a thickly carpeted and darkened room free from all noise and vibration is essential. The hair over the scalp should be shaved or clipped close with scissors, and the ice-cap, Leiter's coil or iced cloths kept continuously applied. Headache may be further relieved by leeching the temples or mastoid region and by a sinapism to the nucha, but blistering this region or the scalp should not be practised, as this interferes seriously with the comfort of the patient as he usually lies upon his back. Antipyrine combined with Bromides in large doses may be pressed in the presence of severe restlessness, intense cephalalgia and photophobia, and Chloral Hydrate may be given to induce sleep, opiates being contra-indicated. A full dose of Calomel for the clearing out of the alimentary canal is a usual routine.

Only liquid nourishment as small amounts of diluted or peptonised milk should be administered at brief intervals, soups and animal foods being clearly contra-indicated. Fever must be controlled by assiduous cold or tepid sponging, each portion of the body being submitted to the

treatment seriatim. The movement of the body entailed by immersion in the cold or tepid bath, except in the case of young children, should be avoided.

Lumbar puncture can be at the best but palliative; nevertheless as a means of reducing cerebral pressure and agonising headache it may be resorted to when the suffering is extreme. When lumbar puncture has been followed by recovery, probably the attack was one of simple basic meningitis.

Mercury has been universally discountenanced in the treatment of an obviously tuberculous meningitis, though unquestionably it possesses the power of diminishing the cerebral tension during the later stages of the diseases by causing the absorption of serous or inflammatory fluid within the ventricles or in the arachnoid space. The writer does not hesitate to advocate inunction in every case where there is a reasonable doubt about the diagnosis, and it cannot be denied that in practice such cases are numerous. The rubbing in of weak mercurial ointment causes no discomfort, and cannot possibly do harm in a disease which is practically always fatal. He has insisted upon inunction even when the diagnosis seemed to be fairly certain and the case appeared to be hopeless, and has seen recovery follow; the diagnosis in such cases was almost certainly in error. But where as in the great majority of all examples of accepted tuberculous meningitis the fatal issue of the disease was not averted, the suffering was alleviated and never increased by mercurialisation.

Iodides in large doses appear not only to relieve headache, as they sometimes palliate other forms of pain, but they assist the action of mercury, and may be employed in conjunction with inunction in slowly progressive types of the disease.

Tapping of the ventricles alone or accompanied by drainage, trephining and other operative procedures appear to only hasten the fatal issue, often without affording any temporary relief.

MENINGITIS, Spinal.

This is rarely met with as a primary affection, being generally an extension along the spinal membranes of the mischief due to the tubercle bacillus, to the *Diplococcus intracellularis* or to the pyogenic organisms causing a septic cerebral meningitis. Occasionally it may be the result of the direct infection in carbuncle or bedsores without involving the cerebral meninges.

The treatment is that already detailed under cerebro-spinal fever and the other types of meningeal inflammation. Absolute rest in bed on the side or with the face downwards and the application of the spinal ice-bag, free dosage with Bromides and Iodides and mercurialisation. Lumbar puncture should be resorted to early, and may be repeated at intervals as long as the fluid is ejected under abnormally high pressure through the needle. Counter-irritation of the spinal region by blistering or the cautery has its advocates.

Where the affection has resulted from punctured or gunshot wounds

involving the spine (external pachymeningitis) the surgical procedure should be carried out on the lines indicated in septic cerebral meningitis.

Chronic spinal meningitis is generally a manifestation of syphilis, and is allied or identical in its treatment to syphilis of the brain, already detailed. Horsley regards the affection as a pachymeningitis, in which a history of syphilis is not always to be found. He advocates laminectomy, incision of the sheath of the cord and flushing with a 1 in 1,000 Perchloride of Mercury solution, as recommended by Cushing, the skin wound being sealed up without drainage. Inunction with mercury or the intravenous method of Bacelli should be resorted to in all cases.

The method of administering Auto-salvarsanised Serum or Mercurialised Serum by the spinal canal as described under Locomotor Ataxia has proved successful in many cases of late years which otherwise would have been hopelessly invalided.

The treatment of *chronic internal* or *hypertrophic pachymeningitis* of the cervical region is as unsatisfactory as is that of the allied cerebral affection known as Hæmatoma of the Dura Mater. No drugs exert any specific action over the peculiar hæmorrhagic tendency in the spine or cerebrum. The only hope lies in rapid mercurialisation and counter-irritation, as a percentage of the cases show a syphilitic history.

The treatment of the *chronic external pachymeningitis* which sometimes forms a part of tuberculous softening of the spinal column is identical with that of the compression myelitis present.

MENORRHAGIA.

An increased loss at the menstrual epoch may take the form either of a prolongation of the normal period of hæmorrhage, a more profuse discharge while the period lasts, a shortening of the normal interval or of a combination of these. In the worst cases the normal periodicity is masked and the bleeding comes irregularly, the interval being shortened or practically absent (metrorrhagia).

No treatment of the condition is satisfactory which does not take account of the cause and aim at its removal, and there are few complaints in which the routine use of a stock remedy, before a proper diagnosis is made, is so likely to lead to disappointment and discredit to the practitioner. It should be always remembered that uterine hæmorrhage may be due, not to any fault in the uterus or pelvic organs themselves, but to interference with the venous return, as in mitral disease with back pressure or in hepatic disease such as cirrhosis with portal obstruction. Anæmia, scurvy, phthisis and the infectious diseases may cause excessive menstrual loss. The treatment of any of these conditions, which will be found under the appropriate headings, is, of course, much more important than the treatment of the menorrhagia, and really includes it.

In most cases, however, a local cause is to be found for excessive menstrual loss, and in considering the treatment I propose to group these cases as follows:

1. *Menorrhagia in Puberty and Adolescence.*—Excessive loss in young

women just after puberty may be due to defective development of the uterus associated with chlorosis, or in rare cases to an excess in development of the uterus. Later on the hæmorrhage may be caused by some form of endometritis, either a hypertrophy of the endometrium associated with dilatation of the capillaries (hæmorrhagic endometritis) and often with erosion, or less commonly a thin and atrophic endometrium. A mucous polypus may be present, or the ovaries may be the seat of follicular or lutein cysts or of a dermoid cyst. The possibility of the hæmorrhage being due to an abortion or to an extra-uterine pregnancy should not be lost sight of.

In treating menorrhagia at puberty the practitioner should be warned against being too hasty in making local examinations or in applying local treatment. One of the most important remedies is *rest*, and the patient should be warned to abstain from all violent exercise, dancing, bicycling, long walks or active games for two or three days before the period is expected. If this measure does not restrain the hæmorrhage she should rest in bed for two or three days, beginning, if possible, before the onset of the flow. Such treatment continued for six months to a year often results in cure. Proper hygiene in regard to food, clothing and sleep should be insisted on, and measures should be taken to insure a proper evacuation of the bowels every day. For this purpose nothing is better than a saline aperient mineral water first thing in the morning, or, what is much cheaper and as efficacious, Epsom or Rochelle salts in a tumbler of warm water. The dose should be gauged so as to give one free motion per day. As regards drug treatment, Iron should be avoided, as it does not suit these cases. Arsenic, Quinine and Strychnine are valuable remedies. They may be combined as in the "Tabloid":

℞. *Quin. Sulph.* *gr.* j.
Acid. Arsenios. *gr.* $\frac{1}{20}$.
Strych. Sulph. *gr.* $\frac{1}{30}$.

Signa.—"One three times a day after meals."

Ext. Viburni Prunifolii in drachm doses is a useful drug. Styptol is recommended in grain doses thrice daily during the intermenstrual interval, and in 1½-gr. doses every three hours during the period itself. Iodal in 1 gr. doses three times a day may be given. Calcium chloride seems likely to be of service in cases associated with chlorosis; it may be given in 5-gr. doses thrice daily during the interval and more frequently during menstruation. Ergot and Ergotin are not very suitable for these cases and are best avoided. The injection of Pituitrin (1 c.c.) has been highly recommended, and in cases associated with obesity small doses of thyroid gland extract may be tried. Injections of normal serum up to 200 c.c. have been given with good effect.

If the hæmorrhage is excessive in amount or continues in spite of a faithful trial of the remedies indicated above, a local examination should be made. An anæsthetic should always be given, both to spare the

patient's feelings and because anything like a thorough pelvic examination is almost impossible in a virgin who is not anæsthetised. The practitioner should obtain permission and should be prepared to carry out at the time any minor operative treatment which the examination may show to be necessary. In most cases which have reached this stage it is advisable to dilate and curette the uterus (see under Endometritis: Curettage), and this may have to be repeated on one or two occasions before a permanent cure is attained. An erosion of the cervix may require to be shaved off, or a mucous polypus of the cervix may be grasped by the base and twisted off, the site of attachment being then thoroughly curetted. If cysts of the ovary or dermoids are present, the position must be explained to the relatives and suitable measures taken to deal with the condition. It may be well to warn the impetuous that because a slightly enlarged ovary is to be felt it is not always necessary to arrange for its immediate removal or mutilation, and that it is well first to try the effects of curetting and resuming general treatment for another three months or so.

2. *Menorrhagia in Virgin Adults.*—Most cases coming under this category are caused by the presence of a tumour, either ovarian or uterine fibroid or a cervical erosion, with, as age advances, increasing probability of a malignant growth of the body of the uterus, though in a minority tuberculous or hæmorrhagic endometritis may be responsible for the bleeding. Such cases are not, therefore, likely to derive much benefit from general or drug therapy, and a local examination should not be too long delayed, otherwise permanent damage may be done to the system by the continued drain of blood. The treatment will depend on the finding at the examination (see Ovarian Tumours, Uterine Fibroids, Cancer of Uterus, Endometritis).

3. *Menorrhagia in Married and Parous Women.*—In this group of patients, which includes, of course, those who have the misfortune to be neither maid nor wife, a large number of causes may give rise to menorrhagia. These may be divided roughly into three main classes, and as no possible objection to an immediate vaginal examination can be urged, the practitioner should lose no time in deciding what is really the matter with his patient.

(1) *Menorrhagia as the Result of Inflammation.*—Foremost in this group is gonorrhœal inflammation, and the hæmorrhage may be associated with acute or chronic endometritis, with salpingitis or pyosalpinx, or with ovarian abscess; indeed, its development may be the first sign which brings the patient under the notice of the physician in cases of involvement of the uterus, tubes or ovaries in an attack of gonorrhœa. The treatment of the menorrhagia is subordinate to that of the disease which is its cause; it consists in an endeavour to lessen congestion and to promote the elimination of the microbe by hot douches, swabbing the uterus with antiseptics such as phenol, and the use of glycerin and subitol tampons, to be followed by surgical measures if required, such as curetting, removal of pus tubes, &c. (see under Endometritis, Gonorrhœa, Pyosalpinx). Puerperal inflammation is more acute, and clears up more

completely than gonorrhœal. It may leave sequelæ in the shape of ovarian or tubal suppuration which sometimes give rise to menorrhagia and which should be treated by the drainage or complete removal of the suppurating foci. Finally, menorrhagia may be due to a tuberculous inflammation of the endometrium, which is practically always secondary to tubal tuberculosis, and should be treated as detailed under Endometritis. Much benefit may be looked for from the administration of Tuberculin; $\frac{1}{20000}$ milligramme should be injected and the result carefully watched. The initial rise of temperature should be allowed to subside, and a full fortnight should elapse after the first injection before a second is given. If the reaction is excessive, the patient being made extremely ill and her condition not improved after a few days, too large a dose has been given and half the quantity should be injected on the next occasion. On the other hand, if there is no rise of temperature and no reaction, the dose is probably too small and a larger one should be given, or a mistake in diagnosis has been made.

(2) *Menorrhagia due to Puerperal Causes.*—The uterine hæmorrhage may be due to abortion threatened or inevitable. As a rule this is recognised by the patient herself, and the treatment should follow the lines laid down under Abortion. The presence of moderate loss lasting for a considerable time, say 10 to 14 days, and appearing slightly before or after the usual time in a patient who is otherwise perfectly regular, should put the practitioner on his guard against a possible extra-uterine pregnancy. If examination shows that the fear is well grounded, the appropriate treatment should at once be instituted (see Extra-uterine Pregnancy).

The incomplete expulsion of the ovum from the uterus, either before or at full term, is a fruitful source of both menorrhagia and metrorrhagia. A fragment of placenta left adherent to the uterine wall undergoes hyaline degeneration itself and induces in the neighbouring endometrium a condition of vascular dilatation which makes its presence felt both by increased flow at the normal period, and by anomalous and frequently profuse hæmorrhages at other times. For such a condition there is only one remedy—the removal of the retained fragments by the curette. The use of ergot, iron and other drugs is unjustifiable, as it simply exposes the patient to the risk of developing a profound secondary anæmia without affording the slightest hope of removing the cause of the trouble. In curetting for retained fragments of placenta, considerable care is necessary, especially if the retention is of old standing, as the uterine wall at the site of the attachment is often much thinned, and may easily be perforated by injudicious use of force. After curetting, the uterus should be packed with iodoform gauze, to be removed next day, and douches should be given for a week. Sometimes the retained fragment is of considerable size and stands out from the uterine wall forming a placental polyp, which may be twisted off with forceps and the base curetted.

A post-puerperal condition which gives rise to menorrhagia is chronic inversion of the uterus, most likely to be confounded with a fibroid polypus, but distinguished from it by the fact that *per rectum* the fundus

of the uterus is felt to be absent, and a dimple is made out in the abdominal aspect of the cervix. For the appropriate treatment, see Uterine Displacements: Inversion.

A fairly common cause of hæmorrhage is the condition known as subinvolution of the uterus. The organ is enlarged and firm. If the condition is recognised within a few months of the labour, Ergotin in ½-gr. doses three times a day may be given, or Ext. Hydrastis Canadensis, 30 mins. in water three times a day, or a pill—

℞ *Aloin.*
Ext. Nuc. Vom.
Pulv. Ipecac. *āā gr.* ⅓. *Misce.*
Ft. pil. Cpt. i. t.i.d. p.c.

may be given. If these measures fail to produce involution, the most satisfactory treatment is to curette and pack with iodoform gauze, to be followed by daily warm douches, and the administration of ergotin or hydrastis canadensis.

We have, finally, the condition known as "fibroid metritis" or "arteriosclerosis of the uterus," which causes a most intractable form of menorrhagia. The uterus is enlarged, very firm and feels gritty to the curette. A good deal of evidence has recently been accumulated tending to prove that this condition is syphilitic in origin, at least in a large number of cases, and cures have been reported after the use of iodide in large doses. Curetting and packing with gauze should first be tried, but in established cases of this disease the only treatment which affords relief is the removal of the uterus.

(3) *Menorrhagia due to Tumours.*—The form of tumour which is the most common cause of menorrhagia in the middle decades of sexual life is uterine fibroid and the allied tumour adeno-fibroma, which is responsible for some of the most inveterate cases of menorrhagia. It should be remembered that the amount of bleeding bears no relation to the size of the tumour, and that quite a small submucous or polypoid fibroid, causing an inconsiderable amount of increase in the size of the uterus on bimanual examination, may give rise to profuse and even dangerous hæmorrhage. With a patient aged over thirty the practitioner should be on his guard against the possibility of malignant disease either of the cervix or body of the uterus, and it is as well to have a microscopic examination of the scrapings made by a competent pathologist in every case in which curetting has been done for the relief of menorrhagia. Sometimes the symptom is caused by ovarian or tubal tumours, dermoid cysts almost invariably giving rise to increased loss, probably through their proneness to inflammation with consequent pelvic congestion. The treatment of this group of cases of menorrhagia resolves itself into the treatment appropriate to the form of tumour present (see under Cancer, Uterine, Ovarian Tumour, Uterine Fibroid).

4. *Menorrhagia at the Menopause.*—As it is from the fortieth year

onwards that cancer of the uterus is most commonly found, and as the disease is a very common one amongst women, who are doomed by it to a certain, a painful and a distressing death, from which their only hope of escape lies in early hysterectomy, I should like to impress on every practitioner the folly and even the criminality of prophesying smooth things in regard to hæmorrhage at the time of the menopause without making a thorough examination of the patient. Only too often a patient is deluded into the belief that the loss is a normal occurrence at her time of life; only too often she wastes months drinking ergot while a cancer of the cervix is growing, until operative removal is futile and hopeless. *When a woman over forty complains of hæmorrhage, the wise practitioner assumes that the hæmorrhage comes from a cancer until he has proved that it does not.* To prove the point, he will make an immediate vaginal examination, and will curette and have the scrapings microscopically examined. The curetting will cure a senile endometritis, which may be the cause of the hæmorrhage. Other causes, such as a cervical polypus or a fibroid, may be present about the time of the menopause, and will be discovered in the course of a routine examination. The treatment of these several conditions will be found under the appropriate headings.

In summing up the whole question of treatment, it will be seen by what I have already said that not much faith can be put in drugs. The most useful are Ergotin (½ gr. in pill), Ergot (15 to 30 mins. of Liq. Ext.), Ext. Viburni Prunifolii (30 mins. to 1 dr.), Styptol (1 gr.), Hydrastis Canadensis (15 to 30 mins.) or Hydrastin (¼ gr. in pill). Locally, swabbing with a caustic such as iodised phenol, pure carbolic acid or pure formalin, the glycerin and ichthyol tampon and the hot douche are of service in inflammatory cases. Of general measures, rest is most important, and a smart saline purge is useful. Iron should be looked on as a remedy to combat the resultant anæmia, not as a measure for checking the hæmorrhage.

When the loss is going on and is profuse enough to be alarming in spite of rest in bed, it may be necessary to check it for the time, and this may be done by packing with iodoform gauze. The most effectual method is to pack the uterus, which must be done with careful antiseptic precautions. This can, however, rarely be done without dilating the cervix, and if the cervix be dilated it is wiser to curette before packing. When the cervix is not sufficiently dilated, the hæmorrhage can usually be stopped for the time by packing the vagina firmly with gauze or cotton swabs as described under Abortion. In the majority of cases the curette is the simplest, safest, and quickest method of stopping the hæmorrhage. After it has been used, the uterus should be packed with iodoform gauze, which is allowed to remain in place for 24 hours. The treatment of tumours causing hæmorrhage usually requires the assistance of a specialist.

Radiotherapy in Menorrhagia.—A very large amount of work has been done within the past few years in connection with the treatment of various forms of menorrhagia by means of X rays or of radium emanation.

The therapeutic effect seems to be due to the " hard " or gamma rays in which radium emanation is specially rich, while the X-ray tube by the use of suitable metal filters may be utilised as a source of them. The primary effect of the rays is probably in most cases the production of ovarian atrophy with consequent menopause, but in the case of tumours such as myoma or cancer a destructive effect is also produced on the tumour cells, sufficient in most cases to lead to the diminution in size or even to the total disappearance of the tumour macroscopically. The details of the treatment should in all cases be left to an expert radiologist, and it is advisable that the advice of a gynæcologist should also be taken lest an error in diagnosis be made and valuable time be wasted. Generally speaking, the cases most suitable for radiotherapy are those in which fibroids or inoperable cancer are the cause of the bleeding. Cases of so-called " hæmorrhagic endometritis " which fail to benefit by ordinary methods of treatment should also be given a course of radiotherapy before the last resort of hysterectomy is decided upon. The cases unsuitable for this form of treatment are those occurring in young women, on account of the likelihood of bringing on a premature menopause with consequent sterility; those in which inflammatory disease exists, especially if associated with suppuration in the tubes or ovaries; cases of degenerated, gangrenous or submucous fibroids or cases of early and operable cancer. The best results are attained in patients who are already approaching the menopause. The principal ill effect that has been observed is an increase of the hæmorrhage immediately after the commencement of treatment.

Where the hæmorrhage has been severe enough to cause collapse, saline transfusion or injection, with other measures necessary to combat the collapse, will be required. (See under Hæmorrhage and Shock.)—R. J. J.

MENSTRUATION, Disorders of—see under Amenorrhœa, Dysmenorrhœa, and Menorrhagia.

MESENTERIC-GLAND DISEASE.

This may be regarded as being practically always the result of tuberculous invasion through the gastro-intestinal tract, caused by the use of uncooked milk from infected cows. Pathological research has demonstrated abundantly the fact that the tubercle bacillus may rapidly pass through the intact intestinal epithelium without leaving any local evidence of its point of entry. Thus the writer in his Cavendish Lecture (1908) has shown that the bacilli when injected into the stomach of the guinea-pig were detected by Symmers and himself in stained sections of the lungs a few hours later. Calmette and Guérin in a highly important research claim to have established the fact that when a similar experiment is performed upon a *very young* guinea-pig the bacilli are arrested by the mesenteric glands because the mesh or network in these organs is much closer than in adult animals. Behring advances the view that these

filtered out and quiescent bacilli may years afterwards find their way into the lung and originate phthisis.

The above researches demonstrate the vital importance of preventive measures which may be easily and effectively carried out by sterilising the milk-supply.

Once mesenteric-gland enlargement has been detected, the treatment becomes clear and imperative. Open-air life, overfeeding and the improved hygiene which constitute the essentials in the treatment of every form of local tuberculosis should be perseveringly carried out. Mesenteric-gland disease has been demonstrated to be more amenable to such treatment than are the ordinary forms of tuberculosis. Even where involvement of the peritoneum and bowel has already occurred the results of abdominal section have proved how readily tubercle in this portion of the body may be successfully overcome, as detailed under Peritonitis, Tuberculous. Every aid, however, should be pressed into the service of the physician in the struggle against the encroachments of the bacilli once they have entrenched themselves in the mesenteric glands, especially in view of the theory of Behring just mentioned. Cod-Liver Oil, Malt Extract and Creosote internally should be employed. For many years the writer, in mesenteric disease and other affections associated with marked wasting employs cod-liver oil by the inunction method at the same time that he administers the drug by the mouth. This can be carried out in the following manner:—After a warm bath, the skin being thoroughly dried by friction with hot towels, a tablespoonful or more of Cod-Liver Oil is rubbed by the palm of the hand into the front and the sides of the abdomen, especially into the skin in the inguinal regions. A flannel roller is bound round the abdomen, reaching from the pubes to the middle of the sternum. Over this, and covering it in at all points, is applied a broad piece of moderately strong mackintosh sheeting. The friction should be continued night and morning for the first four or five days, the same soiled flannel being reapplied each time. Soon this becomes saturated with the oil under the impervious sheeting, and as the little patient twists, cries or coughs during the day and night, the oil is rubbed in incessantly. After the saturation of the flannel only one fresh and free application need be made in the day. The patient's clothes or linen are not much soiled, but the odour becomes very objectionable to the patient's friends, though he soon appears to become insensible to the discomfort himself. The binder need not be changed oftener than once in ten days.

The writer in 1875 first became satisfied about the value of cod-liver oil inunction, after observing its effects in one instance in an emaciated, scrofulous child, whose abdomen seemed distended with fluid almost to bursting, the umbilicus being protruded like the finger of a glove. The parents, believing the case to be hopeless, refused to permit tapping. The inunction was, however, persevered with, and after many weeks the patient recovered. A mass of enlarged glands, around which the great epiploon was probably matted and adherent, slowly and steadily disappeared. This child became a strong, healthy man, but died 25 years

afterwards from acute pulmonary phthisis, affording an illustration of the probability of Behring's theory already mentioned.

Vaccine therapy by injections in small doses is clearly indicated in all forms of abdominal tuberculosis, the Human Tuberculin being selected.

METRITIS.

Metritis and endometritis are most frequently found occurring together, the most rational view being that metritis as an idiopathic affection does not exist, but when present is always secondary to endometritis. The modern view is that metritis is a combination of endometritis, myometritis, and perimetritis, with the endometritis as the essential factor. The chief indications for treatment are identical in each case, and as these have been already detailed under Endometritis they need not be repeated.

The condition known as "fibroid metritis," in which hæmorrhage is the main symptom, and the uterus is usually hard, firm and enlarged, is probably syphilitic in origin in most cases and should be treated with iodide of sodium or potassium. If these fail to relieve it, hysterectomy may be called for owing to the uncontrollable bleeding.

MIGRAINE—see **Megrim**.

MILIARIA RUBRA.

This affection is known also as Lichen Tropicus or L. Papulosa, or Prickly Heat, and is closely allied to or identical with Strophulus Infantum of Red Gum, which affects overclad infants soon after birth. The disease is always the result of excessive warmth, usually affecting the cutaneous parts which are covered by the clothing.

The treatment consists in removal when possible to a cooler locality and the substitution of open-meshed cotton or silk fabrics for closely woven woollen or flannel under-garments.

In the tropics the best fabric is one made of large-meshed material consisting of a mixture of silk and woollen fibres; alcohol and excessive exercise should be forbidden, and muscular work should be performed in the early morning or evening hours. Too much bathing and soap are to be avoided, and it is a good plan to anoint the skin every morning with a pure animal fat or olive oil as a prophylactic. In the case of infants the free use of a dusting-powder, as Fuller's Earth mixed with one-fourth its weight of Boric Acid and Zinc Oxide, or any soothing evaporating lotion such as is suitable in acute eczema may be applied to parts severely irritated; thus Diluted Liquor Plumbi, with 2 per cent. Liq. Carbonis, is very efficacious, or a weak Spirit Lotion, 1 in 10, with Calamine, may be employed to check sweating.

Miliaria or Sudamina—the sweat-rash which accompanies excessive perspiration in various febrile conditions—usually passes off without treatment.

MOLE PREGNANCY.

When the diagnosis has been made clear by the escape of some of the characteristic vesicles or fluid contents of the uterus, and there is any

evidence of hæmorrhage, the physician should proceed to remove the uterine contents without delay by dilating the os by means of metal dilators or Barnes' bags. At the same time Ergot should be given in full doses.

Where hæmorrhage is copious, plugging may be performed till the canal or os is sufficiently dilated to admit the dilator or finger; in some cases rapid dilatation may be necessary. After the dilatation has been accomplished in the absence of uterine pains following the internal administration of Ergot, Ergotin should be given hypodermically, and the uterus emptied by expression from above, after which the case may be treated as one of premature birth or abortion.

It is highly desirable that all the diseased products be removed from the uterus, but in using the curette for this purpose it should be remembered that the uterine wall is invaded by the mole, and great care should be taken to avoid a perforation. Curetting may have to be repeated if hæmorrhage recurs. The prolonged administration of a mixture containing Ergot, Quinine and Strychnine may be indicated with the view of producing steady contraction and hastening involution.

℞. *Extracti Ergotæ Liq.* ʒvj.
Tinct. Nuc. Vomicæ ʒiv.
Tinct. Digitalis ʒij.
Tinct. Quininæ ad ℥vj. *Misce.*

Fiat mistura. Capiat cochleare medium quater in die ante cibos ex paululo aquæ.

MOLES.

These when causing any unsightly deformity should be excised by a clean cutting operation, which will permit of the edges of the wound being brought together in a line with any skin curves or markings to minimise the effects of the cicatrix. The removal of extensive growths will necessitate skin-grafting by Thiersch's method. The plan of excision by caustics and corrosive substances is now abandoned. Babcock infiltrates the skin by a fine needle, injecting a few minims of Quinine and Urea Hydrochloride (33-50 per cent.), which causes necrosis of the affected tissues.

Where a large hairy mole on the face cannot be removed without causing deformity the hair, by being constantly shaved, may minimise the unsightliness, but the irritation or stimulation of the hair bulbs will lead to increased growth of the shafts through continual shaving; hence electrolysis should be resorted to, but in very extensive hairy moles the prolonged use of the Röntgen rays gives much more satisfactory results by destroying the bulbs.

Prolonged exposure to the rays in conjunction with Electrothermic Coagulation or diathermy should be the routine treatment for all cases of degenerating moles. Rodent ulcer, melanotic cancer, and neuromata sometimes owe their origin to moles, and this is a strong reason, apart

from cosmetic considerations, for their excision in every case where they show the least signs of activity, and large pigmented moles on the dorsum of the foot are believed to be especially prone to induce melanomata, and should be excised by the knife during childhood.

MOLLITIES OSSIUM, OR OSTEOMALACIA.

Bossi, finding that the removal of one suprarenal capsule in the sheep was followed by softening and brittleness of the bones, has tried Adrenalin injections in human osteomalacia and reports complete cure. If this result be confirmed much of the mystery in the pathology and treatment will be cleared up. Phosphorus has been extensively tried and found valueless except as a palliative when employed with Cod-Liver Oil in cases where the disease occurs during prolonged lactation. The disease is often associated with pregnancy, as in Puerperal Osteomalacia, so frequently seen in its endemic form in the Valley of the Rhine, and the question of inducing very early labour will often thrust itself upon the physician, though the fact must not be lost sight of that where the disease is still in progress the pelvis is almost certain to be dilatable. Unfortunately, however, if the gestation be permitted to go to full time the pelvic outlet may be found dilatable, whilst the brim is unyielding, in which case Cæsarean section may be demanded. After delivery it has been recommended and successfully carried out that both ovaries should be removed in order to arrest the disease which is certain to rapidly advance if pregnancy again occurs. By performing Porro's modification of the Cæsarean section the body of the uterus and appendages are removed after the extraction of the child, the placenta being taken away *in situ* along with the body of the uterus, so that a second operation is unnecessary.

Oöphorectomy has been occasionally successfully performed independent of pregnancy when the disease in a well-marked form has attacked girls at puberty, but often it has signally failed under such circumstances.

MOLLUSCUM CONTAGIOSUM.

When upon the face, a small incision with a fine tenotomy knife and the thorough evacuation of the contents of each little tumour by pressure of the thumb-nails suffice for their entire destruction. Upon the body they may be snipped out by scissors or the knife, or when very small and numerous they may be destroyed by Ethylate of Sodium solution, pure Carbolic Acid, Nitric Acid, Trichloracetic Acid, or other caustics. When very large a free incision into the tumour may be made, the contents squeezed out, and the cavity curetted.

By injecting a few drops of any strong antiseptic solution through a fine needle introduced into the minute opening at the apex of each tumour, the growth may be caused to shrivel up and finally to disappear without scarring.

Where numerous clusters of small tumours exist close together, a 10 per cent. Salicylic Acid Collodion may effect their destruction.

When the tumours are numerous a short exposure to the X rays is

sufficient to effect their dispersal. Isolated growths may be easily dealt with by electrolysis. It may be worth remembering that, as implied in its name, this affection is contagious, and a child suffering from it should not be permitted to sleep with other children.

MOLLUSCUM FIBROSUM.

This is a different affection from the preceding, often being of the nature of a plexiform neuroma, or forming folds or wattles (pachydermatoceles) simulating elephantiasis.

Excision by the knife, by the elastic ligature, by scissors, or by the galvano-cautery, is the best practice. Where the tumour is large the ecraseur may be necessary. The method of electrolysis by using the needle, as in the destruction of small nævoid growths, has been found to succeed without causing any mark after the shrivelling up of the tumour, but it is only available for small, isolated growths.

MORPHIA HABIT—see Opium Habit.

MOVABLE KIDNEY—see under Glénard's Disease.

MOUNTAIN SICKNESS.

The group of symptoms to which the above name has been given only occurs in mountain-climbing after an elevation of over 16,000 feet has been reached. The obvious treatment will be to reach a lower level as soon as the physical condition of the individual warrants his attempting the descent, but relief will not be experienced till a lower level is reached than that at which the first symptoms of the attack were experienced. Absolute rest is essential till the temporary dilatation of the heart has had a chance of relieving itself. A hypodermic of Strychnine, if available, would be indicated. Stimulants should be administered cautiously and ice employed to relieve vomiting and intense thirst. Oxygen inhalation affords relief, and Hill's method of generating the gas from Sodium Peroxide may be employed at high altitudes with benefit. The form of mountain sickness known as Puna in Peru and Bolivia yields completely to rest in bed for 5 or 7 days.

MUMPS.

The disease is very infectious from its onset, and even before the swelling of the jaws appears, and as the incubation stage varies from 14 to 25 days and the contagiousness may last for a month after apparent convalescence, a prolonged period of isolation is necessary to prevent the spread of the affection.

Rest in bed for a few days and a milk diet are all that ordinary cases require, but owing to the danger of complications the patient should, as a rule, not be permitted to leave his room for 14 days. The chief indication is to keep him protected from draughts, and the swollen region covered by warm, dry dressings. A pad of absorbent cotton-wool covered by a layer of oiled silk is all that is necessary in most cases. Where the tension

gives rise to great pain and inability to open the jaws, a hot fomentation or warm poultice may be applied, but cold lotions should not be employed. The Green Extract of Belladonna may be smeared over the poultice. Should the pain continue, with much throbbing and local increase of temperature, suppuration may be feared, though this event is exceedingly rare. An antiseptic mouth-wash (weak Boric Acid or Condy's fluid) should be frequently employed.

Fluid nourishment is essential for several days till the swelling subsides. Where there is much increase of temperature and constitutional disturbance, Antipyrine or Salicylates or a mixture like the following may be given:

℞ *Spt. Æther. Nit.* ʒiv.
Tincturæ Aconiti ℥xij.
Syrupi Rosæ ʒiv.
Liquor. Ammon. Acet. ʒj. *Misce.*

Fiat mistura. Capiat coch. min. secundis horis.

Orchitis should be treated by a suitable splint on which to rest, as on a shelf, the swollen testicle. Belladonna is the favourite local application, but the standardised official preparations made from the root should never be employed, owing to the real danger of absorption through the delicate cutaneous covering of the scrotum. Any evaporating lotion, or Spirit 1 in 4 may be applied under oiled silk. Where pain is severe and continuous the *Green* Extract of Belladonna rubbed up with 3 parts Glycerin may be applied.

Meningeal symptoms must be promptly treated by the use of the ice-cap, Bromides with Antipyrine and a smart Calomel purge, and though counter-irritation to the parotid region by a sinapism may be an unscientific method of treatment in such metastatic conditions, nevertheless it can do no harm. Leeches to the temples or behind the ear will also afford relief.

Pancreatitis may produce intense vomiting and abdominal pain, which will require poultices and Morphia hypodermically in conjunction with rectal feeding. This complication occurs much more frequently than is usually recognised.

MUSCLES, Affections of.

Under Cramp, the treatment of painful tonic spasm will be found detailed. The clonic spasms known as Myoclonia or Paramyoclonus Multiplex are usually beyond the reach of remedies, but mild cases may be relieved by Bromides in full doses and the use of a weak continuous current, and the same remarks apply to the treatment of the tonic spasm of Myoclonia Congenita or Thomsen's Disease, which can also be minimised by the application of continuous warmth, muscular exercises and gymnastics.

The treatment of Muscular Contracture will be dealt with in the descrip-

tion of the treatment of the primary joint disease or spinal affection to which it is secondary.

Under Fractures the treatment and prevention of traumatic myositis will be mentioned.

Myositis, Neuro-myositis or Fibrositis may be regarded as a manifestation of Myalgia or Muscular Rheumatism affecting the interstitial fibrous tissue in which the muscle spindles are embedded, or involving the sheaths of the nerves distributed to the muscles. Its treatment will be detailed in the articles on Rheumatism, Muscular, Lumbago, &c.

Muscular Atrophy of arthritic origin is to be met by the treatment suitable for the primary joint affection, as massage, passive movements, electrical stimulation and measures calculated to restore the motor function of the articulation.

The treatment of the various types of muscular atrophy or dystrophy, of spinal, neuropathic or myopathic origin will be referred to under their appropriate names.

Myositis Ossificans is a progressive malady usually considered beyond the reach of medical and surgical art, though long periods of halt in its progress may be noticed. Morley recommends excision and grafts the deep fascia on the exposed fresh surface of the bones.

MYASTHENIA GRAVIS.

The profound muscular exhaustion which follows upon the mildest voluntary movements in this rare and mysterious affection is not relievable by the ordinary measures which are suitable for the restoration of muscular function in other weakened conditions of the fibres, as massage, resistance movements, Faradism, Strychnine, &c. By careful avoidance of all muscular actions which are not necessary to life and by the removal of mental excitement and by rest in bed, with warm clothing when the patient is able to move about, life may be prolonged for many years.

Calcium salts, testicular, thymus and ovarian extracts have proved useless, but good results have been reported from Thyroid feeding. Bramwell emphasises the importance of careful feeding, and as the muscular exhaustion is greatest in the evening hours, when the muscles which move the jaws are involved, the feeding should be pressed in the morning and fore part of the day. Liquid dietary is essential in such cases, and should be supplemented by rectal alimentation.

Difficulties in breathing should be met by artificial respiration and drawing forwards of the tongue by traction upon its apex.

MYCOSIS FUNGOIDES.

The growth and progessive fungation of the tumours whose presence characterise this rare cutaneous malady are uninfluenced by internal medication, though Arsenic, Iodides and preparations made from Thuja Occidentalis have been vaunted.

At the earliest stages the local treatment is identical with that of acute eczema, soothing lotions and ointments being indicated for the relief of the burning itching which banishes sleep.

The only routine lies in the use of X rays, under which the tumours usually wither up and the health improves, though relapses are almost certain to occur. This treatment, however, if postponed till the later stages when the lymphatics have become involved, may do harm in some cases.

MYELITIS.

Rest, as near to being *absolute* as possible, should be insisted upon from the onset of the first symptoms. The best position is the horizontal. Most authorities insist upon the danger in permitting the spine to become the lowest part of the body, and recommend the lateral posture with occasional change to the prone. The nursing is of the utmost importance; a water or air bed is of great use, and in some instances it is essential for the prevention of bedsores, which often are the cause of death in this affection.

The primary cause must be sought out and treated; thus syphilis will demand Mercury and Iodides and the intraspinal measures indicated in brain and spinal meningitis when these affections are the result of the spirochetæ.

The treatment of the compression myelitis, which is the serious factor in Pott's curvature of the spine, will be found detailed in the article on Caries of the Spine. Myelitis arising as the result of wounds and fractures of the spinal column will be described under Spinal Injuries.

The worst forms of myelitis coming under the care of the physician are those which arise during the convalescent stage of typhoid fever, influenza, diphtheria, malaria, gonorrhœa and other microbic infections. A milk diet is the most suitable in all cases, and attention must be paid to the condition of the bowels and the bladder.

In acute cases cold to the spine by means of the spinal ice-bag is the safest remedy which our present knowledge can supply. Where there is great pain and tenderness a dozen leeches may be applied in two or three places on each side of the spine, and, after they fall off, cupping-glasses may be applied over the bites with great advantage in some cases. Dry cupping has its advocates. The cautery or blisters are sometimes recommended, and occasionally good has resulted from hot sand-bags, poulticing and hot fomentations. Gowers pointed out that both cold and heat act in the same way by lessening the tendency to stasis of the blood, and unless where there is danger of hæmorrhage he preferred hot applications, but in the application of heat the danger of sloughing and bedsores must never be forgotten.

The course of acute diffuse central myelitis is uninfluenced by any form of treatment.

Drugs are of little value in most cases, but even in non-syphilitic myelitis Mercury has been found to do good. It should be given in small doses, and the perchloride is the best preparation. Salivation by inunction is contra-indicated in the great majority of cases. Ergot, though theoretically indicated, has rarely proved useful. Iodides in the later stages are

often valuable, and many authorities combine with them small doses of Belladonna.

Vaccine therapy may be tried in chronic septic cases where the meninges are extensively involved, as in compression myelitis.

After the acute symptoms have passed off, galvanism may be employed. The continuous current from 15 Léclanché elements may be used by placing one large moistened electrode over the cervical spines, and the other over the lower part of the spinal column. The electrodes should be not only thoroughly saturated with liquid, but they should be warm. A strong solution of common salt in hot water answers perfectly. Ten minutes will be long enough for each séance. The electrodes should be moved up and down the spine, and the applications should be made once a day.

Faradisation and Massage of the wasted muscles, with Phosphorus by the mouth, and Strychnine injected into the muscular substance or subcutaneously, may be of the greatest benefit, but this latter drug should never be administered during the acute stage when great exaggeration of the tendon reflexes exists. Counter-irritation is occasionally beneficial, and in the chronic form of the disease is often most valuable when combined with Massage and Faradisation in those cases where the muscles are flaccid and wasted. The writer has seen best results from the judicious use of Corrigan's button applied *lightly* at a dull red degree of heat.

The treatment of bedsores, which are so prone to occur, is of the utmost importance, and the numerous remedies which are available will be found under Bedsores. The state of the bladder will require the closest attention, and rigid sterilisation of the catheter is imperative; fœtor of the urine should be instantly met by the internal administration of 10-gr. doses of Urotropin. With this remedy the washing out and injection of the bladder by antiseptics is often unnecessary. The soft rubber catheter lubricated with Glycerin of Borax should be used to relieve retention of urine, which sometimes occurs without the patient being aware, and the physician should be upon his guard lest he mistake the dribbling of an overdistended bladder for incontinence of urine.

The treatment of contractures and spastic conditions of the legs is to be pursued under recognised orthopædic principles. The operation of resecting the posterior roots of several of the spinal nerves in the cervical or lumbar region has given most satisfactory results, especially when combined with tenotomy, tendon implantation and other orthopædic measures. By these means bedridden patients have been enabled to move about and live in comparative comfort, the contractures and involuntary spasmodic movements being entirely removed by the root section, though the paralysis has remained.

MYOPIA.

When the myopic eye is quite healthy a fair amount of exercise of the ciliary muscle will tend to keep up its normal tone, but the diminution of

the angle of convergence at near work by the employment of suitable concave glasses certainly tends to prevent the myopia increasing, and diminishes the danger of the supervention of organic disease so liable to occur in high degrees of shortsightedness.

Even when the myopia is fully corrected the habit of reading in bad light must be guarded against, and the patient should be encouraged to wear his glasses constantly for near work and to keep the print as far from his eyes as possible. The clearest type, the best light and the most suitable form of writing-desk should be selected. Special attention should be paid to the position in which school-work or reading is done, and the common habit of bending over a table corrected. The head should be thrown well back, and all tendency to congestion of the eyes avoided. If more attention was paid to the printing, type and paper entering into the ordinary school-books, and if the result-fee system was done away with, there probably would be less myopia. Where pain or aching follows the use of the eyes all school work should be given up entirely for a short period, and after the complete rest has removed these symptoms, shorter school hours, better print, and clearer light should be provided.

Experience pronounces in favour of a full rather than a partial correction of the myopia. Suitable concave lenses fitted in a spectacle frame are preferable to folders or pince-nez. In the higher degrees it is a good plan to disorder the accommodation by instilling Atropine, so as to prevent the otherwise powerful efforts at accommodating. In very mild cases, resulting from overwork, especially when the eyes have been long and persistently fixed upon minute objects, and where myopia may be said to be commencing, the proper treatment will be to insist upon proper rest to the eyes and the instilling of a drop of weak Eserine solution every night for a couple of months.

In high degrees of myopia, operative cure should be considered. The practice of removing the lens has given satisfactory results, the resulting acuity of vision being greater without the aid of lenses than that attainable by glasses. It causes a lessening of the myopia by from 12 to 20 dioptres, so should only be done in cases where the myopia is over 20 D, except in children with progressive myopia of 12 D or more. In these last cases the best results are obtained. The lens is needled, and after some time what fragments remain unabsorbed can be removed by extraction. Swanzy advises that, owing to the possibility of the supervention of detachment of the retina, one eye only should be operated upon, this being kept for distant vision, whilst its fellow can be employed for near work. The recent statistics from Leipzig and Giessen demonstrate that detachment of the retina followed in 44 cases out of 400 operated upon for a high degree of myopia, but considering that in a fair percentage of these cases detachment would have supervened without operation the removal of the lens is more than justified. All authorities agree that the operation should be performed only on otherwise healthy eyes, and that the risk of failure following operation after 30 is very great.

MYXŒDEMA.

Thyroid feeding is the specific for this condition.

The only difficulty to be met with is the problem of dosage, since it is impossible at first to determine whether any portion of the gland is still functioning. Murray has shown that in ordinary routine practice 10 mins. of the old B.P. Liquor Thyroidei daily for 6 out of the 7 days in every week constitute a sufficient amount for most cases, once the signs and symptoms have been combated by larger or smaller doses. This dosage of 1 dr. per week may therefore be taken as a good practical guide to the amount necessary to maintain a healthy standard of metabolism during the remaining life of the myxœdematous subject, though in rare cases double this quantity may be necessary.

2 grs. *Dry Thyroid* are accepted as equivalent to 10 mins. of the liquor by Murray, so that the ultimate weekly dosage of the drug in the tablet form should be about 10 grs. It is necessary to point out that the liquor should not be used if more than a month or six weeks old, though the dried B.P. powder will keep for long periods if preserved in stoppered bottles.

It does not yet appear that any of the numerous preparations made from the gland, as Iodothyrine or Thyro-iodin, Thyroglandin, Thyrocol, &c., are in any way superior to the official preparation. Kendall has isolated the pure alpha-iodine compound in crystalline form which promises to be an advance.

As soon as a case of myxœdema presents itself to the physician, thyroid feeding should be commenced without waiting for any preliminaries. If degenerative changes have occurred in the cardiac muscular fibre, the patient should be ordered to bed or to rest upon a sofa. The only danger lies in the over-anxiety of the physician to make a too rapid impression upon the abnormal metabolism; every case is one to which the maxim " Hasten slowly " is applicable. The best plan of procedure in advanced cases is to give 1 min. of the liquor after each meal thrice daily for about a week, then 2 mins. twice daily for the next week, after which 5, 6, or 7 mins. may be given at bed-hour only; the patient in about 6 or 8 weeks should be getting 10 mins. nightly. If the dried thyroid be used, 10 to 12 grs. weekly meet the requirements in most cases.

The pulse-rate increases under full doses, and any very marked elevation is a clear indication that the dosage should be reduced. In a similar manner the employment of the drug may be regulated by periodically weighing the patient, any rapid loss of weight being taken as proof that the thyroid feeding is exercising a too active influence over the body metabolism. When the amount is much beyond the needs of the patient it is a common occurrence for the body-temperature to rise above the normal, and the steady advance from the subnormal to the healthy temperature is a fair indication that the treatment is pursuing a satisfactory course. In over-dosage, symptoms of exophthalmic goitre develop and should be always watched for.

The heart should be watched; any tendency towards syncope or dyspnœa

upon exertion should be met by restriction of exercise or absolute rest for a time and a reduction of the dose. Active exertion should be prohibited during the first few months of treatment, though mild cases may be permitted to pursue their ordinary avocations.

As the skin becomes moist, the solid œdema passes away, the intellect brightens, and thought power becomes more active, the physiognomy changes and the myxœdematous patient, like the cretin, emerges from a lower to a higher plane of existence. The hair, as a rule, does not show any marked changes for some months. By the time that the above improvement has been effected the physician will be in a position to lay down the dosage of the thyroid preparation which will be required to be maintained through life, and about 1 fluid dr. (10 to 12 grs. dry) weekly, as already mentioned, will usually be found sufficient. Some patients get along quite satisfactorily by dividing this amount evenly over each day, whilst others manage to take the requisite quantity every second, third or fourth night, and some do well on half this amount. The excessive clothing which was formerly necessary to maintain the reduced body-heat may then be gradually diminished.

NÆVUS.

Before deciding upon the question of operative interference for the removal of these congenital capillary or venous growths, the fact must be realised that, whilst the purely *cutaneous* forms (exemplified in "Port-Wine Mark" and nævoid moles) show little, if any, spontaneous tendency to disappear, the *subcutaneous* and *mixed* types in at least half of the cases wither away as the child gets older.

Port-wine marks, formerly treated by the method of multiple scarification, are now generally dealt with by Radium emanations. When the mark or so-called stain is a small one, a button of radium should be fastened on the site with strips of adhesive plaster and left on for half an hour, the number of exposures and the duration of each being determined by the effect produced. Lewis Jones finds that these marks are more resistant to the radium treatment than the more severe types of nævi because the cells entering into the affected tissue are normal cells. This method of treatment leaves little, if any, deformity, the trifling superficial scar being smooth and white. X rays have given good results, and are preferable where the mark is extensive, but after both these agents sometimes a stellate visible congeries of small vessels develops later on in some parts of the scar; these can, however, be dealt with successfully by the one-polar method of electrolysis.

High-frequency currents and the withdrawal of sparks have given good results in some cases, and the electrical methods employed in the removal of the subcutaneous nævi are recommended by Morton.

The old plan of painting with caustics, as Ethylate of Sodium, &c., is now generally abandoned, owing to the dangers of sloughing and disfiguring scar formation; but recently Carbonic Snow has been employed with marked success, and promises to come into routine use, as its scarring is

trifling when skilfully handled, not more than 30 seconds' application of a crayon shaped to the size of the mark being necessary.

The form of cutaneous nævi known as the nævoid mole, as in the case of the port-wine stain, if occurring on parts covered by the clothing, requires no treatment. When its site is the face, it may be treated by Radium, X rays, Electrolysis or Carbonic Snow. When small, the speediest and most satisfactory treatment consists in excision with the knife, but before resorting to excision puncture with a finely pointed thermo- or electro-cautery may be tried.

The treatment of *subcutaneous* and *mixed nævi*, as already mentioned, should not be decided upon without waiting till the hopes of a spontaneous disappearance have passed away. But where the site of the growth is in the vicinity of the eye, where expectancy may probably render a radical removal more difficult when the child gets older, it will be advisable to operate without delay. When the nævus is progressing or keeping pace with the body development, delay is no longer justified.

Growths on parts of the skin covered by clothing are best treated by complete excision; the dangers of hæmorrhage are but trifling except in the case of very extensive and deep nævi. The old-fashioned method of strangulation by ligatures applied below pins transfixing the base of the growth, the injection of strong iron and other corrosive fluids, alcohol, carbolic acid, &c., setons and caustics should never be resorted to, and the practice of vaccination upon the site of the nævus has been completely abandoned.

The gap left by excision can be filled up by undercutting or by skin grafts on Thiersch's plan.

Subcutaneous and mixed nævi on the face can also be treated by the methods used for the removal of the purely cutaneous type. Many will yield to Radium, some to X rays, some to Carbonic Snow, when small.

An excision must be followed by scarring, even when Thiersch grafting is employed; it is seldom indicated. The following surgical methods may be resorted to:

Though caustics and escharotics are inadmissible, owing to the deformities which they are liable to produce, in *very* small and circumscribed growths a sharply pointed piece of firm wood dipped in strong Carbolic or Nitric Acid may be made to puncture a minute facial nævus with the view of obliterating the small vessels, and sometimes excellent results follow.

Upon the same principle into larger nævi a number of punctures may be made by a fine thermo- or electro-cautery. Paquelin's instrument is the best appliance for this purpose, and if skilfully used little deformity follows.

Electrolysis is often the only successful method of dealing with large subcutaneous or mixed facial nævi. It may be used for minute nævi also, in which case the one-polar plan may be resorted to as in the removal of superfluous hairs. The anode being placed on the sternum or neck, the current from 4 to 6 small portable cells is turned on. A fine platinum

needle mounted on a handle is attached to the kathode and thrust into the nævus, and permitted to remain till the discoloration spreads from the puncture for about $\frac{1}{6}$ inch, after which the cells should be cut off seriatim before withdrawing the needle.

This plan suits well for " spider " or small stellate nævi.

For all facial nævi over $\frac{1}{3}$ inch in diameter the bipolar method must be employed, and large Bunsen's cells (4 to 6) should be used. Both needles are thrust into the nævus, the one attached to the positive pole being kept stationary, whilst the negative is moved from one portion of the growth to the other before the needle is withdrawn, in order to cause coagulation of blood and sealing up of the vessels. When the growth is large, a number of sittings may be necessary, the nævus being dealt with in detachments. Skill and experience are required to determine the duration of the electrolysis; the contents of the growth become discoloured or livid around the frothing negative, while at the positive electrode the tissues become firm and bleached.

By employing the bipolar needle-holder of Lewis Jones, in which several parallel needles are attached alternately to each pole, a much more uniform and satisfactory result is obtainable, and a fair-sized nævus may be destroyed at a single sitting of about 20 minutes, little scarring being liable to follow, if the needles be only partially withdrawn and moved about so as to reach the different parts of the growth without making unnecessary puncture marks.

Chloroform anæsthesia is necessary, as the operation causes a considerable amount of pain, and before inserting the needles the skin should be thoroughly sterilised. After the withdrawal of the electrodes a dry sterilised gauze pad should be bound over the site of operation by strips of adhesive plaster or by painting with flexible collodion.

Bleeding at the punctures is easily prevented by slowly withdrawing the electrodes before shutting off the current. Where the entire nævus cannot be operated upon at a single sitting, an interval of about four weeks may be permitted before the next insertion of the needles, but as cicatrisation goes on slowly a longer interval should elapse between subsequent applications.

Cirsoid aneurisms or arterial angiomata of the scalp, when small, may also be treated successfully by the electrolytic method, if complete excision be not decided upon.

Cavernous Angiomata are best removed by a careful dissection after ligature of the main vessel supplying the growth.

NAILS, INGROWING—see p. 454.

NASAL CATARRH—see under Catarrh, Hay Fever, Rhinitis, and Ozæna.

NASAL POLYPUS—see Polypi.

NECROSIS OF BONE.

The treatment of inflammation of bone ending in necrosis will be found detailed in the articles on Osteomyelitis and Periostitis.

The treatment of caries occurring in bone will be found detailed in the article on Caries and on Caries of the Spine. (See also under Hip-Joint Disease and Knee-Joint Disease.)

NERVES, Gunshot Injuries of.

See under Neuromata, where the operations of nerve transplantation, nerve anastomosis or nerve transference are enumerated.

NETTLE-RASH—see under Erythema.

NEURALGIA.

Probably no such condition as a purely functional neuralgia can exist, and the tendency to regard the majority of cases formerly labelled as neuralgia in the light of a neuritis is a growing one; nevertheless, a group of neuralgias remain which present symptoms different from those typical of neuritis.

In neuralgia of the fifth nerve it has been long demonstrated that a point of irritation situated anywhere in the sensory path without revealing its location by pain or even tenderness may excite severe paroxysms of pain along distant branches of the nerve. Thus a diseased tooth in the upper jaw which does not ache may cause severe reflected pain in the lower maxillary region, in the supra-orbital branches, the eye, nose, temple or lips. Hence in every case of neuralgic pain the first duty of the physician is to make a diligent search for any point of irritation in the course of the numerous branches of the affected nerve, and upon the discovery of such a focus, measures should be employed for its removal, after which the neuralgia may be expected to disappear.

Each tooth is carefully examined, the condition of the gums investigated, and the ear, the frontal and nasal sinuses explored; the sight must be tested for errors of refraction and the globe submitted to examination in order to exclude glaucoma, iritis, foreign bodies, &c.

In neuralgic pain in other regions the presence of such foci must be sought for, otherwise severe pain in the testicle may be treated as a neuralgia of the nerves supplying this organ when the mischief may be due to a stone in the ureter; or a case of liver disease, aortic or heart affection be treated as one of brachial neuralgia. The detection of tender points may be taken as strong evidence of the functional nature of the pain, and the presence of anæsthesia and muscular wasting are suggestive of inflammatory condition of the nerve.

After the elimination of every possible source of local irritation a considerable group of cases remain, to which the title of *idiopathic* neuralgia may be applied. The first step in the management of such cases should be an investigation into the possible constitutional causes. Anæmia is the most important of these, and especially that form of secondary anæmia which arises from exhausting diseases like diabetes, and continuous suppurations, from prolonged lactation, frequently recurring pregnancies, severe mental strain and long-continued anxiety and emotional disturbances. There is a clearly defined group of toxic causes as the poisons

of lead, alcohol, arsenic, copper and mercury, and the organic toxins produced in influenza, malaria, gout, rheumatism, Bright's disease and the eruptive fevers. The cases in which trauma and exposure to cold figure as causal agents are probably examples of neuritis.

Any such causes having been discovered, the indications for treatment become clear, and the causal elements, together with every other departure from the healthy standard, should be met by suitable eliminatory treatment. Improved hygiene, open-air life, overfeeding by a diet rich in fats and easily digested proteids, should be instituted, the digestive functions being aided by peptonised foods and gastric tonics when needed, or by massage and Weir Mitchell treatment in cases where anorexia and wasting are present. The hours of rest should be prolonged and those of mental work or close application shortened. The physician should see that sleep be encouraged by natural means, and when insomnia exists simple hypnotics should be administered, narcotics being avoided when possible.

Such rational treatment in no way interferes with the various methods by which pain is to be relieved. It cannot be too strongly stated that though the temporary relief of suffering should play an important part in the treatment of the various neuralgic conditions, it should not be regarded as the chief or sole principle upon which the physician should approach the management of a case of severe neuralgia, though it is true that he may find in some cases no other indication for treatment.

A smart neuralgia may for a time persist after the removal of the cause which, in the first instance, induced the neuralgic condition in the nerve trunk or its branches, and this consideration should prevent the very common mistake of flying from one remedy to another in quick succession without waiting a sufficient time for that steady and continuous action of the drug which may be crowned by permanent success. It is only after the evident failure of such rational treatment that the scientific physician will feel justified in resorting to the various empirical methods which experience leads him to hope as likely to prove useful.

As regards the routine use of drugs, it is the experience of every physician that anæmia and neuralgia often occur together, and that sometimes no treatment will give any permanent benefit till the anæmia is removed, hence in every such case Iron is indicated. The scale preparations, the tincture, saccharated carbonate, Blaud's pills or other preparations may be given according to the special indications present. Occasionally, indeed, it may be necessary to give one preparation for a time, and follow it up by another until the system is saturated with iron.

The following pills may be given for a considerable period:

℞ *Ferri Redacti gr.* iij.
Ferri Arseniatis gr. $\frac{1}{8}$.
Quininæ Sulphatis gr. ijss. *Misce.*

Fiat pilula. Mitte tales xxiv. *Sumat unam ter in die post cibos.*

Arsenic is another routine drug of great value in neuralgia, especially in the very chronic or obstinate forms. Like iron, it must be given in full doses, and be continued for a considerable time after the painful paroxysms have passed off. It is, moreover, useful in cases not characterised by marked anæmia, and the writer generally gives it in combination with iron, or during the intervals when the administration of iron is suspended. It must not, however, be forgotten that the prolonged administration of arsenic in full doses when prescribed for other diseased conditions is liable to be followed by neuritis or neuralgic symptoms; hence the arsenical course should not be a prolonged one.

Phosphorus in the free state or as the glycerophosphates has been employed as a routine drug, and often with much benefit.

Rheumatic, gouty and malarial conditions of the system should be met by Alkalies, Colchicum, Salicylates, Iodides, Salol, Quinine or other recognised agents. Syphilis is to be met by Mercury and Iodides. Lead poisoning, which not infrequently is the cause of neuralgia, calls for appropriate management by Iodide of Potassium and purging with Sulphate of Magnesia.

Neuralgia occurring in glycosuric or diabetic subjects is a clear indication for a strictly regulated dietary.

The next indication is the urgent demand for the relief of pain; the selection of the most suitable remedy for a given case is little influenced by the site of the neuralgia. Hence in the following description of the value of the drugs ordinarily employed as pain relievers, except when specially stated, the dosage and method of administration may be taken as applying to facial neuralgia. The local treatment will be considered later on.

Opium or Morphia is the most reliable of all drugs for the relief of pain, but though it must stand at the head of the list it is practically banned in the treatment of the affection under consideration owing to the very obvious danger of the establishment of the opium habit. Whilst it never should be prescribed for the relief of neuralgia of any lengthened duration, it may under rigid restrictions be employed with advantage in a small percentage of cases when the first symptoms of a severe neuralgia abruptly manifest themselves. Even then it must be resorted to with the distinct understanding that its administration is not to be repeated after a few doses. The hypodermic method gives the speediest and most satisfactory results, but the rule must be laid down that never under any consideration should the patient himself be permitted to use the hypodermic syringe.

Experience shows that in a small percentage of cases pain does not return after being once subdued by a good opiate, and there are strong reasons for believing that this is the result of the opiate, and that the cessation of pain is not owing to the natural decline of the disease.

This desirable result is more likely to happen when the opiate has been injected into the immediate vicinity of the affected nerve than if administered by the mouth. In closely examining this statement it may be fairly supposed that the acupuncture is an important element in the treat-

ment, since excellent results have sometimes been obtained by simple puncture of the affected nerve trunk by a stout needle, and aquapuncture has also a beneficial effect, and the advantages of counter-irritation are in some cases also beyond doubt.

By combining all these methods of treatment the writer has sometimes been able to cut short a severe attack of neuralgia in its early stage. The advantage of his plan is best seen in acute neuralgia of a large nerve like the sciatic, and it may be carried out as follows:—A hypodermic syringe of at least 30 mins. capacity is needed, and the dose of Morphia (say $\frac{1}{3}$ gr.) in solution is diluted with the syringeful of water; the course of the nerve being marked out on the skin, the stopper of a bottle containing concentrated Carbolic Acid is applied to the spot about to be punctured. The needle is plunged deeply into the tissues at right angles to the surface, the aim being to puncture the sheath of the nerve and inject about 5 mins. of the solution into the nerve substance; 5 or 6 punctures are to be thus made between the trochanter and the heel along the course of the nerve in the thigh and its main branch in the leg; some of these insertions can hardly fail to strike the sheath. The anæsthetic action of the carbolic acid renders the puncture almost painless, whilst its caustic or vesicant action affords marked counter-irritant results afterwards. By this simple method all the advantages obtained by the narcotic are combined with acupuncture, aquapuncture, counter-irritation and parenchymatous or hypodermic injection. This plan is not suitable for the treatment of facial neuralgia except under special modifications.

If the pain returns the operation may be repeated after a few days' interval, and the sleeping hour is, for obvious reasons, the best time for the injections. By employing morphia in this way the risks of the opium habit are decidedly less than when the drug is given by the mouth or by one dose injected under the skin; should the result prove to be but temporary or palliative, the morphia should not be continued after a few trials, but other measures should be resorted to.

Unfortunately treatment must be mainly symptomatic and empirical; the drug (narcotics being excluded) which relieves smart neuralgic pain in one patient may have little or no effect in another case.

Cocaine is preferred to morphia by Gowers and others, who maintain that the drug not only relieves pain, but that it arrests the local transmission of impulses which cause pain. Unfortunately, the danger of establishing the cocaine habit is a very real one, and the drug should only be given by the hypodermic route and never by the mouth for the relief of neuralgia.

Next in value to narcotics come the host of new analgesics—Antipyrine, Phenacetin, Aspirin, Salicylates, Caffeine, &c., which possess some power of relieving pain without acting on the cerebrum, as narcotics do. The list of these drugs continues to increase, as new ones are created from day to day in the laboratory, and the reader will find all the most important and reliable members of the group mentioned upon p. 551, in the article on Megrim, the relief of migrainous pain being carried out on the same principles as in neuralgia.

Butyl Chloral Hydrate is believed to exercise a selective analgesic action over the different branches of the fifth nerve. It often entirely fails except in very mild attacks, and it is of no use in the grave so-called epileptiform type of tic douloureux. Nevertheless, it is a useful and safe routine at the commencement of supra-orbital neuralgia, and in mild cases of involvement of the twigs supplying the alveoli in the lower jaw; the drug, moreover, possesses some hypnotic power. It may be combined with the following remedy:

Gelsemium has been vaunted as a specific in neuralgia of the dental branches of the fifth nerve; like almost every other antineuralgic remedy, it sometimes acts most satisfactorily, whilst at other times it fails to produce the slightest result. A good combination will be found in a pill containing gelsemium and butyl chloral, to which Cannabis Indica is added:

℞. *Ext. Gelsemii Alcoholici* gr. ss.
Butyl Chloral Hydr. gr. iv.
Ext. Cannabis Indicæ gr. $\frac{1}{6}$. *Misce.*

Ft. pil. *Mitte* xii. *Sumat* i. *tertiis horis.*

Gelsemium may be pushed in maxillary neuralgia till ptosis becomes evident and some giddiness is experienced; the writer has witnessed its absolute failure in a case where the patient had taken an overdose which caused alarming symptoms of poisoning—staggering gait, double vision, &c. The drug is worthless in all forms of visceral neuralgia. The Indian Hemp in the above recipe appears to exert a very desirable analgesic action in those cases where the pain is slight and almost continuous, but as in the use of opiates the danger of a drug habit must be always kept in sight.

Atropine or Belladonna internally has been often found successful, especially when combined with other remedies. Thus in visceral neuralgias when prescribed with Codeine or Heroin ($\frac{1}{2}$ gr.) it is a valuable routine. Trousseau treated facial and other neuralgias by administering $\frac{1}{5}$ gr. Ext. Belladonna every hour till giddiness was produced, after which the intervals between the doses were gradually lessened. Atropine is a valuable addition to morphine whenever this narcotic is urgently demanded for the relief of neuralgic pain by the hypodermic method, and 1 min. of the B.P. solution may be added to the morphia when the deep parenchymatous method already described has been decided upon; a hypodermic dose of Hyoscine Hydrobromide ($\frac{1}{120}$ gr.) relieves pain and sends the patient to sleep.

Chloroform, Ether and Alcohol in full doses will relieve all forms of neuralgic pain, but their use is obviously contra-indicated owing to the dangers which are liable to follow their repeated administration.

Nitrite of Amyl inhalation occasionally cuts short a severe paroxysm of neuralgia of the fifth nerve, and in all neuralgic conditions involving the heart it may be resorted to repeatedly. The routine of some physicians

is to administer Trinitrin till the tension of the vessels has been markedly reduced.

Two drugs have been so often found to be efficacious in the relief and cure of neuralgia affecting various nerves that they require special mention, though their use must be regarded, like that of many other substances, from the empiric point of view. These are Quinine and Chloride of Ammonium.

Quinine in malarial neuralgia can hardly be regarded as an empiric agent, since the pharmacological action of the drug has been so clearly demonstrated on the parasites in the blood, but it exerts specific influence over the neuralgia which supervenes in malarious patients long after the amœbæ have perished.

Quinine seems to act best in those types of neuralgia in which intermittency of the paroxysms is best marked, the intervals between the attacks being prolonged. One large dose of 10 grs. of the sulphate or 6 grs. of the acid hydrochloride should be administered before the expected paroxysm or as soon as this comes on. It may be combined with a small dose of Morphia or with 10 grs. Antipyrine, 5 grs. Caffeine, or a corresponding amount of any of the new analgesics. This form of treatment is often highly efficacious for the relief of ordinary supra-orbital neuralgia. Brachial, cervico-occipital, sciatic, crural and intercostal neuralgias (which are often, strictly speaking, forms of neuritis), usually yield to quinine combined with Aspirin; the following formula may be employed:

℞. *Quininæ Sulph.* *gr.* viij.
Aspirin *gr.* xv.
Morphiæ Hydrochlor. *gr.* $\frac{1}{6}$. *Misce.*
Ft. cachet. *St.* i. *bis in die, p.c.*

Chloride of Ammonium may be employed in the same empiric fashion, and as in the case of quinine, if relief be not experienced after a few doses, the drug should be discarded. 20 grs. may be given in solution every 2 or 3 hours, or the same amount may be prescribed with 5 to 10 grs. Quinine in cachet form, and this latter method of treatment is a good routine in facial and sciatic neuralgia, and sometimes proves effectual in the visceral types.

Iodides should constitute the main element in the treatment of neuralgia occurring in syphilitic patients, but the iodine salts undoubtedly possess marked pain-relieving properties in some forms of neuralgia in subjects who have never suffered from syphilis. Iodide of Sodium in 5 to 10 gr. doses may be tried in chronic, intractable types of neuralgia affecting any nerve. When relief and cure follow, the physician will probably conclude that the case was one of chronic neuritis of rheumatic origin or of a neuralgia of syphilitic nature. The drug may be combined advantageously with full doses of Bromides, which, though possessing little if any analgesic action, will nevertheless assist in procuring sleep and diminishing restless-

ness. In hysterical patients Valerianates may be combined with whatever antineuralgic remedy is selected for administration, but to be of use the Zinc or Iron Valerianate must be administered in doses of not less than 5 grs. If quinine be tried in such cases, it appears better to give 5 to 10 grs. of the sulphate with the same quantity of the zinc valerianate in cachet than to administer a large dose of the valerianate of quinine.

Tonga, Cimicifuga, Piscidia Erythrina, Aconite, Veratrine, Sumbul and many other vegetable drugs have been administered and extolled from time to time.

Local treatment has been as varied as the constitutional; it may be employed for the relief of pain during a paroxysm, or after this has passed off, with the view of preventing a return.

Dry heat has been always a popular local agent, and in the great majority of cases a considerable amount of relief may be obtained from it. This is best seen in those examples of supra- or infra-orbital neuralgia where severe paroxysms are induced by every cold current of air which strikes the face. By applying a thick layer of warm cotton-wool and a bandage much comfort may be procured. In occipital, brachial, intercostal and sciatic neuralgia excellent effects may be obtained by the continuous application of a rubber bottle partially filled with very hot water so as to permit of its being moulded to the shape of the affected part. The luminous radiant heat of the Dowsing, or the ordinary thermo-electric bath, may be utilised to great advantage when the neuralgia involves a limb nerve, and a temperature of 400° F. can be safely employed. The Leucodescent Therapeutic Lamp may be readily used for concentrating radiant heat upon any part of the surface of the body by means of a polished nickel-plated reflector and a high-power electric lamp. By the Greville Electro-thermic Generator the invisible rays beyond the red in the spectrum can be utilised without the light rays.

Sometimes these methods of applying heat increase the pain, and they should not then be persisted in, otherwise a neuralgia may be changed into a severe neuritis, or if the pain is due to a neuritis in the first instance it is almost certain to be aggravated, especially when the affected nerve is superficial.

The heat from a Bunsen burner, as in the Tallermann apparatus, may be used on a single limb when electric heat is not available and a temperature of 300° F. (148° C.) can be safely borne.

Cold applications, as Ice, freezing with Ether or Ethyl spray, Carbonic Snow or Liquid Air, are seldom well borne, but they may be tried when heat fails.

Local anodyne drugs have been applied to the skin over the affected nerve, and when this is very superficial considerable relief may follow. Thus Menthol, Aconitine or Aconite, Belladonna or Atropine, Chloroform, Veratrine, Chloral Camphor, Radium emanations, Thorium, Guaiacol, &c., have all been employed. The following formula combines several of these, and it may be painted on the skin over the pained nerve:

℞. *Ol. Menthæ Pip.* ʒvj.
Ol. Caryophylli ʒij.
Chloroformi ʒij.
Linim. Aconiti ʒvj. *Misce*

Kataphoresis.—Electric Osmosis or Ionic Medication is now extensively resorted to in order to cause certain anodyne substances to penetrate the unbroken skin, which under ordinary circumstances offers an effective barrier to absorption. The electrolytic drug in solution is placed upon the skin and a galvanic current passed through it to dissociate its opposing "ions," which are carried through the skin and reach the affected nerve terminals. The base appears at the negative pole or kathode; the acid radical is attracted to the anode. Excellent results have been obtained in facial and other neuralgias by applying the negative pole over the skin moistened with Sodium Salicylate solution; the positive salicylic ions are driven inwards. Cocaine, Morphine, Aconitine, Atropine and Quinine are applied under the positive pole, like all metallic substances. A current commencing with 15, increasing to 30, milliampères should be employed and so manipulated by gradually turning it on and switching it off after about 30 minutes' action that no shock need be felt.

Hypodermic or deep parenchymatous injection is employed for the local effects of such drugs as Cocaine, Morphine, Atropine, Chloroform, Ether, Alcohol, Antipyrine, Menthol, Guaiacol, Osmic Acid, &c. When Water alone is injected the method is known as Aquapuncture.

Alcohol has been injected with marked success in severe tic douloureux; 1 or 2 c.c. of 80 per cent. alcohol produce considerable pain of short duration when injected into the affected nerves; this is followed soon by anæsthesia which lasts for several days; usually many months' and in some cases several years' respite is obtained. Stewart employs the solution recommended by Patrick and Hecht, which consists of 3 drs. absolute alcohol, 1 dr. water, 1 gr. cocaine hydrochloride and 10 mins. chloroform. The injection is made with a specially devised strong needle containing a blunt stilet, which is pushed home after the skin has been punctured with the needle.

The supra-orbital division of the nerve is operated upon as it emerges through the sphenoidal fissure by entering the needle at the outer margin of the orbit, and pushing it home for about 1½ inches; the third division is attacked at the foramen ovale by thrusting the needle deeply through the cheek behind the last molar and guiding it upwards and backwards till the base of the pterygoid plate is reached. The second division is injected as the nerve emerges through the foramen rotundum by entering the needle posterior to the lower border of the zygoma till the floor of the pterygo-maxillary fossa is reached.

The injection is usually repeated upon the second and third days and in some cases at later periods, a dozen being usually necessary for a course.

Osmic Acid (1 per cent. solution) has been injected in exactly the same

way as the alcoholic solution, the nerve being reached in the bony openings as it leaves the skull. The writer has used this acid for deep injection into the sciatic with great advantage.

Counter-irritation.—The Cautery is a favourite with some practitioners; every shade of intensity of action can be gauged by regulating the temperature of the metal and the pressure with which it can be applied to the skin. Thus the actual cautery may be dipped in very hot water and applied directly over the tender points or over the trunk of a painful nerve, when it may afford relief without injuring the skin. Dipped in boiling water or heated gently over a spirit lamp a mild dermatitis can be produced by permitting it to remain for a few seconds. At a dull red or even at a bright red heat it may be rapidly drawn across the skin like a pencil so as to very lightly scar the superficial layer, or it may be pressed for a few seconds at various points along the course of the nerve so as to produce a series of eschars. This method is very satisfactory in intercostal neuralgia and in intractable cases of sciatica. The Paquelin cautery may be also employed in these various ways, but the electro-cautery causes too severe a destruction of tissue to be manageable.

Blistering by Cantharidin is a favourite routine, the plaster, collodion or liquor being employed. The plaster is decidedly to be preferred, as the duration of its application can be so gauged as to produce a mild degree of vesication after 2 or 3 hours, when the blister may be removed to another spot over the painful nerve and the application continued for a longer period. In this manner a series of so-called "flying blisters" may be employed in the treatment of sciatica, the skin over the nerve being irritated from the notch to the heel.

Anstie applied the blister over the posterior branch of the spinal nerve trunk, from which the affected intercostal branch springs. In facial neuralgia a small circular blister may be applied over the temple, behind the ear or over a tender point till complete vesication occurs. A combination of counter-irritation and local anodyne treatment may be tried by rapidly blistering the skin over a neuralgic nerve with a few drops of strong Ammonia on cotton-wool covered in by a watch-glass. After snipping the bulla, any alkaloid, as Aconitine, Veratrine, Atropine, Morphia or Cocaine in minute amount, may be dusted over the abraded surface, or this may be dressed by an ointment containing the alkaloid. Mustard as a counter-irritant often aggravates neuralgic pain.

Capsicum, as Chili Paste or Calorific Wool, is sometimes valuable when employed in very chronic cases. Strong Iodine preparations may be similarly used. Leeching has occasionally proved useful in very acute cases when applied over a tender point or where the nerve issues from a dense fascia or through a bony canal; probably the cases relievable in this manner are always examples of acute neuritis and not of true functional neuralgia. Any form of counter-irritation which requires friction should never be attempted in acute neuralgia.

Various forms of apparatus for producing mechanical vibrations are in use. The best of these are driven by the electric current such as the Ruk,

Barker, or Granville machines. By a suitably shaped applicator laid over the skin a series of minute regular strokes may be employed to set the nerve and underlying tissues into vibration without causing pain or jarring effects. The benefits obtainable are comparable to those effected by massage without the danger of irritating the nerve.

Electricity has been employed in endless ways. As a rule the best results are obtainable from the continuous or galvanic current of low tension produced by a battery of several cells, and the Léclanché element is the most convenient. A large wet-cell battery may be easily rigged up in the patient's house by any intelligent bellhanger. The stabile anodal method of application is the most soothing and sedative, and by a careful attention to the switching on and off of the current no shock or painful sensation need be experienced. The negative pole (kathode) should be attached to a large moistened rheophore and applied to the skin over an indifferent part and the positive electrode placed over a sensitive or tender spot in the course of the nerve. When thus employed the nerve in the region of the anode is in a condition of decreased excitability after the current is slowly turned on. 3 to 8 milliampères may be permitted to pass for 10 to 15 minutes, and the applications may be repeated daily for a few weeks, care being taken to keep the skin and the electrodes quite moist throughout the whole of each séance. The labile method may be employed in chronic cases, the anode being moved along the course of the nerve, without, however, breaking contact.

In sciatic and brachial neuralgia the kathode may be dropped into a bath and the anode applied as before, or the 4-cell bath of Schnee may be used.

The interrupted current may be tried when the continuous fails, but as a rule it should not be used in acute cases. A strong current in chronic cases may be employed as a counter-irritant.

Static electricity is used in various ways. The best is to place the patient in an insulated chair connected with the positive pole of the machine, and after he has been charged with electricity, the operator approaches a conducting material towards the affected region, so as to produce " the electric breeze " without withdrawing sparks.

High-frequency currents may be employed in a manner similar to the above and the condensing electrode (a pointed electrode enclosed in a glass tube and insulated by a glass handle) may be permitted to approach closely to the skin over the affected nerve so as to produce a " breeze " without sparking.

The high-frequency current is used in the method known as Diathermia or Thermopenetration in which the temperature of the tissues is raised. Thus one electrode is applied to the nucha near the occiput and the other over a thick pad of cotton well soaked in salt solution over the upper jaw or eye for ½ to 1 hour, 700 ma. being employed. X-ray exposure has been tried and sometimes has proved beneficial, the action being probably similar to that following radium and thorium emanations.

Surgical Treatment.—Some of the methods already described fall under

this heading, as the local injection of Alcohol, Osmic Acid, Water and other substances into the nerve. Acupuncture or needling, whereby the nerve is stabbed in several places with the view of temporarily injuring or destroying some of the fibres, is an old method seldom now employed except in the treatment of sciatica. Several long steel needles are thrust into the trunk of the nerve at the buttock and along the thigh, these being left *in situ* for about 20 minutes. As already stated, these surgical methods are combined with the medicinal in the writer's plan of treating sciatica with diluted morphine solutions.

Nerve stretching may be carried out in two ways. Bilroth's plan does not involve section of the skin. The patient, under Chloroform anæsthesia, is placed upon his back with the hip flexed to a right angle, when the leg is forcibly extended so as to be brought into a straight line with the thigh and the ankle powerfully flexed and the entire limb maintained in this position for 15 minutes, after which vigorous massage is applied. Any nerve, including the sciatic, may be reached by a skin incision, after which, by inserting a blunt hook under its trunk, powerful steady traction may be made upon it with the fingers for a period of 10 minutes.

Where the pain has been due to adhesions (a condition different from true neuralgia), this plan is often serviceable; occasionally it has proved effectual in functional cases, probably by causing some molecular change in the fibres of mixed nerves.

Neurotomy has proved of little value, the pain being uninfluenced as soon as the divided ends of the nerve unite again.

Neurectomy, resection or excision of a portion of the nerve, has been performed with successful results alone or in conjunction with the following operation: "Avulsion" and "Neurexaresis" are the names given to the procedure, in which a sensory nerve like one of the branches of the fifth is torn, wrenched or forcibly detached from its central connections in order to destroy its functions, the foramen through which it escaped being afterwards plugged with an ivory peg or silver screw. Kanavel after curetting the foramen closes it by a periosteal flap made from the adjoining bone or procured from the tibia.

Removal of the whole or a part of the Gasserian ganglion has been successfully performed many times for neuralgia of the fifth nerve, as will be presently detailed, and success has followed in many cases by injecting Alcohol or Osmic Acid into the ganglion.

No description of the treatment of neuralgia would be complete without special mention of—

Tic Douloureux, or epileptiform neuralgia, which is perhaps the most painful of all the affections from which a human being can suffer; when this is established in its typically severe form, internal medication is hopeless and resort must be had to surgical measures.

The injection of Alcohol into the trunk or root involved may be first tried, but relief lasts only for about a year or two, and rarely as long as three years, even when a dozen injections have been employed. The average duration of relief is under one year. Osmic Acid injections

carried out in the same manner are more painful and apparently afford no longer immunity from suffering.

If the pain is limited to a single division of the nerve this may be resected and avulsion performed, but in early cases resection of the affected branch may be successful; thus the supra-orbital or supra-trochlear branches of the first division may be excised or the infra-orbital branch of the second division may be resected as the nerve is traced along its canal in the floor of the orbit, or the main trunk along with Meckel's ganglion may be resected close to the round foramen.

The inferior dental branch of the third division is the most commonly involved single nerve. This may be reached by trephining the lower jaw opposite the last molar, and by cutting the nerve at the mental foramen; avulsion should be resorted to in order to draw out the trunk of the nerve from the inferior dental canal.

When the entire trunk of the third division is involved, as in the case of the second division, resection of the trunk and adjoining part of the Gasserian ganglion will be required.

When the branches of two or of the three main divisions are involved, the only hope of success lies in the removal of the entire Gasserian ganglion with the trunks of the second and third division. The operation is carried out by various methods; the intracranial route through the temporal bone is the best, and though the operation itself is a difficult and serious one owing to the necessity of freely opening the cranium and fully exposing the ganglion on the upper surface of the petrous bone, its mortality is slight. Thus Mr. Hutchinson's series of 31 operations showed no fatality, and he recommends leaving the ophthalmic division of the nerve untouched, whereby all eye complications are avoided.

Very important elements in the treatment of neuralgia are hydropathy and climatic change, but it is obviously irrational to send from home a patient who is suffering very severe pain in frequent paroxysms, and still sles is it desirable to submit him to promiscuous hydropathic measures as douching, cold packs, &c. A dry warm climate or a sea-voyage often works wonders after the neuralgia has commenced to yield to the measures before mentioned, and in chronic cases it may be the first agent to tell upon the pain and sleeplessness.

NEURASTHENIA.

Though the treatment of the hysterical condition and that of neurasthenia often run on lines which are nearly parallel, much confusion and consequent failure results from lack of appreciation of the fundamental differences between the two states. If the essential element in neurasthenia, which is nervous exhaustion or nervous debility in an abnormally sensitive individual, be prominently kept in view there will be little danger of enforcing an element of treatment on the neurasthenic patient which, though highly beneficial in hysteria, may be fraught with mischief when applied to one whose reserve of vital energy has been used up by some exhausting mental occupation or prolonged application to a wearying

routine struggle against time and competition in some strenuous walk in life.

Prophylaxis is a problem of vital importance. The majority of patients who succumb to nervous " breakdown " are middle-aged males inheriting a weak nervous system from parents who have continuously drawn too freely upon their own store of vital energy in the battle of life. The recent war has produced a type of neurasthenia which may be seen in the mixed condition described as Shell-shock.

The prophylactic measures indicated in other neuropathic conditions have been mentioned in the article on Hysteria, and should be carried out in the case of neurasthenic subjects. Of all the exciting causes none is so frequent and powerful as competition, especially competition against time. This is seen in its most typical form in literary men, especially in those pursuing creative work. A labour which could be achieved in leisurely ease and safety if pursued under the stress of a time limit often causes a serious breakdown from which the ambitious author never completely recovers. In the case of clergymen this is a common factor, if the preparation of their seventh-day work be crowded into the last day or two of the week. Even the mere " compiler," whose literary achievements are not in the creative realm, is liable to succumb to neurasthenia when he wilfully sets himself a daily task which *must* be accomplished. All such performances should be avoided by every brain-worker and never attempted under any circumstances by the neurasthenic.

Neurasthenia, like other neuropathic tendencies, is often found associated with ambitious and philanthropic desires, and even the hard-working clerk may be frequently found struggling in the arena of church work or politics during every possible opportunity when not confined to his ledger.

In every case it will be the duty of the physician to search for evidence of the inherited tendency and insist when possible upon a change of occupation when this is at all practicable. In the same way he should investigate the cause of the acquired type of the diseased condition and act accordingly.

When once neurasthenia has manifested itself mental rest is imperative; physical rest is, however, seldom necessary and is often harmful, as few cases of this condition arise directly from excess of bodily fatigue, though in the spinal type of neurasthenia marked muscular exhaustion follows the most trifling degree of exercise or bodily exertion. There are few situations calling for more skill and tact than in the prescription of a rest cure for the victim of neurasthenia. There is, however, no difficulty in the grave type of the disease where the breakdown is complete and all intellectual exercises are impossible or accompanied by profound mental exhaustion. Here a Weir Mitchell course is clearly indicated, and should be carried out as described in the article on Hysteria, the usual elements in the treatment, as absolute rest of body and mind, isolation, forced feeding, massage, electricity, hydropathy and suggestion, all being requisitioned for a period of a couple of months, followed afterwards by a

long holiday in which physical exercises should play a prominent part.

It is in the milder types of the disorder that the difficulty arises in carrying out treatment. Cessation from all the mental operations which have preceded the breakdown must be insisted upon, but absolute mental rest is as undesirable as it is impracticable. A constant feature in the symptoms being not only the exhaustion which follows intellectual exercise, but a constant restlessness and a burning desire for further mental work, any rigidly enforced system aiming at total intellectual inertia only aggravates the condition. These patients are frequently possessed with the dread of becoming demented or imbecile, and the rigidly enforced commands for mental idleness drive their thoughts inwards upon their abnormal sensations and phobias. The neurasthenic patient usually is incapable of taking mental rest, and the tactful physician, on recognising the individual peculiarities and tastes of the patient, should direct his mental exercises along new channels whereby introspection and concentration of his mind upon his former labours are averted. It is in these cases that the bad effects of the so-called "rest cures" are evident; properly adjusted physical exercises, as shown by the results obtained by Rigg's method of graduated exercises and calisthenics at Massachusetts, go a long way in bringing about a complete re-education of the patient.

Nothing is so successful as a prolonged holiday amongst unfamiliar scenes, and the effects of a tour in a strange country should be sought when the patient's means afford him the facility of travelling. In the great majority of cases this is much more desirable than the usual recommendation to loaf about some secluded seaside spot or health resort where sick folk will be his only companions. Often a sea-voyage with an agreeable associate is most beneficial.

Games and sports, when the season permits, may be freely indulged in, but severe muscular exercises are to be avoided. Fishing to those who formerly enjoyed the sport and even to those who are strangers to it is often helpful; yachting is an ideal only within the reach of a few. Golf is upon the whole the most easily procurable open-air pastime, and for those beyond middle life it supplies everything desirable in the treatment of neurasthenia.

When the physician has possessed himself of the entire confidence of the patient by a thorough investigation of his ailment and by giving a sympathetic ear to the recital of his abnormal sensations he should utilise to the fullest extent the element of suggestion, pronouncing calmly and forcibly his assurance of a certain and complete recovery. Till this confidence has been gained and the assurance of a recovery insisted upon little progress will be made under any system of treatment.

Secondary or traumatic neurasthenia is so frequently complicated with the worrying experiences of law procedures that little improvement need be expected till the patient gets free from his legal anxieties. An intelligent individual may be assured that his ailments are mainly due to the severe shock received by his nervous system in the brief moment between

the perception of his formidable danger and the reception of bodily injury; and that as the latter plays but a minor rôle in the production of his illness, complete recovery may be confidently expected. This appears to be also the determining cause in most cases of shell-shock, and hence the obvious value of physical exercises.

Sexual neurasthenia occurs as a rule in younger subjects, and in addition to moral treatment active exercises, as cricket, football and mountain-climbing may be permitted.

The worst form of neurasthenia is that allied to and frequently combined with hysteria which follows the long and tedious nursing of some relative; in such cases prolonged physical strain is often associated with anxiety or grief; the resulting breakdown is complete and profound, and can only be met by Weir Mitchell treatment.

It is difficult to lay down a rule for the duration of the treatment in all cases; it is a common mistake to make it too short. A period of six months at least is required if the patient is to hope for a complete recovery, and often a year may be necessary. Amongst those whose spare means prohibit a long holiday the wisest procedure is to insist upon a total change of occupation. This may be recommended as a temporary expedient, and if the patient takes to his new avocation he may be encouraged to permanently adopt it with advantage.

Drugs should play a secondary rôle in the treatment of neurasthenia; they cannot, however, be discarded in any case. Though quackery is to be contemned, the moral effect of a course of medicinal treatment is always of value, and the physician as a matter of fact will never meet with a case in which he cannot conscientiously find indications for the administration of remedial substances. The beneficial results of suggestion have been already referred to; these may often be obtained without any sacrifice to principle through skilfully prescribed drugs; many patients become depressed and anxious when informed that medicines will do them no good.

Phosphorus as a routine drug gives the best results, but ordinary phosphates possess no power or influence over the nutrition of the fagged brain and nervous system. Free phosphorus is always of use when given in minute doses ($\frac{1}{50}$ gr.); organic phosphates, as in Phytin and the Syrup of the Glycero-phosphates, or the Sanatogen compound of sodium glycero-phosphate with casein may be administered. The preparations of phosphates and hypo-phosphites containing strychnine should be avoided. As in hysteria, strychnine often aggravates the patient's misery, making him feel more acutely his abnormal sensations and increasing his insomnia and nervous excitability; phosphorus will produce the same effects if given in full doses. During convalescence, the syrup of triple phosphates with strychnine may be advantageously prescribed, as Iron is always beneficial.

Arsenic is often serviceable and may be combined with iron and quinine in a pill. Valerianates may be prescribed as a routine in all cases exhibiting much nervous irritability or fidgetiness. A pill containing 1 gr. each

of the zinc, iron and quinine salt may be taken for long periods without ill-effects.

Insomnia is a symptom usually calling for thorough treatment, as little improvement is to be expected as long as sleep is markedly disturbed. Opiates are contra-indicated in this condition. Bromides may be given freely in the evening and at bed-time, but they should be suspended at intervals, and the routine drugging with large doses of these salts several times a day for a long period is productive of much mischief, since bromism greatly increases the mental and physical depression of the patient.

Trional or Paraldehyde or one large dose of Alcohol occasionally at bed-time will act satisfactorily. Veronal is extolled by some nerve specialists, but the writer has frequently observed untoward results from doses under 10 grs. Sulphonal is especially to be avoided, as it causes a depressing drowsiness upon the day following its administration. Chloral Hydrate should be only administered occasionally. A long walk immediately before retiring to rest is the best hypnotic for the neurasthenic, and if to this be added a small (5 grs.) dose of trional which will act mainly by suggestion, excellent results may be expected. Tea and Coffee should not be permitted except at the morning meal.

Anorexia and digestive disturbances figure prominently in the so-called "visceral" type of neurasthenia, and these call for gastric tonics and digestives, as no real progress can be expected so long as the patient is unable to take abundance of nourishment and to digest the same within the normal period. Papain, Pepsin and Trypsin are valuable, and the latter substance may be utilised for peptonisation of the food before its administration when necessary.

In the cardiac visceral type characterised by much functional disturbance of the heart's action and abnormal sensations in the precordial region, Strophanthus in 3-min. doses of the tincture is clearly indicated, or $\frac{1}{6}$ gr. of the extract may be combined with the triple valerianate pill, or the tincture may be prescribed with Sumbul and Bromides.

Electricity, massage and hydropathy are valuable remedial agents, and, as already stated, constitute important elements in the Weir Mitchell treatment. All these adjuncts may, however, be employed by patients whose symptoms do not warrant such a rigid course. Hence the value of a sojourn at a suitable spa or health resort where the services of a trained masseur can be obtained, and if a suitable natural mineral water is available which will excite the eliminatory organs so much the better.

There are few more potent factors in completing the cure of neurasthenia than open-air sea-bathing for those who take the full value out of swimming exercises under the best surroundings. But this powerful remedial agent, like electricity, douching and high altitude treatment, is too stimulating in the earlier stages of the condition. Benefit may be obtained by the administration of the triphase form of sinusoidal currents as carried out by Herschell.

NEURITIS.

Treatment depends upon the local or constitutional cause: in many instances where only one trunk is affected (mononeuritis) a careful inquiry will reveal trauma, pressure or compression, as when one or more of the arm nerves become inflamed after a heavy sleep during which the nerve trunks have been compressed against some hard body by the weight of the upper extremity, thorax, or head. It must always be remembered that in such cases the first results are those of neuritis, which afterwards are followed by paralysis and wasting. This is seen in so-called "crutch-palsy" and in those cases of tumour pressure and continuous strong muscular action as in hammermen. The treatment consists of absolute rest to the affected limb, the application of dry warmth by light bandaging over a thick layer of cotton-wool, and when the pain is severe the internal administration of an analgesic or the hypodermic use of Morphia. Upon cessation of acute pain, electricity, massage and passive movements will be indicated for the restoration of function.

Where an attack of acute neuritis (perineuritis) follows exposure to cold, especially a stream of cold air playing upon a localised area of the skin, the same treatment is indicated combined with full doses of the usual anti-rheumatic agents, as Salicylates, Aspirin, &c. A good routine is the following:

℞. *Acid. Acetylsal.* *gr.* x.
Salicin. Purif. *gr.* viii. *Misce.*

Fiat pulv. Mitte tales xviij. *St.* i. *ter die post cibum.*

Blistering is clearly indicated in such cases where the symptoms fail to yield rapidly to the above measures.

In very chronic examples of mononeuritis, the inflammatory changes are of an interstitial character, and in addition to the indication for the relief of pain, the wasting of the muscles and loss of power call for electricity and continual gentle massage combined with the internal administration of large doses of Iodides and repeated blistering, as in the treatment of sciatica.

In every case a search must be made for a constitutional cause; thus gout, rheumatism, diabetes, alcoholism, diphtheria, malaria, syphilis, influenza and mineral poisons, like those of mercury, lead and arsenic, may be the underlying causes, though these factors are more liable to lead to the peripheral type of neuritis. The presence of each of these causal elements affords clear indications for treatment. Arterio-sclerosis is another well-recognised cause and is an indication for the free administration of Nitrites.

Local treatment of a neuritis involving a single nerve or any of the cords given off by a large plexus, as the cervical, brachial or lumbar, may as a rule be carried out upon the lines laid down for neuralgia, but in the early acute stage of neuritis, heroic massage, very hot applications, the cautery, acupuncture and electricity are certainly contra-indicated.

Leeching the skin over the trunk of a solitary inflamed nerve near to its exit from a bony foramen or from a fascial opening is often productive of excellent results, as in acute neuritis of the facial as it emerges from the stylo-mastoid foramen. In acute neuritis of the sciatic nerve in thin patients the leech bites may be covered over by a cupping-glass with advantage.

For the relief of pain locally and constitutionally and for the various means of carrying this out, the reader is referred to the article on Neuralgia. The treatment of the resulting paralysis and muscular wasting will be detailed in the articles on Paralysis.

NEURITIS, Peripheral.

This is usually of the multiple degenerative type, and commonly caused by alcoholism alone or in combination with arsenic, as in the memorable Manchester epidemic of 1900, but other causal factors, as diabetes, rheumatism, influenza, malaria, syphilis, gout, gonorrhœa, diphtheria, erysipelas, beri-beri, leprosy, mineral poisons, as copper, lead, arsenic, mercury, carbon disulphide and dioxide, naphtha, &c., may be present. The condition has been observed to follow typhoid and other exanthematous fevers, mumps, puerperal fevers and various forms of tuberculosis. The above causes should be sought for, especially as multiple peripheral neuritis of an intractable type may in any given case arise from a combination of any two or even more of these causal factors, treatment being unsuccessful till the removal of all the primary elements has been accomplished.

Whilst treatment of an eliminatory character suitable to each primary toxæmic condition is being pursued, the patient should be placed at rest in bed. The limbs, generally the lower ones being first and chiefly affected, may be enveloped in a thin layer of cotton-wool and a light bandage, and where a marked degree of heat does not exaggerate the pain and discomfort, the wool may be covered in by a layer of oiled silk. Warm fomentations are often soothing, but hot baths and all forms of counter-irritation, friction, massage and electricity in the early stages of pain and tenderness are distinctly contra-indicated, as sloughing may be readily excited by these agents. In advanced cases first coming under observation, a water-bed should be procured, and from the first attention should be directed to correct by suitable and well-padded splints any faulty position of the limbs caused by the contraction of unopposed muscles.

During the early stages of treatment, the dietary and general hygiene are those indicated in the treatment of chronic alcoholism, and as the condition of the digestive organs is unhealthy, catarrh of the stomach being nearly always present, a great difficulty arises in combating the nausea, anorexia, vomiting and craving for stimulants. It is unnecessary to say that alcohol in every form must be strictly prohibited; rectal feeding may be necessary. (See under Alcoholism.)

Severe pain rarely calls for Morphia, and the danger of establishing

another drug habit must never be lost sight of. This remark also applies to the treatment of the insomnia which is almost always present, and which must be relieved by simple hypnotics. Trional is frequently employed for this purpose, but the writer has several times observed a type of peripheral neuritis develop under the continuous use of this hypnotic when employed for the relief of insomnia in other conditions; hence, if administered during alcoholic neuritis, it should only be given occasionally. Bromides in large doses or Paraldehyde may be safely given to induce sleep.

The pain may be relieved by small doses of Antipyrine, Phenacetin, Aspirin, or any of the analgesic drugs mentioned in the list under Megrim. One of the best routine combinations for most cases is the following:

℞. *Phenazoni* ʒij.
Ext. Cocæ Liq. ʒj.
Tinct. Capsici ʒiv.
Glycerini et Aquæ ad ʒiv. *Misce.*

Fiat mistura. Cpt. coch. min. ter in die ex aquâ.

Salicylates are always useful; in addition to their slight analgesic action they act as diuretics and aid in the elimination of the toxins by the kidney and skin, and are clearly indicated in all rheumatic and gouty types of neuritis. Iodides are valuable in all forms of the disease, and constitute the best routine in the treatment of the neuritis following lead, copper, mercury and arsenical neuritis, and are especially indicated in syphilitic and rheumatic cases.

As soon as local pain and tenderness have been overcome by the above measures gentle massage and passive movements may be commenced, and graduated voluntary exercises may be permitted as the patient gains the power of his limbs.

In chronic and neglected cases, in those examples of dual forms of the disease arising from the operation of more than one causal factor, and in the peripheral neuritis following prolonged and inveterate alcoholic excess which fails to respond to abstention and rest, much wasting and a high degree of paralysis result, often with contractures of muscles and deformity of limbs and secondary arthritic complications. The treatment of such cases resolves itself into active Faradisation of the affected muscles long continued and perseveringly employed, large moistened electrodes being used with a current strong enough to produce mild contractions of as large a number of fibres as possible in the partially degenerated muscles. Strychnine, which is contra-indicated in the early stage, may be injected deeply into the centre of the muscles. Hot air or the electro-thermic bath or Tallermann's apparatus may be employed where there is much rigidity before beginning massage, passive movements, Schott's or Swedish exercises. Surgical procedures may be necessary to divide tendons and overcome adhesions.

NEUROMATA.

Treatment is only called for when the newly formed nerve and ganglionic tissue of a true neuroma assumes such bulk as to mechanically call for excision—an extremely rare condition; these tumours cause little if any pain, and may safely be let alone.

Fibro- or false neuromata, when circumscribed and situated on the trunk or cutaneous branch of a nerve, should be excised or the growth turned out of its capsule. If the nerve trunk is found to be deeply involved in the growth, the best procedure is first to stretch the entire nerve and then excise the part connected to the tumour, bringing the divided ends together by sutures. The superficial painful nodules springing from cutaneous branches should be dissected out, along with the involved branch. The same treatment is demanded for the neuromata occurring on stumps after amputation, though sometimes it may be necessary to resect a portion of the nerve trunk higher up, or even to perform a fresh amputation when the pain remains intractable.

Malignant neuromata should be treated like other forms of sarcoma by amputation of the limb well above the seat of the new growth, as return generally follows resection. The diffused neurofibromata constituting Recklinghausen's Disease, and usually of congenital origin, should not be interfered with except when after trauma they cause severe pain and become liable to take on malignant action, in which case the only hope lies in amputation as far above the seat of the tumour as practicable.

The plexiform neuromata or neurofibromata should be let alone unless situated upon some nerve trunks in the neck or face causing deformity, in which case the mass may be dissected out. The treatment of the cutaneous neurofibromata is described under Molluscum.

In operations where a considerable portion of the nerve has to be removed and primary suture of the divided ends is impracticable, the operations of nerve transplantation or nerve grafting and nerve anastomosis may be resorted to. In nerve transplanting a portion of considerable dimension of a nerve from a recently amputated limb or of the radial nerve of the patient is sutured into the hiatus between the divided ends of the trunk from which the tumour has been removed. Or the ends of the divided nerve may be connected by a number of fine strands of loose catgut suture surrounded by a long decalcified chicken-bone in order to permit of the gradual growth of the axis cylinders without these being involved in scar tissue, or tubulisation by means of Cargile membrane or hardened arteries may be carried out to bring the divided nerve ends together, as after gunshot injuries to the nerve trunks.

Nerve anastomosis is accomplished in several ways; the most satisfactory is the one known as complete peripheral anastomosis, in which the distal end of the divided nerve is inserted into a vertical slit or gap in a sound nerve trunk. In central anastomosis a sound nerve is divided across and its proximal end sutured to the distal end of the nerve from which the tumour has been removed, or the proximal end of the divided sound nerve may be implanted into a vertical slit in a paralysed nerve

trunk. Stookey points out that in nerve transference, if the fibres are mainly sensory at the point selected in the healthy nerve, a double transference is necessary; both the proximal and distal ends of the severed trunk should be joined to the nerve selected. These operations are employed in the treatment of gunshot injuries to nerves and for the relief of various types of paralysis.

NIGHTMARE.

Preventive treatment is often successful; a close scrutiny of the causes which were at work in former attacks will generally give the clue to the management of the patient's feeding, sleeping or mental work, which will prevent the recurrence of the disorder. As a rule it is produced by the presence of a considerable amount of undigested or indigestible food lying in the stomach, and this is very often produced by late suppers in those who dine early. The habit of occupying the mind by severe exercise up to the moment of lying down may be the cause of the attacks. Severe business worry, prolonged grief or anxiety and alcoholic excesses may be the cause. Some patients are liable to experience attacks when they turn over upon their backs in sleep, or when the weight of the body, sinking gradually into the depths of a soft feather bed, causes the head to slip off the pillow, or when the feet get cold.

Late dinners, which do away with the necessity for supper, a hard hair-mattress, and a contrivance which awakes the patient the instant that he turns over upon his back, such as the tying of an empty cotton-reel across the back (*i.e.*, over the spine), and the avoidance of indulging in severe mental labour before retiring to bed, will generally prevent the attack. A full dose of Bromide of Potassium or, better still, Paraldehyde, Trional or Sulphonal will be worth trying when there are special reasons for suspecting an attack, and the feet should be kept warm.

When the attack comes on, the sooner the patient gets roused thoroughly the better. There is not much use in prescribing remedies which he is to use himself, as by the time he would be in a position to employ them the attack would have entirely passed away. He should be advised to get rapidly out of bed as soon as he is able, and dash some cold water upon his face or dip his head into a basin of water. When the attack tends to recur upon the patient's again lying down, he may induce vomiting, and insure the complete evacuation of the contents of the stomach. The friends of a patient who is subject to attacks of nightmare may be instructed to administer a cold douche, a whiff of Nitrite of Amyl or strong Ammonia.

NIGHT SWEATS—see under Phthisis.

NIGHT TERRORS.

This condition occurs in children and resembles the nightmare of adults, with this essential difference, that in night terrors the neurotic child sees some distressing vision, whilst the nightmare is the result of a vivid dream. The exciting causes should always be sought for. Sometimes they are

associated with delayed dentition, worms, adenoids, constipation and indigestion, but often in neurotic children an exciting factor cannot be found. The moral surroundings of children so affected should be closely studied. The ghost and witch stories and appalling tales of the nursery, often combined with threats of boding evil and future punishment, should be discountenanced. Overwork at school and cramming must be strictly forbidden.

Neurotic children who dread the darkness are sometimes injured for life by being shut up in dark rooms as a punishment for some trivial offence. A night-light in the bedroom often acts like magic in preventing attacks, especially in those cases caused by punishment in the dark lock-up.

The removal of adenoids is often followed by a complete disappearance of the affection.

Obstinate constipation and dyspepsia should be met by a powder after each meal containing a few grains of Bicarbonate of Soda and a small dose of powdered Rhubarb, with ½ gr. Papain.

As in the prevention of nightmare, supper should be prohibited; the last meal a few hours before bed-time should consist of some easily digested food of a liquid or semi-liquid nature.

Drugs are of value, especially in the so-called idiopathic cases where an exciting cause cannot be found; they are useful in all cases after the removal of such causes in order to prevent future attacks.

Bromides of Potassium, Sodium and Ammonium afford the best means of accomplishing this. One good dose, according to the age of the child, may be given at bed-time. Sulphonal or Chloral may be also given. The latter drug is, however, not so suitable, as patients often dream unpleasantly under its influence. For this reason Opium is also unsuitable. Paraldehyde is very efficacious, and Claus claims that Trional is curative. Generally it will be found only necessary to administer these drugs for one or two weeks at a time. The attacks tend to disappear naturally about the tenth or twelfth year.

During the attack, little can be done save by lighting up the room and soothing the patient's excitement and calming his fears by assuring him of his present safety, though often this will be of little use, as there appear to be delusions and hallucinations which cannot be dissipated until sleep occurs. Punishment, cold douches, or any treatment which could possibly add to the little patient's distress is to be strongly condemned.

The following mixture may be administered at bed-time every night to a child of two years old:

℞. *Sodii Bromidi* ʒij.
Chloral Hydrat. *gr.* xx.
Phenazoni *gr.* xx.
Syrupi Simplicis ʒj.
Aquæ Menthæ Pip. *ad* ʒij. *Misce.*

Sumat cochlearium minimum omni nocte hora somni.

NIPPLE, Paget's Disease of.

This disease, if not primarily of a malignant nature, ultimately becomes a true epithelioma which invades deeply the mammary gland. In the early stages the treatment is that suitable for eczema, and only soothing remedies as Vaseline, Lanolin or Cold Cream should be applied under a roomy nipple-shield which will effectually protect the nipple and areola from the pressure and friction of the dress. All treatment is useless in staying the slow and steady progress of the affection, and such soothing measures should only be persisted in as long as the diagnosis admits of any doubt.

Once the inveterate nature of the apparently eczematous state of the nipple and areola demonstrates itself, operative interference affords the only hope of a cure. Unfortunately it is but seldom that the patient seeks advice in this early stage, when an incision around the excoriated tissues might be expected to entirely remove the disease, so that as a rule the whole breast will require removal. In the majority of chronic or long-standing cases even this serious procedure is not sufficient, and the radical operation now recognised as essential for all forms of cancer of the mammary gland must be carried out, in which the whole gland, together with the underlying muscle, covering skin and the entire contents of the axilla, will require removal, as it is impossible to be certain that the malignant process has not already extended along the milk ducts and lymphatics, even when the mischief appears not to have extended beyond the areola.

NIPPLES, Sore.

The treatment of sore nipples begins during the pregnancy, when the patient's breasts, especially if she is a primipara, should be examined, and measures taken to remedy any defects in the form of the nipple that may be present. Depressed nipples should be drawn out daily in the later months of pregnancy, and a wooden nipple shield may be worn constantly in the hope that the nipple will be induced to project through the opening in its centre.

Soreness is almost invariably due to cracks or chaps on the surface of the nipple, and the nurse and doctor should be on the lookout for the appearance of these, as they are only too frequently the forerunners of mastitis and mammary abscess. To prevent their formation the nipple should be sponged with boracic acid solution, washed off with warm water before nursing, and after nursing it should be again sponged and carefully dried with a soft clean rag. Some authorities recommend that the baby's mouth should be wiped out with a clean rag wet with boracic lotion before it is given the breast. When the cracks or fissures have developed a piece of lint soaked in saturated boracic acid solution should be kept on the nipple during the interval between the times of nursing and the breast sponged clean of the solution with warm water before the baby is suckled. A glass nipple shield should be worn, and great care should be taken that the shield is cleansed after using, and kept lying in boracic acid lotion until it is next required, the lotion being washed away with boiled water before use. If

it is difficult for the child to obtain enough milk through the shield, the perforations in the rubber teat should be enlarged by passing a hot wire through them. If the fissures refuse to heal up under this treatment, the nipple should be painted with a 5 per cent. solution of cocaine and then with Friar's Balsam, glycerin and tannin or nitrate of silver (10 grs. to 1 oz.). The chemical used must be washed off the breast with boiled water before the child takes it. Sometimes acute pain is complained of by the mother when the child is sucking, and no fissure or crack can be found to account for it. This usually occurs in neurotic women, and can only be combated by moral influence. Patience, time and a placebo will often overcome it.

Should it become necessary for any reason to remove the child from the breast, measures must be taken to relieve the engorgement of that organ and to put a stop to the secretion. Nothing gives more relief than the judicious employment of massage, as detailed under Mammary Gland, Inflammation of (*q.v.*). Failing this, a breast-pump may be used occasionally. The breasts should be firmly bandaged, but many patients find this irksome, and there is no objection to the application of the time-honoured belladonna plaster except its messiness. A circular plaster should be cut to cover the breast, with a hole in the centre for the nipple, and the edge nicked deeply to allow of the plaster lying snugly over the whole organ. A smart purge of Epsom salt should be given, and it is well to follow this up by giving one or two teaspoonfuls of the salt every morning on a fasting stomach for a week. The amount of fluid taken should be restricted.—R. J. J.

NOCTURNAL EMISSIONS—see under Spermatorrhœa, Hypochondriasis, and Masturbation.

NOSE, Affections of—see Adenoids, Ozæna, Polypi, etc.

NYSTAGMUS.

The lateral, rotatory, or vertical oscillatory movements of the globe of the eye to which this name is given are but a symptom or sign of various cerebral or visional defects mostly of organic nature and beyond the influence of treatment. Thus the condition occurs in about 50 per cent. of all the cases of disseminated cerebro-spinal sclerosis, cerebellar tumour, hereditary ataxia, in some instances of spastic and of ataxic paraplegia, and in albinism.

The nystagmus caused by congenital defects of vision and eye troubles arising during infancy may entirely disappear under suitable treatment directed to the primary malady, as in the case of congenital cataract and dense opacities of the cornea, &c.

Nystagmus associated with "head-nodding," occurring in infancy and not dependent upon visual defects, usually clears up without treatment by the end of the third year.

The type of nystagmus met with amongst miners is due to working in a stooping or constrained posture in defective light, and can only be met

by a change of occupation, which if resorted to early will be entirely successful in removing the error in co-ordination, the affection being of the nature of a craft-palsy.

OBESITY.

The treatment of obesity or corpulency cannot be regarded as in a satisfactory state, as of the various so-called "systems" some are founded upon erroneous theories at variance with recognised physiological laws, whilst others, though based upon sound theory, cannot be carried out as a routine owing to individual peculiarities. The physician, before adopting any system, must carefully investigate the causal factor in each case. Thus, in the hereditary type, which may not, however, show itself till middle life, the obese condition flourishes upon a dietary which is barely sufficient to maintain a healthy standard of nutrition in ordinary individuals, whilst in the acquired type of obesity, over-eating, with insufficient physical and mental exercise, are the causes which can be easily removed.

Drugs as a rule should be discarded in every case; the only substance known to possess any specific action is Thyroid Gland, which possesses a powerful influence over the body metabolism, causing serious reduction in the amount of fat along with wasting of the nitrogenous tissues when given in full doses. Hence, if thyroid feeding be pressed into the service of the therapeutics of obesity, it becomes absolutely necessary to administer large amounts of proteids to make up for the increased nitrogenous waste. Not more than 5 grs. twice a day of the dried gland substance should be administered, and never for very prolonged periods.

Fucus Vesiculosus is the basis of several patent or proprietary nostrums for the cure of obesity. The writer knows that this—the common bladder seaweed or wrack—has been used in the North of Ireland as a food for fattening pigs, and owing to the physiological relationship existing between man and this despised animal, as shown by the dentition and omnivorous character of the food, it might be reasonably expected that it would tend to increase instead of diminish corpulency.

Vinegar and alkalies have been resorted to from time to time to cause diminution of fat, but this effect can never be obtained without dangerous deterioration of the general health from serious blood change.

Citric Acid is now very extensively used, alone or as a part of some popular system; the best that can be said for it is that, though not so dangerous perhaps as vinegar, its power of decalcifying the blood must never be lost sight of.

Before considering the subject of *dietary*, the effects of *exercise* may be briefly referred to, as these two agents must constitute the basis of all systems of treatment for the reduction of obesity. As inactivity of body due to indolence, laziness or sloth is a common factor in the acquired and a frequent adjuvant in the hereditary type of obesity, the opposite condition may be rationally expected to effect a reduction of fat. Muscular exercise should always be associated with some plan of increasing

mental activity, and no system of treatment should be pursued for the reduction of obesity which does not include the fullest possible degree of physical combined with mental exercise. An important detail in this connection must not be lost sight of—in order to get the best results from physical exercises these must be carried out systematically in the open air. Mountain climbing is a part of Oertel's system. The best results are obtainable from swimming exercises carried out in the open sea or in some inland lake or large river, and a very considerable degree of obesity may be successfully removed by this form of vigorous exercise.

When the physical condition of the patient contra-indicates active open-air exercises, much benefit may be obtained by a prolonged course of vigorous general massage, and this may be combined with Sandow's or other form of gymnastic exercises, followed up by the Turkish Bath. The Electric Light Bath, in which the entire surface of the body, excluding the head, is exposed to powerful arc lights, as in the Winternitz cabinet and horizontal electric light baths, is a most effective method of increasing oxidation, improving metabolism, and diminishing fatty deposition. The open-air Sun Baths at Peebles and Battle Creek effect the same results.

Dietetic Treatment.—The older plans were erroneously based upon the theory that fat was only formed out of certain articles of food, as hydrocarbons (fats) and carbohydrates (starch and sugar), whilst it is a well-known fact especially seen in hereditary obesity that proteids also contribute to the formation of fat. Some individuals manufacture and store up their fat chiefly from some one of these classes of food, whilst others may chiefly store up their fat from another class, and hence no one system can be expected to suit all the cases of obesity. By a careful study of each case the physician can soon find out which plan is best suited to it. Often the most suitable treatment will not lie in hard and fast adherence to any recognised plan, but in such modifications of it as may be rationally decided upon after frequently weighing the patient and watching which class of food best nourishes the body and maintains a high state of vigour without adding to the deposition of adipose tissue. Unless there are special reasons for the contrary, it will be desirable to make the changes slowly and gradually at first. Sudden and marked reductions in the body weight cannot be safely made, and, moreover, the attempt often leads to the disarrangement of both appetite and digestion. As a rule a reduction of more than 8 oz. daily in body weight should not be permitted in the early stages of treatment, and about 1 lb. per week in the later months.

Banting's diet consists of: Breakfast—4 to 5 oz. of animal food, consisting of beef, mutton, kidney, bacon, boiled fish, or hot or cold meat of any kind, except veal and pork. A little biscuit, or 1 oz. dry toast. A large cup of tea or coffee, without sugar and milk. Dinner—5 to 6 oz. of any fish, except salmon, eels, or herrings, or of any meat, except pork or veal, or of any poultry or game. Any vegetables, except potatoes, parsnips, carrots, beetroot, or turnips. 1 oz. dry toast. Cooked fruit out of a pudding and unsweetened. 10 oz. claret, weak sherry or madeira. Tea—2 to 3 oz. cooked fruit and a rusk or two, and 9 oz. tea without milk or sugar. Supper—3 or 4 oz. fish or meat, as at dinner, with 7 oz. claret or sherry and water.

The normal amount of calories is calculated at 3,000; the Banting diet contains only 1,100, and is not capable of maintaining life for any considerable period without inducing dyspepsia and gout, and, it is stated, also renal disease. There is often unconquerable abhorrence of animal food induced, and the patient feels compelled to abandon the system. Gutman's diet, like the above, contains only 1,100 calories; the meat is reduced to 10½ oz. and the bread increased to 4½ oz. Salad, fresh vegetables, fruit and potatoes are permitted to the extent in all of 19 oz. daily.

Ebstein recognises that fat is formed from albuminous foods, especially if carbohydrates are freely administered at the same time, and that this transformation takes place independent of the administration of fats. The presence of fats in the food he believes tends to prevent its deposition in the body, and hence fatty substances enter into this dietary; their use prevents the craving for hydrocarbons and they give a feeling of satiety which is never experienced under the Banting system, in which fats, starch and sugar are omitted. The diet is made up of the following:

Breakfast—1·76 oz. white bread (toasted) with plenty of butter, and 8·8 oz. tea without sugar or milk. Dinner—Fatty soup made from a beef marrow-bone. 4 to 5 oz. fat meat with some cabbage, asparagus, spinach, peas or beans in moderate quantity, and 2 or 3 glasses of light wine, and a little stewed fruit without sugar. Late in the afternoon—A cup of tea without milk or sugar. Supper—A large cup of tea without milk or sugar, 1 oz. each of bread and butter, one egg, or a corresponding bulk of fat ham, fat roast meat or cheese, with fresh fruit. No alcohol.

This diet gives good results in many instances, but as it contains carbohydrates in quantity insufficient to sustain life, it cannot be continued except for short periods. Wood, contrasting it with the Banting diet, points out that the food of an average healthy man should contain 30 drs. proteids, 25 drs. fat and 92 drs. starchy carbohydrates, whilst the Banting diet supplies 43 drs. proteids, 2 drs. fat and 5¼ drs. starchy carbohydrates, and the Ebstein system gives 25½ drs. proteids, 21¼ drs. fat and 11¾ drs. starchy corbohydrates.

Oertel's system provides for a moderate reduction of carbohydrates and a great diminution of fluids; it was at first introduced for the treatment of corpulency associated with valvular lesions. Though now practically discarded for the treatment of heart affections, this dietary is often used in simple obesity. The amounts are varied according to circumstances, there being a maximum and minimum; the average figures give a good working mean. It differs from the Banting system in the increase of fat and carbohydrates and from the Ebstein by the diminution of the fat and the doubling of the carbohydrates and proteids.

The amount of water is not to exceed 35 oz., but a vital element in the Oertel plan is the *mountain climbing*, by which there is rapid elimination of water from the blood. He calculated that 40 oz. were eliminated in an ascent of 1,000 feet during four hours' walking, the skin and lungs getting rid of the most of this, the urine being but slightly augmented.

Pfeiffer starts with a dietary supplying 3,000 calories, which is equivalent to the normal demands, and this "maintenance" diet is to be slowly

diminished, each element being reduced as the peculiarities of the case indicate.

Van Noorden's dietary consists of the following:

Breakfast—3 oz. lean meat with 1 oz. bread and a cup of unsweetened coffee or tea containing about ½ oz. milk. 2 hours later an egg is taken, and 2 hours afterwards a cup of strong clear soup. Dinner follows in 1 hour, and should consist of a small cup of clear soup, 5 oz. fish or lean meat, and 3½ oz. potatoes, and the same amount of fresh fruit with some green vegetables. 2 hours later a cup of strong coffee is permitted, followed in an hour by 7 oz. fresh fruit, and 2 hours afterwards by a tumblerful of skimmed milk. Supper following 2 hours later, and consisting of 4½ oz. cold meat without fat, 1 oz. wholemeal bread, and 1 or 2 oz. of unsweetened cooked fruit.

The daily intake in this system represents nearly 1,400 calories, being 250 above the Banting and 200 below the Oertel maximum, and slightly exceeding the Ebstein.

The Weir Mitchell plan of treating obesity by a simple dietary of skim-milk is often satisfactory and is easily carried out. It consists in giving a tumblerful of milk with one egg every three hours whilst awake for three weeks at a time. The objection to this plan is the large amount of milk sugar ingested.

In all the treatments of obesity sugar should be discarded; where a sweetening substance is demanded saccharin may be permitted. Green and fresh vegetables are unobjectionable; they may be freely permitted no matter what plan of treatment be pursued, and they produce a feeling of satiety which is greatly to be desired when the bulk of the diet has to be seriously curtailed.

The Salisbury system consists of a diet of beefsteaks and hot water, and is now only employed in the form modified by Towers-Smith, who gives for the first 14 days for breakfast and luncheon, 1 lb. of lean steak; for dinner, 1 lb. of grilled cod and 1 lb. of lean rump steak; and at intervals during the 24 hours, one gallon of hot water; and the last thing at night, half a wineglassful of whiskey in cold water. During the next 21 days the diet is more varied, and the hot water is reduced to 4 pints. Mutton chops without fat, turbot, whiting, sole, green vegetables, and rusks are allowed. During the next 31 days the amount of hot water is further reduced to 1 quart, and tea is permitted with captain's biscuit, the bottom crust of a stale loaf, fish, fowl, game, joints of any kind, with a little light wine and seltzer water; 5 grs. of Bicarbonate of Potash are to be taken night and morning. After these periods, which amount to about 9 weeks, the ordinary diet is indulged in.

When so employed there is not much distaste against the sameness of the animal food; should this arise, beef tea or beef essence may be substituted. If a slice of fresh lemon be infused in each cupful of hot water, the danger of any scorbutic condition arising is prevented. A serious objection to the original Salisbury treatment was the absence of fresh vegetables for long periods.

The "Dry Cure" is in marked contrast to the above system as carried

out by Schroth and Dancel. The diet consists chiefly of dry rolls, two or three days old, a little thick gruel, and a small amount of light wine. It is a method to which even the most resolute patients will not long submit, and it is unsuitable for gouty subjects owing to the restrictions placed upon the eliminatory organs.

In the use of any of these dietaries the carbohydrates should be first restricted, next the fats, proteids and fluids. Once the excess of fat in the patient's body has been consumed by the demands made upon it through feeding upon a starvation dietary and the increase of metabolism by open-air exercises, the loss of weight should be stopped by a cautious approach towards the ideal maintenance diet. The total and relative proportion of proteids, fats and carbohydrates necessary to keep the individual permanently at the reduced body weight and in good vigorous health can only be ascertained by frequent weighing and judicious changes in his dietary till the physician finds the minimum of each class of food necessary to meet the requirements of the case.

All of these dietaries except Ebstein's contain more proteids than are necessary to sustain life under normal conditions, and this dietary only affords less than one-tenth part of the ideal amount of carbohydrates (15 oz.). It also should be kept in mind that it supplies over 60 per cent. of necessary fat, containing as it does more than ten times the Banting. These considerations demonstrate the serious dangers which are certain to follow a rigid adherence to any system of reduction except for comparatively short periods.

The rare form of localised deposition of fat known as Adiposis Dolorosa or Dercum's Disease, and which is often associated with neuritis, is best met by thyroid feeding and local sedative applications.

ŒDEMA—see under Dropsy, Heart and Bright's Disease, etc.

ŒSOPHAGUS, Cancer of.

The treatment of this condition has been already described in the article on Cancer upon p. 124.

ŒSOPHAGUS, Diverticula of.

The form of pouching of the gullet which is due to pressure from within acting upon a congenital local weakness, is caused by abnormal persistence or irregularity in the position of a visceral cleft. It is usually met with amongst those who rapidly bolt their food in large mouthfuls without chewing.

The pouch in these cases is situated near the pharynx, and its exact position and size should be outlined by filling it with Bismuth emulsion and exposing the neck to the X rays, or by Plummer's method of causing the patient to swallow a long skein of silk. When the mouth of the sac is wide and the case comes under early observation, much may be done by reforming the patient's habits as regards feeding. Food should be thoroughly masticated and swallowed in small amounts, or the patient may be fed for a time through a rubber tube passed beyond the pouch

into the stomach or fluids may be administered in small amounts by the mouth.

Where the pouch becomes distended with retained food its pressure upon the œsophageal tube may cause a considerable degree of dysphagia and rupture of its walls is liable to occur. These cases are best dealt with by Butlin's operation, which consists in cutting down upon the diverticulum as in an ordinary œsophagotomy for an impacted foreign body, dissecting it out and closing the wound in the gullet by a triple row of catgut sutures. As deep cellulitis of the neck is likely to follow this operation it may be done in two stages: (1) Exposure of the diverticulum; pack the wound for two or three days; (2) complete the operation by removal of diverticulum and suture of œsophageal wall in layers.

Stetten divides the neck of the diverticulum with the cautery between a strong catgut ligature and a distal clamp, after which the stump is thoroughly sterilised by the cautery and covered over with the muscular layer of the gullet by catgut sutures.

ŒSOPHAGUS, Foreign Bodies in.

The fluorescent screen, a skiagram or the œsophagoscope should be employed to determine the position and nature of the impacted object when the history of the case and the signs do not afford sufficient data for treatment. Small angular objects, fish-bones, pins, &c., are best dealt with by the umbrella probang made of horsehair, which is gently coaxed past the object; on withdrawal, the expanding brush entangles the foreign body, which is brought up in its meshes. Cheatle's steriliser forceps are frequently successful in withdrawing coins or other similar objects lodged about the level of the larynx.

Coins can be extracted sometimes in the same manner, as they are easily passed by the instrument, since they generally lie edgewise in the gullet; but the instrument known as the coin-catcher or money probang is more suitable. In the absence of a suitable probang a skein of thread attached to the end of a flexible bougie makes a suitable substitute, in which the body may be entangled as it is withdrawn. Crégny advises in such cases that a skein of thread rolled up in a globular form, to which a piece of stout ligature silk is attached, should be swallowed in jam or butter, and after the foreign body has been passed the thread may be pulled up by dragging upon the silk. As it is withdrawn, the foreign body may be found entangled in its meshes. Swallowing a large bolus of bread may carry small fish-bones and bristles before it into the stomach. Where the foreign body is soft, it may be gently pushed down by the point of the probang or by the tube of the stomach-pump until it enters the stomach.

Occasionally the act of vomiting may be made to dislodge impactions. This may be induced by tickling the fauces or by giving Apomorphine ($\frac{1}{10}$ gr.) hypodermically. It is not, however, a safe practice when the body is of sufficient dimensions to completely block up the tube, as a rupture below it might possibly take place. A smart slap with the open

hand, applied between the shoulders, is a popular, safe, and sometimes successful procedure when the body is lodged high up.

If a hard angular body be pushed down into the stomach in the efforts used for its removal, purgatives should not be administered, but firm pultaceous food or dry biscuits may be given with the view of enveloping the object and shielding the intestinal and gastric walls from its angularities. A diet of hard-boiled eggs is, in the writer's opinion, the best means of carrying out this object.

A hard angular body should never be pushed downwards by the probang or bougie. A careful attempt may be made to extract it by using a suitable curved forceps guided by the œsophagoscope or the X rays, but no considerable degree of force should be applied, otherwise dangerous laceration may be produced. This is liable to occur with the sharp hooks or edges of dental plates, and as a rule, when such have entered well into the gullet, they should be removed by the operation of œsophagotomy. If the plate has become impacted in the pharynx or entrance of the gullet, it may be possible to extract it by the fingers of the surgeon, as a pretty accurate estimate of the danger of laceration may be made by the degree of resistance experienced. Before any attempt at œsophagotomy can be made the presence of urgent symptoms of suffocation may demand a prompt opening of the larynx or trachea in order to admit air to the lungs, and even artificial respiration may be necessary.

The operation of œsophagotomy is performed by an incision $3\frac{1}{2}$ to 4 inches long made immediately in front of the interior border of the left sterno-mastoid muscle. The gullet is reached after retracting the carotid sheath, sterno-mastoid and omohyoid outwards and the depressors of the hyoid bone and the trachea inwards. The tube is opened in its long axis over the end of a soft stomach-tube introduced through the mouth, care being taken to avoid injury to the recurrent laryngeal nerve which lies in front of it. The foreign body is then cautiously extracted with gentleness and the wound in the œsophagus sutured with catgut and suitable drainage instituted for the skin wound. No food should be allowed for 3 or 4 days, and then liquids may be introduced into the stomach through a soft rubber tube, rectal feeding being instituted in the meantime. This operation, like that for an œsophageal pouch, is often done in two stages as described in last article.

Where the foreign body has lodged in the lower end of the gullet near the stomach, the operation of gastrotomy should be performed, and the object extracted through the gastric opening. When its removal is found impossible it should be left *in situ* and the patient fed through the gastric opening with the hope that after the subsidence of spasm the body may drop into the stomach, from which it can afterwards be removed through the original opening. Mediastinal œsophagotomy is almost invariably fatal, and the best procedure is to leave the case to Nature and patient feeding through the gastric opening without attempting to pull the foreign body upwards through the mouth by probangs or coin-catchers.

Torek's operation for the resection of the thoracic portion of the gullet

in cancer by the transpleural route by an incision through the entire length of the seventh intercostal space and the division of the fourth to the seventh ribs has demonstrated the possibility of reaching any foreign body in the lower part of the gullet.

ŒSOPHAGUS, Inflammation of.

This is generally due to the swallowing of corrosive liquids or to the irritation caused by the use of the stomach-pump, bougies, &c. In rare cases it may be caused by the extension downwards of aphthous conditions of the mouth and pharynx.

A weak acid may be permitted when the œsophagitis is due to the irritation of an alkaline substance like ammonia, caustic soda, &c., and a mild alkali such as Magnesia or Bicarbonate of Soda may be administered to counteract the effects of acid corrosives.

In the first instance shock will have to be combated, and in all cases the use of the stomach-pump is contra-indicated. As soon as any free acid or alkali has been neutralised by the antidote the best routine is to administer small quantities of any bland unirritating oil.

Strong carbolic acid is a form of poisoning met with often, and here the rule regarding corrosives does not maintain; the rubber tube should be passed and the gullet and gastric mucosa must be thoroughly irrigated with glycerin. Afterwards oil should be administered in small quantities and frequently.

Dysphagia is always present in irritable and inflamed conditions of the gullet, and, save a teaspoonful of oil, cream, melted butter or liquid paraffin, nothing should be given by the mouth, the feeding being for days entirely rectal.

The after-consequences of the mischief may be expected to show themselves in cicatricial stricture, in order to prevent the formation of which the occasional passage of a large sound will be advisable before waiting for symptoms of narrowing to show themselves.

ŒSOPHAGUS, Spasm of.

Œsophagismus is usually met with in neurotic women and alcoholics, and is sometimes accompanied by marked emotional disturbance arising from the complete temporary obstruction of the gullet.

Drugs are not to be relied upon to control the spasm, though Bromides and Belladonna are generally recommended as a routine, and they are harmless. Electricity often aggravates the condition. Remedies suitable for the hysterical condition should be persevered with. The only satisfactory form of treatment is the passage of a full-sized bougie, preferably of a large tapered firm gum-elastic instrument, which may be kept *in situ* as long as the patient can tolerate it at each séance, which should be repeated every or every other day for a few weeks.

Where the obstruction occurs at the termination of the gullet in the stomach, the condition is recognised as Cardio-spasm and is associated with a considerable degree of œsophageal dilatation, as demonstrable by

the X rays and Bismuth emulsion. There are good grounds for regarding this as the result, not of spasm, but of inco-ordinating power. Mikulicz has carried out an operative procedure in these cases which proves satisfactory. An opening is made into the stomach and the narrowed cardiac orifice is dilated by manual pressure or by introducing a bougie surrounded by a rubber jacket which is capable of being distended by fluid pressure. Jordan treats this condition by causing the patient to swallow a long roll of ligature silk with a leaden shot at its extremity; this passes down the intestine to the anus: an acorn-shaped bougie is threaded or guided through on the end of the silk protruding from the mouth, and by this means the contracted part of the gullet is freely dilated.

The opposite condition of paralysis of the gullet is usually a sequela of diphtheria, and is associated with loss of power in the constrictors of the pharynx. It is to be met by feeding through the soft rubber tube till the return of muscular power.

ŒSOPHAGUS, Stricture of.

Spasmodic stricture has been dealt with in the preceding article, and the treatment of malignant narrowing will be found detailed in the article on Cancer.

Cicatricial stricture is nearly always the remote effect of swallowing corrosive liquid, and is to be met by mechanical dilatation.

The patient should be fed upon liquid diet to minimise catarrh and spasm in the neighbourhood of the stricture before resorting to dilatation where the narrowing is very advanced. Various forms of bougie are recommended. Whilst the olive-headed instrument mounted upon a whalebone stem is preferable for diagnosis, the writer believes that a graduated firm gum-elastic bougie is better for dilating purposes. This should be passed through the stricture two or three times a week, leaving the instrument *in situ* for the brief moment during which its presence can be tolerated, employing a larger instrument every time till the fullest size is reached.

The passage of the instrument must be resorted to once every 4 or 6 weeks as long as the patient lives. Where the stricture whilst easily dilatable shows a tendency to contract rapidly between the operations, *continuous* dilatation may be employed (as in the treatment of resilient strictures of the urethra) by inserting a Symonds' tube. After 2 or 3 days the tube is withdrawn and replaced by a larger till the largest size can be left in, but this method is obviously unsuitable where the narrowing is situated high up near to the pharynx. The writer successfully employed partially dried sea-tangle as a dilator in an obstinate narrow cicatricial stricture as long ago as 1879.

Internal œsophagotomy was an unjustifiable operation till the introduction of the perfected œsophagoscope; by means of this aid in suitable and select cases good results will be doubtless forthcoming.

Various devices may be employed when the narrowing will not admit any form of dilating bougie. The simplest procedure is to perform a

gastrostomy, and through the artificial opening in the stomach wall to feed the patient for the remainder of his life.

In some cases, after several days' complete rest to the gullet has been secured by the gastrostomy, it will be found that the spasm which has been added to the organic narrowing has subsided so as to permit the passage of a fine bougie. Abbé's operation may then be carried out; he introduces the bougie, armed with a stout thread, through the stomach opening, and directs it from below into the gullet and through the stricture till it appears in the pharynx. The string or thread is employed to divide the stricture by pulling it up and down to imitate the action of a saw. As soon as the narrowed portion has been cut by the string a series of graduated bougies may be passed down the gullet through the mouth, after which the opening in the stomach should be closed and a Symonds' tube worn for a time.

In some cases it may be possible to carry out Abbé's method by getting the patient to swallow a few yards of fine silken cord where the gullet cannot be entered from below. If a steel bead attached to the end of the thread can be got to pass through the stricture, after a preliminary gastrostomy the bead will be easily attracted to the stomach opening by a magnet. Having now got the thread *in situ*, it may either be used as a saw or as a guide by which bougies can be drawn up from below through the stomach till the requisite degree of dilatation has been secured. In a case of impassable stricture where gastrostomy had been performed four years previously, and the patient was living on nourishment injected through the fistula, Bernays cut down upon the site of the stricture at the inner edge of the sterno-mastoid and opened the gullet above the stricture. Later on he perforated the stricture by a pointed bougie introduced from below through the gastric fistula, and eventually inserted a funnel, through which the patient was able to swallow food, which entered the stomach for the first time in five years through the gullet.

Strictures at the lower end of the gullet may be dilated by the methods of treating cardio-spasm, and impassable narrowings in the thoracic zone promise to fall under the method of posterior mediastinal œsophagotomy carried out in Sauerbruch's chamber under increased atmospheric pressure or by Torek's operation mentioned on p. 613. Lexer has succeeded in supplying the patient with a new extra thoracic gullet by an elaborate œsophagoplastic operation in which a coil of jejunum was transposed and fixed under the skin of the thorax, and Jianu has utilised the great curvature of the stomach in a similar manner.

OLFACTORY NERVE, Disease of.

Under Anosmia the treatment of loss of function of the first cerebral nerve will be found detailed. Hyperosmia—the opposite condition—and Parosmia, or perversion of the sense of smell, are usually found in association with the hysterical condition, and yield to moral and general treatment directed against the primary underlying neurosis.

ONYCHIA AND PARONYCHIA.

Acute inflammation of the tissue of the matrix or soft parts surrounding the nail is of septic origin and is known as onychia, and as whitlow or paronychia when the end of the finger is involved.

The treatment of the mild subcuticular or most superficial form consists in the application of an evaporating lotion and elevation of the part. As soon as pus appears this may be let out by the prick of a sharp lancet, small bistoury, or sharp scissors—an operation which requires no form of anæsthesia owing to the very superficial position of the small abscess.

In the form of whitlow which is caused by the presence of septic inflammation where the nail is covered by the overlapping fold of skin near its root, the pus collecting under the nail must be evacuated under local anæsthesia (Ethyl spray) by excising the fold of overlapping skin and removing when necessary a small portion or the whole of the nail itself. Where the infective material has found its way in by the side of the nail, the resulting pus with a small portion of the side of the nail should be removed and the thickened epidermis and overlapping skin sliced off with a sharp scalpel or scissors.

The ordinary subcutaneous form of paronychia or whitlow starts from a punctured wound in the pulp of the finger and requires active treatment in order to prevent the septic inflammation extending to the tendon sheath or periosteum. The acute pain may be relieved by either cold or hot applications, both of which tend to reduce the high tension which causes the acute suffering. As soon as pus has probably formed a free incision should be made into the swollen pulp of the finger, when possible, under a general anæsthetic, as the operation is accompanied by intense pain, which withstands freezing or other methods of producing local insensibility.

An important point should not be lost sight of—as long as the paronychia is confined to the pulp the surgeon should avoid opening the sheath of the tendon, otherwise the knife, after passing through the infected tissues, will carry the septic organisms into the synovial membrane and convert a subcutaneous into a thecal felon. Hence a further reason for inducing complete anæsthesia, under which a more accurate gauge of the depth of the incision can be formed; moreover, under local anæsthesia the patient is certain to pull his finger away vigorously from the knife, when the tendon itself may be divided or only an incision effected which is too small to provide free drainage.

A valuable guide to the requisite depth of the incision is afforded by examining the power of flexion of the last joint of the affected finger. As long as the patient can freely bend this it may be taken as proof that the paronychia is still subcutaneous and the sheath should not be injured. No curettage is permissible for fear of opening fresh tissue to infection.

The best procedure after incision is to place the hand with its freely incised finger in a deep basin of very warm antiseptic liquid, in which it may be kept for several hours if the pain is severe, after which compresses

of warm saturated Boric Acid solution may be applied under oiled silk for several days, when dry dressings or Boric Ointment may be applied to relieve the sodden condition of the superficial tissues and to hasten the healing process. Any exuberant granulations springing from the wound during healing may be rubbed with a large crystal of Sulphate of Copper or touched with a piece of matchwood dipped in Carbolic Acid, but this latter substance should only be applied by the surgeon himself owing to the danger of producing gangrene when too freely applied.

The treatment of tendinous whitlow should be prompt; it is a mistake to wait for evidence of pus formation, as the greatly increased tension caused by the inflammatory process is fatal to the integrity of the parts, and is liable to lead to destruction of the flexor tendon and a useless finger, or the mischief may extend to the bone and cause necrosis, or it may extend up the arm as a dangerous cellulitis.

Some surgeons recommend that in the early stage the method of inducing passive hyperæmia should have a trial in order to abort the septic inflammation. Hot antiseptic poultices act in a similar manner, but they should be discarded after a short trial if the ordinary signs of severe inflammation fail to subside rapidly.

A free incision under general anæsthesia, Nitrous Oxide or Ethyl Chloride should be made in the middle line of the finger opposite the seat of maximum tenderness and tension. Where the inflammation has extended beyond the finger a further incision may be necessary, in the case of the thumb and little finger in the wrist, and in the case of the three other fingers in the palm.

The after-treatment consists in free flushing or immersion of the hand and forearm in a vessel of warm antiseptic solution—Boric Acid (saturated), weak Perchloride of Mercury, or Permanganate of Potassium—and the gentle removal of all sloughs. Afterwards the wound should be dressed with warm Boric Acid compresses.

Whilst in the subcuticular and subcutaneous forms of paronychia it is advisable to keep the hand elevated, in the deep tendinous variety this must be avoided in order to prevent the pus burrowing along the tendons. Owing to the danger of matting of the tendons and stiffening of the joints, passive movements, massage and voluntary exercises of the fingers should be commenced as soon as signs of active inflammation have subsided.

Where ankylosis of a joint or total destruction of its tendon results, there may be no resource left to the surgeon but to amputate a portion or the whole of the useless finger, but this should never be undertaken till long after the active mischief has disappeared.

Subperiosteal paronychia is to be treated like the thecal by a deep incision, which, however, must be carried down to the bone. As a rule no attempt should be made at the removal of any diseased or dead bone till after the subsidence of all active inflammation.

In the chronic forms of onychia due to injury, tuberculosis, syphilis, etc., where active pyogenic organisms play but a secondary part, the

best treatment is to surround the finger with a double layer of lint soaked in Spirit or Boric Acid lotion, and cover this by enveloping it with oiled silk, which should be tied tightly like a Christmas cracker beyond the finger-tip without including the lint, forming a perfectly impervious finger-stall.

After subsidence of any active inflammation, the wet should be changed for a dry dressing such as Boric Acid powder, or powdered Nitrate of Lead. Exuberant granulations which do not yield to these dressings may be cautiously treated by a light application of pure Carbolic Acid or a daily application of Sulphate of Copper or Nitrate of Silver, after which any astringent antiseptic ointment may be used as a dressing.

When the above treatment fails, removal of the nail and dressing of the raw matrix with finely powdered Lead Nitrate should be resorted to. Should the onychia return with the growth of the new nail all the tissues on the dorsal surface of the last phalanx, including the nail and underlying matrix, should be shaved off by a sharp scalpel. Or the new nail may be removed with its matrix or the matrix may be destroyed with strong Carbolic or Nitric Acid or Pernitrate of Mercury solution.

Some cases of mild chronic onychia yield to a number of X-ray exposures which obviate the necessity for avulsion of the nail and prevent the irregular growth so liable to follow when this has been forcibly removed.

Syphilitic onychia is best treated locally with a weak Perchloride of Mercury lotion, Yellow or Black Wash, or by the application of dry Calomel or an ointment of this latter drug.

The onychia which results from tinea and favus must be treated on the lines laid down in the articles on these ailments.

Tuberculous onychia must be met by removal of the nail, scraping away the tissues down to the bone, and, if this be found to be diseased, it should be amputated in order to arrest the spread of the disease along the medullary canal of the adjoining phalanx.

Lateral onychia is the term applied to inflammation following on ingrowing toe-nail; its treatment is described under its own heading.

OPERATIONS, Treatment of.

As the general practitioner is often saddled with the preparation of the patient and the treatment after operation, the following suggestions are offered. Surgeons differ, of course, as to the treatment they prefer, but if one has to act on his own resources these hints may be useful, especially for abdominal cases.

Preparation for Operation.—The practitioner should make it his business to see that a suitable room is prepared for the operation if possible. Where there is a choice the room should be large and airy; there should be a good light, north by preference; if the operation is to be done at night a supply of artificial light should be seen to. If sufficient time, say 24 hours, is available, all hangings, pictures and superfluous furniture, carpets and rugs should be removed from the room, the floor and woodwork dusted with damp cloths, a fire put on to remove dampness, and

the windows well opened to secure ventilation. If the operation is one of urgency, it is best to disturb the room as little as possible, since the dust set in motion will not have time to settle, and to content oneself with the lighting of a fire and opening the windows to secure ventilation.

As regards furniture, unless a portable operation table is available, a strong plain wooden table, such as a kitchen table, should be provided, and covered with a clean folded double blanket, then a mackintosh sheet, and finally a clean linen or cotton sheet. Two half-blankets folded in clean sheets should be provided to cover the patient during the operation. If the Trendelenburg position is likely to be required, a table with cross-pieces between the legs should be selected, and a strong kitchen chair provided on which one end of the table may be elevated by resting the cross-piece on its seat. A smaller table will be required for instruments and dressings, and either small tables or kitchen chairs as stands for hand basins and lotion basins. Three hand basins, one for antiseptic lotion and two for plain water, will be required for the operator, and two more if he has an assistant. A chair and a small table should be provided for the anæsthetist, and if the operation is a vaginal one a chair should be provided for the operator, and a suitable nail or hook fixed at a height of about 7 feet from the floor in order to support a douche can, with an additional basin for antiseptic lotion in which the end of the douche tube may repose. The basins should all be scrubbed with soap and water and scalded with *boiling* water in readiness for use.

At least 8 to 12 gallons of water should be boiled and set to cool in clean scalded jugs or buckets, covered with clean towels to protect the water from accidental contamination. It is a good plan to boil ½ gallon to 1 gallon of water with *two teaspoonfuls* of common salt to the pint. This can be used after the necessary dilution as normal saline for transfusion, &c., if required. It has been shown by Bayliss that a much more effectual solution for the treatment of shock by transfusion is one which contains 6 per cent. of gum arabic, or 2 per cent. of gelatin to the pint of ·9 per cent. saline. The gum is dissolved in the saline solution, filtered through clean flannel and sterilised by boiling. The advantage of this solution is that the fluid remains permanently in the circulatory system and does not rapidly leave the vessels as normal saline does.

Soap, boiled nail-brushes and clean towels should be in readiness; a bottle of good brandy or whiskey should be at hand in case of need, and turpentine, methylated spirit and a fish-kettle are very useful accessories in case of any accident or omission in the surgeon's kit.

The patient, if time permits, should have an aperient, in the case of an abdominal operation repeated for two or three nights in succession; an enema of soap and water should be administered about two hours before the operation, and for four hours beforehand solid food, including milk, should be prohibited, but beef juice, clear soup or beef tea, or a cup of tea may be allowed up to within an hour of the operation. The skin of the operation area should be shaved, well washed with soap and water, swabbed with methylated spirit, and after being allowed to dry, painted

with weak tincture of iodine, or with a saturated solution of picric acid in water or preferably in spirit. If the operation is to be a vaginal one, the vulva should be washed and shaved and a vaginal douche administered. Thirty minutes before operation the patient should be given $\frac{1}{4}$ gr. of morphine with $\frac{1}{100}$ gr. of atropine, unless some contra-indication exists, as such an injection materially facilitates the administration of the anæsthetic.

TREATMENT AFTER OPERATION.—The following symptoms may require treatment:

Shock and Collapse.—Nothing is so effectual in warding off or in treating shock and collapse as the administration of normal saline solution or, better still, of Bayliss' solution as described above. If the collapse is very profound, the intravenous method may be used and about 5 pints transfused. In performing this operation, the strictest antiseptic precautions must be observed, the whole apparatus sterilised by boiling and the patient's skin and surgeon's hands carefully sterilised also. The vein selected is usually that crossing the bend of the elbow. It should be made prominent by pressure on it above the elbow and should then be exposed by an incision along its course. Avoiding any wounding of its wall, the vein is then carefully dissected free from its bed for the distance of 1 inch, and a ligature, preferably of iodine catgut, is placed under it at each end of the freed portion. The lower ligature is tied to prevent flow of blood from the distal end. A nick is then made in the wall with scissors or scalpel, and through this the canula attached to the funnel and rubber tube is pushed into the proximal end of the vein beyond the ligature there, which is then tied around the end of the canula. Care should be taken that the funnel and tube are full of saline solution, which should be welling out of the canula as it is being pushed into the vein, otherwise there is risk of introducing air-bubbles into the circulation, with a possibly fatal result. After the requisite amount of fluid has been transfused the canula is withdrawn and the ligature tied so as to occlude the upper end of the vein. The operation may be repeated if necessary on the opposite arm.

Should there be insufficient time, facilities or assistance to carry out the rather elaborate technique which is necessary for successful saline transfusion, saline solution may be transfused under the breasts, and in women this affords a fairly satisfactory and rapid method of increasing the quantity of fluid in the circulation. The apparatus required consists of a hollow needle or needles attached to rubber tubing which is connected with a clean jug or reservoir full of sterilised saline solution. (Down Bros. make a very satisfactory apparatus.) The gland should be lifted up from the chest wall with the left hand, and the needle thrust almost parallel with the chest wall into the *submammary* tissue. If this precaution is observed, the unpleasant sequela of mammary gangrene will be obviated. The fluid is allowed to flow into the connective tissue by gravity from a height of about 4 to 6 feet above the patient, and from 1 to 2 pints may be got in at a time.

These measures are suited for sudden emergencies, but normal saline gives excellent results in most cases of collapse and shock when administered by the rectum. The method of continuous administration, if properly carried out, is certainly the most satisfactory. The apparatus required is a vessel to contain the saline, with a thermometer standing in it on which the temperature of the fluid can be easily read. This vessel should stand in a water-bath which is heated by gas or a spirit lamp, and the heat should be so regulated that the thermometer reads about 105° F. From the vessel the saline is conducted by a glass siphon to an india-rubber tube on which is a screw-down tap, and which is terminated by a narrow piece of lead pipe bent to accommodate itself to the curve of the anal canal. The tap should be so adjusted that the fluid issues very slowly drop by drop from the end of the leaden tube which is passed through the anus into the rectum. The rate of flow should be regulated by careful observation and should be just short of that which causes escape of the fluid from the anus by the side of the tube. This method is only applicable under constant skilled supervision, but in my experience practically as good results are obtained from the administration every two or three hours of from ½ to 1 pint of saline, according to the amount of toleration shown by the rectum, through a rubber catheter to which a glass funnel is attached, the fluid being allowed to flow in very slowly. ½ to 1 oz. of brandy may be added to each injection with benefit. Bicarbonate of soda solution (2 or 3 teaspoonfuls to the pint) is much used, as a condition of acidosis is alleged by some to be a main factor in shock, and though this theory is far from proven, the results of injection of bicarbonate solution are quite equal to those of normal saline.

In combating shock, *warmth* is most important. The bed to which the patient is removed after operation should be well warmed with hot-water bottles. When he or she has been put into bed a blanket should first be placed over the trunk and limbs; the bottles should then be disposed on both sides so as to supply abundant external heat, and should be replenished as they cool. *Stimulants* may be administered in the form of brandy or whiskey, either by the rectum as already mentioned, or by the mouth in small doses very little if at all diluted.

Drugs are given preferably hypodermically, both on account of the more rapid effect, and because there is no risk of vomiting being excited. The only drugs which should be given in cases of post-operation shock are pituitrin (1 c.c.), which should be injected deeply into the muscles, and morphia (¼ to ½ gr.), which is very useful when the patient is restless or complaining of great pain.

Vomiting and Thirst.—These are two of the most unpleasant sequelæ of operation. I am convinced that much of the distress caused by them is aggravated by the practice of restricting fluid by the mouth to an occasional spoonful of water for the first 24 hours. If a patient is allowed to drink *freely* of warm saline solution (drachm to the pint) or of bicarbonate of soda solution (2-3 drachms to the pint), the result is in the main very satisfactory. The stomach is, of course, excited to vomit, but the bringing up of a large volume of bland fluid washes out that organ, and so tends

to lessen its irritability and the effort required to empty a full stomach is far less trying to the patient than repeated attacks of retching followed by the ejection of small quantities of mucus and bile. If the sickness persists, the patient may be allowed to repeat the procedure. A handkerchief wrung out of *toilet* or *ordinary vinegar* and placed so that the fumes can be inhaled often assists in checking nausea. In some cases a *mustard poultice* over the epigastrium is useful. Some surgeons are in the habit of administering *chloretone* for some days before operation with a view to lessening the after-sickness.

Pain.—Post-operative pain varies enormously in different individuals, even after similar operations. If it is affecting the patient's general condition, inducing restlessness and preventing sleep, it should be met with small doses of morphia. It is better to give ¼ gr., repeated, if necessary, in three or four hours, than to give a larger dose at first. In the case of operations on the pelvic organs there seems to be some advantage in giving the morphia in a suppository. Pain in the wound persisting or returning after the first two days should be looked on as suspicious, and demands a redressing of the wound to make certain of the presence or absence of sepsis.

Flatulence and Abdominal Distension.—These complications are especially likely to occur after a prolonged abdominal operation in which there has been much handling or exposure of the intestines. I find nothing more satisfactory than a warm soap-and-water *enema* containing a drachm of *turpentine*. This may be given on the evening of the operation, and may be repeated after a few hours if necessary. The hypodermic injection of Pituitrin (1 c.c.) is exceedingly useful in cases of persistent meteorism, and may be repeated after an interval of 6-12 hours with good effect. If the condition is very persistent, it is well to administer *calomel* in grain doses repeated every hour for five doses. This may be followed by a saline aperient should the effect be long delayed.

First Movement of Bowels.—Unless some contra-indication exists, the patient should have the bowels moved 48 hours after operation. The best time to give the aperient is on waking after the second night's sleep. If the patient's stomach will stand it, nothing is so satisfactory as *2 oz. of Black Draught*, which gives a single good motion as a rule in from three to six hours without pain or griping. Other satisfactory purgatives are Castor Oil, ½ to 1 oz., especially useful after rectal operations; Pil. Colocynth and Hyoscyamus, 10 grs.; Vegetable Laxative pill (B.W)., 5 to 10 grs.; Cascara Sagrada is rather slow, often requiring to be followed by a saline. The action of the aperient may require to be assisted by an enema in from six to eight hours.

Food.—For the first 24 hours the patient is better if allowed to fast from all solids including milk. If appetite has returned, a cup of tea or beef tea may be given, or some Valentine's meat juice or Brand's essence. In the second 24 hours, a slice of dry toast or of thin bread and butter may be added. After the bowels have been moved more latitude may be allowed, and the patient's appetite may be followed as a guide which will seldom lead the physician astray. Care should be taken that fresh fruit, either

raw or cooked, is given. I have often found great benefit result from the giving of the flesh of ripe grapes or the juice of ripe oranges in cases of persistent nausea.

Treatment of Wound.—In an aseptic case the first dressing need not take place till three days after the operation, unless pain in the wound or a rise of temperature leads to a suspicion of sepsis. The patient will be more comfortable, however, when the soiled and hardened dressings are removed and fresh ones substituted. This should be done under strict antiseptic precautions, and the wound should be sponged free of serum or blood-clot with an antiseptic solution and painted with Tr. Iodi M. before the fresh antiseptic dressings are put on. Should everything be in order, the next dressing need not take place till the twelfth or fourteenth day, when the sutures may be removed.

If a drainage-tube has been left in the wound, it should be removed at the end of 24 to 36 hours, and if its reinsertion is required it should be washed and sterilised by boiling. If drainage by gauze was instituted, the gauze must be withdrawn, and the cavity or sinus may be packed with fresh gauze if necessary. This is easily done when a suppurating area has been drained, but if the gauze has been introduced into an abdominal wound in contact with a fairly healthy peritoneum and bowel, it will be firmly held in place for from 7 to 14 days by coagulated lymph, and could only be removed by unjustifiable force and at some risk before the expiry of that period. It will do no harm if left till it loosens.

Should suppuration have occurred in the wound, the best plan is to remove as many stitches as will give free exit to the pus and allow of the inflamed parts being thoroughly cleansed and dressed. A boracic or perchloride poultice, which should be changed every four to six hours, will clean up the wound, and may be applied for the first two or three days. As soon as the sloughing surfaces begin to show healthy granulations, the cavity may be loosely packed with iodoform or cyanide gauze changed twice a day until the amount of pus has become minimal and healing has begun, and afterwards once a day. Each time the wound is dressed it should be sluiced with 1 in 1,000 perchloride lotion to wash away the discharges, the lotion dried out with sterile wipes, and a drachm or two of 20 vols. solution of Hydrogen Peroxide should be poured into it and allowed to remain. The same treatment may be adopted with abscess cavities which have been opened.

Treatment of Rectal Wounds.—Each time the bowels are opened, the anus and surrounding parts should be first carefully cleansed with mops of cotton soaked in boracic acid solution, and then dried with cotton or gauze. If irritation is complained of, an ointment consisting of—

℞. *Hydrarg. Subchlor.*
Bismuth. Oxychlor.
Morphiæ āā gr. j.
Lanolin ʒj.

may be used with good effect.

Treatment of Vaginal and Perineal Wounds.—When an operation has been performed on the uterus through the vagina, a douche should be administered once or twice daily, consisting of 1 in 4,000 perchloride or drachm to the pint lysol or cyllin. A perineal wound should be bathed with a similar antiseptic solution every four hours for the first two days, and afterwards night and morning. It should also be bathed each time the bladder or bowels act. The sutures may be removed at the end of ten to fourteen days.

Convalescence.—After an abdominal operation the patient should keep to bed for at least two or three weeks if all goes well. This time must be extended if any complications have set in such as suppuration, cystitis or the like. The patient may get up first for an hour or two after the midday meal, and the time should be gradually extended. It is a good plan to allow the patient to get up for a few hours in the morning, then to lie down in bed for two hours after dinner and to get up for a few hours in the evening. After a serious operation the patient should be warned that some months will elapse before normal health is restored, and that full recovery will be hastened by a due amount of rest not only at night, but in the middle of the day, by careful attention to the bowels, which are often constipated, by exercise in the open air and by plain nourishing food. A tonic containing strychnine is often most valuable, and when the patient is anæmic iron should be administered. The motto, *Festina lente,* should be dinned into the ears of such a convalescent.

The use of an abdominal belt is often prescribed as a routine after abdominal section. In my opinion it is merely a costly and useless encumbrance. Ventral hernia grows rarer as technique is improved, and it can certainly not be prevented by wearing a belt. Women find, however, much comfort in the wearing of a belt-corset after an abdominal section.—R. J. J.

OPHTHALMIA—see Conjunctivitis.

OPIUM HABIT (Morphinism).

The treatment of chronic morphinism is a serious undertaking which can only be expected to prove successful when the patient is removed from his home and thoroughly isolated from his relatives and environment in a proper nursing institution provided with an experienced resident physician and a staff of highly trained nurses.

After removal the question of the method of withdrawing the narcotic must be decided upon. Unless the drug is to be replaced by Hyoscine in the plan of treatment to be described later on, the withdrawal must not be either *sudden* or *very rapidly* accomplished.

The rapid diminution of the ordinary daily amount is justified in those rare cases where the progress of the morphinism has been acute, and even then the reduction of a daily dose must be spread over at least ten days or a fortnight.

By the majority of physicians the *gradual* method of withdrawal is accepted as the best, the last attenuated dose being administered about

the fortieth day from the beginning of the treatment. The dose of morphia permitted to the patient will depend upon the amount which he has been able to consume before submitting himself for treatment. About three-fourths of his previous daily allowance may be administered during the first few days, and this should be evenly spread over the 24 hours. The quantity should then be so gradually reduced that by the end of six weeks the dose is practically nil.

It is best to administer the narcotic hypodermically, and when the routine of the nursing home or institution permits it should be given by the physician himself, and when this is not always practicable the physician should measure out the next dose and name the exact hour at which it is to be injected by the nurse. Schroeder stoutly maintains that the onset of severe and threatening symptoms is never the result of sudden withdrawal, and he affirms that such dangers are purely imaginary; the drug is always stopped in the Breslau clinique on admission.

No matter what method of treatment is adopted the sufferings of the patient are always most agonising, and he must never be trusted for a moment during the course, as he will bribe his friends to procure his narcotic surreptitiously if these be permitted to visit him, notwithstanding his most solemn promises and protestations to the contrary.

Weak and attenuated individuals should be kept in bed during the first few weeks of treatment, but in ordinary cases the routine of permitting the patient to be up in his room or even to move about in the open air under the close surveillance of his nurse may be permitted.

Feeding should be as liberal as the weakened gastric organs will permit; a modified Weir Mitchell treatment may be resorted to in some cases; rarely will rectal feeding be needed; strong soups should be freely administered at short intervals. Baths and douchings are valuable adjuncts; the hot-air or thermo-electric bath may be administered as the patient lies in bed; the portable Turkish is more soothing and gives better results than the ordinary warm or hot plunge bath.

When the latter is employed it should be immediately followed by a tepid and cold douche to counteract any depressing effect upon the heart. The general moral discipline is strengthened by arranging that the bathing, douching, feeding and such exercises as are permitted should be carried out at stated hours, to fill in as far as possible the wearying day of the patient.

Next to the difficulty in minimising the terrible cravings of the victim of morphinism comes the serious problem of inducing sleep. The insomnia is always most distressing, and it is a judicious routine in proportioning the amount of the narcotic and the times for its administration to so arrange that the largest dose should be permittted to fall due just before bed hour. It need never be expected, however, that this will sufficiently meet the requirements of the insomnia; hypnotics are always demanded.

Under Insomnia the reader will see all the various drugs mentioned, any one of which he may try which does not contain opium or morphia.

The writer has tried almost all of them in the condition under notice, and he finds that either Paraldehyde, Trional or Sulphonal is the best. It is a good plan to abstain from chloral and Indian hemp, as there is much danger of a habit being established by the use of these drugs, and the administration of trional and paraldehyde upon alternate nights is free from any objections. $\frac{1}{100}$ gr. Hyoscine and Hydrate of Amylene (60 mins.) have given excellent results. Mattison gives gradually increasing doses of bromides till 90 grs. daily are taken, when the morphia is entirely stopped, after which 30 grs. Trional are given nightly for seven days, the dose being then diminished to 15 grs. nightly for another week, after which Paraldehyde and Chloral in small doses may be given.

Macleod gives 2 drs. Sodium Bromide every two hours during two days, and 1 dr. during the third day. 3 oz. suffice, and the sleep lasts several days, from which the patient may awake with the craving greatly diminished, and some physicians induce this deep bromide sleep and keep it up for several days at intervals as a routine method of treatment for doing away with the use of morphia.

Many drugs have been recommended as substitutes for the opium during the day-time, but, speaking generally, there is little advantage in replacing one vice by another. The exception which may be made in the case of alcohol will be presently referred to. Some authorities substitute Heroin for the morphia or opium from the start; thus Ahlborn systematically commences with $\frac{1}{6}$ gr. heroin by the mouth for each grain of morphia which the patient had been in the habit of indulging in, and in 4 weeks he states that he has found the craving to have disappeared, after which the drug is gradually diminished. It has, however, been proved that heroin is as dangerous a drug as morphia is in establishing a craving, and there appears to be little if any advantage in employing it as a routine treatment for morphinism.

Cocaine has been recommended and tried, but the cocaine habit being a more serious vice than morphinism this drug should never be employed as a routine. Occasionally, however, a full dose of the Liquid Extract of Coca may be administered when the collapse and restlessness are extreme.

Lott's method of substituting Hyoscine for the opium or morphine is one of the best routine treatments. It consists in the hypodermic administration of the Hydrobromide of Hyoscine, commencing with a single dose of $\frac{1}{100}$ gr. and following it up with half of this amount every hour for 24 hours till a marked degree of hyoscine poisoning has become established, as seen in mild delirium, hallucinations, dilatation of the pupils, dryness of the mouth and skin, &c. These effects are kept up for 12 or 24 hours more by graduated doses sufficient to prolong without intensifying the intoxication, Strychnine being combined with the hyoscine should any sign of cardiac exhaustion appear. After the patient has regained his normal mental condition, Pilocarpine is administered hypodermically every hour in doses of $\frac{1}{8}$ gr. till copious sweating

and elimination of the hyoscine occurs. During this latter stage of the treatment the condition of the heart will require careful watching, and a full dose of Strychnine hypodermically must be administered promptly should cardiac failure threaten. Diarrhœa, which is liable to follow the action of pilocarpine, should be controlled by appropriate astringents combined with Bismuth.

Carlisle's method consists in the hypodermic administration of $\frac{1}{150}$ gr. Hyoscine with $\frac{1}{6}$ gr. Morphine, which is repeated every 6 hours during the first day. On the second day the injection is given every 8 hours, and on the third day at intervals of 12 hours, the last dose being administered at bed hour on the fourth day along with 15 grs. Trional by the mouth, active purgation being kept up all the time.

In one case with very exceptional environments the writer substituted large doses of Alcohol which kept the patient in a state of mild intoxication for several days, but such a plan obviously cannot be recommended as a routine owing to the danger of establishing the alcohol habit.

Many patients are found to be the victims of both opiates and alcoholic stimulants. If the physician should succeed in weaning them off their opium, he will probably find it will be only to receive the credit of having made them inebriates.

In those cases where for any special reasons removal to a nursing institution is impossible, a trial may be made at home of reducing the daily amount of the narcotic; but if such be attempted at all the diminution must be most gradual, the reduction being accomplished by small fractional proportions. Failure generally results in chronic cases by the physician's haste or anxiety to make progress, and sometimes the patient is also to blame, being tempted to curtail to an extent beyond his power of endurance. Moral treatment, in such instances, is of the greatest value for a time, and every change in the patient's environment may be a benefit, such as the selection of new companions and occupation, and change of scene and habits. Alcohol is especially dangerous, and on no account should chloral be prescribed. The greatest difficulty will be from insomnia, and Trional or Paraldehyde combined with a diminished dose of the opiate at bed-time is the best remedy. In cases treated at home Jennings's plan of reduction may be tried, whilst the patient is permitted to carry on his usual avocation, the period of treatment extending over 3 months. He takes the case of a patient injecting 20 grs. morphia daily. The syringe is given up, and an initial drop of 3 to 5 grs. is made, and a daily drop of 1 gr. for some days till this becomes irksome, then $\frac{1}{2}$, $\frac{1}{4}$, and finally $\frac{1}{6}$ gr. is daily dropped. The real difficulty begins when the daily amount injected is lessened to about 2 grs. After this period, for every $\frac{1}{6}$ gr. suppressed he gives twice as much by the mouth or rectum till in about 12 days the injections are reduced to zero, after which the dose by the mouth is gradually diminished to nothing, and if the "progression" is properly carried out the cure is effected with only a night or two of restlessness requiring hypnotics. No suffering need ever occur. Sparteine hypodermically or Digitalis by the mouth

forms an essential part of the routine, and must be commenced as soon as the heart becomes feeble or sluggish.

Whatever form of treatment is selected, supervision should be carried out for a period of several months, as the weakened will-power of the patient requires a long time for recuperation, during which he cannot be trusted.

Certain symptoms are liable to occur during the early days of the treatment; the most important of these have been already dealt with. Next to the insomnia and cardiac weakness the most frequent is nausea and vomiting; these are best met by large doses of effervescing waters, which, if not retained, will aid in washing out the stomach. A copious draught of tepid water containing a teaspoonful of Bicarbonate of Soda may be occasionally administered for the same purpose, and this is also believed to diminish the craving by keeping the stomach contents alkaline.

The Cocaine Habit is to be treated upon the same principles as morphinism, and the same details may be applied and carried out as if the patient had been addicted to opium-eating; unfortunately, both vices are not infrequently met with in the same individual, and when associated with alcoholism the case may well be regarded as hopeless.

OPTIC NERVE DISEASE.

Inflammation attacking the terminal portion of the optic nerve is known as optic neuritis or papillitis, and its treatment must be directed to the removal of the primary cerebral cause, as tumour, internal hydrocephalus, sinus thrombosis, cerebral abscess, meningitis, &c. Trephining is urged by Horsley and Risien Russell in every case of cerebral pressure in which choked disc is present; after the removal of bone a free incision should be made in the dura mater. In this way blindness may be prevented even when the primary disease is incurable.

The treatment of the optic neuritis following various blood conditions as seen in Bright's disease, chlorosis, lead poisoning and diphtheria, which is more amenable to drugs, will be found discussed under the heading of the primary affections.

Retrobulbar neuritis of secondary nature is due to the action of toxins operating upon the nerve behind the eyeball and causing pallor of the temporal half of the disc with some atrophic change. This produces amblyopia with a central scotoma for red and green or a central loss of vision from axial neuritis. The treatment of this toxic amblyopia is discussed under its own heading, and consists mainly in the removal of the exciting causes—viz., tobacco, alcohol, lead, salicylates and quinine.

" Reflex " amblyopia arising from irritation of the fifth nerve causing trigeminal neuralgia yields to remedies directed to the primary cause as discussed under Neuralgia, and the various types of disturbance of vision met with in hysteria yield to agents directed to the general neurotic condition.

" Primary " atrophy of the optic disc, as seen in tabes, general paralysis of the insane and disseminated cerebro-spinal sclerosis, like the " consecu-

tive " atrophy which follows optic neuritis (choked disc), is usually beyond the reach of remedial agents. The same remark unfortunately holds with regard to disease of the chiasma and optic tract producing the various forms of hemianopia, unless when the primary cause is syphilis and energetic antisyphilitic treatment is commenced at an early stage.

Retinitis.—The various forms of retinitis demand measures suitable to the primary blood or bloodvessel conditions. Thus the treatment of albuminuric retinitis is that of the underlying type of Bright's disease, often associated also with arterio-sclerosis.

Syphilitic retinitis is usually complicated with choroiditis, and yields when energetically attacked by Mercury. Retinitis pigmentosa is a congenital affection occasionally met with in hereditary syphilis, and being of a degenerative type is little influenced by mercury, though hypodermic medication with Strychnine and the application of a weak continuous current may retard its progress, and Doyne reports good results from the administration of the uncooked retina of sheep with oxygen inhalation.

Hæmorrhagic retinitis independent of renal disease occurring in chronic valvular disease and arterio-sclerosis can only be met by remedies directed against the primary cause—as saline purgatives and vaso-dilators when the tension is high, and large doses of Iodides in the absence of high tension. The retinitis occurring in diabetes and leukæmia calls for agents indicated by the primary disease.

The " Blinding of the Retina " by strong sunlight, the electric arc, or the reflected light from snow is preventable by the use of dark smoked or coloured glasses. Powerful electric light should be cut off by several layers of red or by a combination of red and blue glass.

When the exposure to strong electric light has already occurred absolute rest to the eye in a darkened room is essential, after which Strychnine hypodermically, following cupping of the temples and subconjunctival saline injections, should be resorted to. At a later stage the use of a weak continuous current is indicated.

Snow-blindness speedily yields to rest in a darkened room or to the use of smoked glasses, but the pain and smarting of the conjunctiva call for Cocaine instillation and astringent eye-washes.

Detachment of the Retina.—The treatment of this serious malady, which often ends in blindness, is still in a most unsatisfactory condition.

Rest in bed is essential in all cases, and the recumbent position should be maintained as long as the patient can be got to submit to it. Bandaging of the eyes is desirable, but few individuals will tolerate this for any length of time; hence a darkened room or one with a subdued light with a couch to which the patient may be gently removed must suffice. Cough, if present, should be relieved, and straining at stool prevented by avoiding constipation.

Iodides may be administered in combination with mild diaphoretics; Pilocarpine injections administered with the intention of producing copious sweating were formerly much relied upon, but the absence of any

real evidence of their value has led to the abandonment of this form of treatment as a routine.

Puncture of the sclerotic for the evacuation of the subretinal fluid, when skilfully performed, always permits the retina to come again into contact with the choroid, and in some cases the fluid does not reaccumulate, but in the great majority of cases this desirable result does not follow, so that the effects are as a rule only temporary, even when pressure bandage is resorted to after the operation. Scleral puncture may, however, be employed in conjunction with the following procedure:

Subconjunctival injections of 4 to 8 per cent. Saline Solution—these alone or with the addition of a small amount of Cyanide of Mercury or 1 per cent. Quinine—may be made beneath the conjunctiva, 10 mins. every 5 or 7 days. Gelatin has been employed likewise in combination with weak saline solution.

Dor advises cauterisation with the view of cementing the retina and choroid; after puncturing to withdraw the fluid the galvano-cautery is introduced into the scleral wound.

Deutschmann's method of treating the detachment is bolder than any of the preceding plans, and he claims to have cured over 25 per cent. of 267 cases. His operation consists in introducing a narrow two-edged knife through the sclerotic, detached retina and vitreous to a counter-opening in the sclera on the opposite side; this bisection of the vitreous and retina he repeated in some cases as many as ten to twenty times at fortnightly intervals, only 38 per cent. of the cases proving failures, the remainder being improved or cured.

ORCHITIS AND EPIDIDYMITIS.

In dealing with *acute* inflammation of the testicle, it is worth while remembering that when the infective organisms are conveyed in the blood-stream the body of the testicle is found to be the seat of inflammation as in the orchitis of mumps, typhoid fever and gout, whilst the infection, extending from the urethral mucosa usually produces epididymitis as in gonorrhœa. In gonorrhœa the testis proper does not wholly escape, hence the term gonorrhœal epididymo-orchitis. In *chronic* tuberculous affections of the testicle, on the other hand, the epididymis is most frequently the first part affected, though the bacilli reach the gland by the blood-stream. These facts have an important bearing upon treatment. The treatment of acute orchitis and of epididymitis is in the main identical.

Rest in bed in the horizontal position, lying on the back, is to be prescribed. A small board should be placed across the front of the thighs; upon this the scrotum can be supported as if resting upon a shelf. A board about as thick as the sides of a cigar-box, only longer, with the upper edge bevelled in the middle, where it may be hollowed out, so as to get well under the scrotum, answers the purpose. A piece of broad strapping may be used in the same way, but it soon becomes permeated with moisture, and pillows are open to the same objection.

In mild attacks where the patient *must* move about, a different method

of obtaining rest for the inflamed gland should be sought. Any of the ordinary suspensory bandages may be tried. As a rule they are much inferior for this purpose to one which the patient can extemporise for himself. This he does by tying a handkerchief bandage or girdle round the waist, to which another handkerchief (three-cornered) is attached behind in the middle line, brought down between the thighs and fastened again in front to the waist girdle. In this way not only is sufficient support given to the testicle, but whatever local application is selected it can thus be easily kept in contact with the scrotum, and at a later stage moderate continuous pressure may be kept up. Patients are found to devise various methods by which the suspension can be carried out by attaching the bandages to the braces or shoulders.

As soon as the patient comes under notice a smart Saline purgative should be given. 1 oz. Rochelle Salt in a bottle of aerated lemonade is an efficient and palatable dose. In very plethoric subjects Sulphate of Magnesia may be given often, in teaspoonful doses, so as to keep up brisk purging for a time.

Where there is much constitutional disturbance a diaphoretic and antiphlogistic mixture like the following may be given:

℞. *Tincturæ Aconiti* ℥xxxij.
Liquor. Ammon. Acet. ʒij.
Vini Antimonialis ʒvj.
Aquæ Camphoræ ʒv. *Misce.*

Fiat mistura. Capiat cochlearium unum magnum secunda quaque hora.

Aspirin or Salicylate of Sodium in 10-gr. doses every 3 hours alone or with 2 grs. Antipyrine is also a valuable method of treatment when the constitutional symptoms are marked.

The diet should consist of milk and kali water or whey, rennet and mucilaginous drinks, solids and animal food being forbidden. One large opiate at night with Bromide of Potassium is a valuable method of giving ease and relieving pain. Local treatment is of importance. Where the patient is seen early, an ice-bag or a cold evaporating lotion continually changed is the best application. A cambric handkerchief, dipped in iced water, with small pieces of ice laid in between its folds, is an efficient method of applying cold, or Leiter's tubes may be employed.

Seldom are poultices or warm fomentations indicated. The most popular and time-honoured local application is the Green Extract of Belladonna rubbed up with three times its weight of Glycerin. The standardised B.P. preparations of belladonna should never be employed owing to the likelihood of absorption occurring from the thin scrotal skin, and the liniment is especially dangerous and is certain to cause poisoning when covered with oiled silk. 1 in 8 of Ichthyol and Glycerin is also a very satisfactory application. An ointment of 5 per cent. Guaiacol in Vaseline

has most marked analgesic action. The belladonna cream is the best local routine in the treatment of the orchitis of mumps, in the epididymitis due to gonorrhœa, and to the inflammatory condition following catheterisation and stricture dilatation.

When the pain and high tension fail to yield to cold and belladonna, Leeches may be applied, a large scrotal vein may be opened, or a number of small incisions may be made into the œdematous skin. A more reliable and speedy method of reducing tension is to make a number of punctures in the epididymis or testicle by a sharp Glover's needle or a fine tenotomy knife. If any quantity of fluid has accumulated in the tunica it should be evacuated with a fine trochar and canula when the tension keeps high, but as a rule the swelling will be found to rapidly subside without making any breach in the cutaneous covering.

The rule laid down for the treatment of gonorrhœal epididymitis is rigidly to suspend all local treatment of the gonorrhœa as long as the testicular inflammation exists, though the writer has often seen good results follow the gentle washing out of the anterior urethra with tepid water injections stained with Condy's fluid, but posterior urethral instillation should be suspended.

Vaccine treatment in gonorrhœa is often unsatisfactory and disappointing, but it unquestionably is efficacious in the encapsuled lesions as epididymitis and arthritis, and may be resorted to in chronic or bilateral affections of the epididymis. Should pus form, which is rare, the abscess must be promptly evacuated by a free incision and the cavity flushed with normal saline solution.

Hagner in acute gonorrhœal epididymitis makes a free incision into the tunica vaginalis, opposite to the junction of the testicle and epididymis, followed by multiple punctures in the tunica albuginea; should pus escape from any of the punctures, these are enlarged and the cavity injected with 1 in 1,000 Perchloride and the tunica sutured after flushing with the same solution.

After the subsidence of active inflammatory mischief, induration and thickening may be dissipated by the application of the Lin. Pot. Iod. c. Sapone or by inunctions of Ungt. Hyd. Oleat. combined with Iodides internally.

Pressure by means of strapping is a valuable means of effecting the absorption of effused products, and this agent has been employed in the treatment during the acute early stage when there is high tension. Though often relief follows this procedure, it causes at first severe pain and distress. Some surgeons apply pressure by means of a laced suspensory bandage which can be tightened over the swollen gland.

An ordinary suspensory bandage should be worn for several weeks after the patient is enabled to leave his bed.

Gouty orchitis, or epididymitis, yields to rest, warm fomentations or hot poultices, and the administration of full doses of Colchicum Wine combined with Salicylate of Soda and the occasional use of cathartic doses of Sulphate of Magnesia as in Scudamore's Mixture.

Chronic Orchitis.—When not of tuberculous origin this is nearly always syphilitic, and will require both constitutional and local treatment. The constitutional remedy is, of course, Salvarsan, Mercury or Iodides or a combination of these.

In weak cachectic subjects who have suffered from syphilis for many years previous to the appearance of the orchitis, and who have been previously brought well under the influence of mercury at least once before, it will be wise to begin with at least one dose of salvarsan or one of its substitutes, or if this be contra-indicated by 20 to 30 grs. of the iodide of potassium three times a day. In all other cases, mercury may be given in amount and in the manner indicated by the symptoms and history of the case. Thus in comparatively recent cases the patient should be brought under the influence of the drug without unnecessary delay by inunction or by the administration of moderate doses of any mercurial preparation. It will never be necessary to cause salivation, but the drug should be pushed till the gums are slightly touched, after which the effect may be kept up for long periods, without injury to the patient, till the induration in the testicle melts away.

The iodide may be combined with mercury and prescribed in a mixture, each tablespoonful of which can be made to contain 20 grs. Sodium Iodide, and $\frac{1}{16}$ gr. Perchloride. Donovan's Solution in the maximum dose of 20 mins. may be given thrice daily. The orchitis occurring in congenital syphilis is best treated by full doses of Grey Powder.

Local treatment will consist in the use of mercurial applications and pressure applied to the enlarged testicle. Where hydrocele complicates the case—a very common occurrence—time will be saved by first tapping the tunica vaginalis, and, after the evacuation of the fluid, applying lint smeared over with Ungt. Hydrarg. Co. and then applying firm pressure to the swollen gland by strips of stout adhesive plaster.

When the patient is already well under the influence of mercury, the mercurial dressing may be omitted and plain soap plaster applied direct to the shaven scrotum. This is often the only treatment necessary in dealing with a chronic orchitis which is not syphilitic, such as where considerable induration or enlargement follows the subsidence of an acute attack of orchitis or epididymitis, or follows upon an injury. Where the induration is localised in a portion of the epididymis or body of the testicle, or in those cases where pressure cannot be tolerated, a little mercurial ointment may be rubbed in with the finger.

The mercurial preparation may be diluted with an equal amount of the Unguentum Conii, or 10 or 15 per cent. of the Green Extract of Belladonna may be combined with it when pain or tenderness exists. The Oleate of Mercury with Conium may be employed with benefit, as in the following:

℞. *Oleatis Hydrargyri* ʒiij.
Unguenti Conii ʒiv.
Extracti Belladonnæ Vir. ʒj. *Misce.*

Fiat Unguentum.

After a few weeks' treatment the organ generally diminishes in size and in consistency, and the true testicular sensation returns. Rarely will castration be called for, unless in neglected cases where the surgeon may find the testicle hopelessly destroyed by abscesses or softened gummata. During the treatment by mercurials and pressure the patient can generally be permitted to walk about or pursue his usual avocation, all sexual indulgence being prohibited.

Close attention to diet and to every means by which the general health can be improved must not be neglected, and at a later stage Cod-Liver Oil, tonics, Chloride of Gold, or Arsenic and Strychnine in combination with Iron and sea-bathing will be very valuable.

Tuberculous disease of the testicle affects the epididymis, and is usually secondary to kidney and bladder infection. Unless it is proved to be primary by examination of the urine and cystoscopy it should never be treated by castration. When this is done the disease invariably spreads rapidly to the testicle on the opposite side. When there is a prospect of removing a primary focus from a tuberculous epididymis then operation is not only allowable but imperative. Secondary infections should be treated by removal of the primary focus, usually the kidney, and symptomatic treatment for secondary lesions. Where breaking down occurs the pus must be evacuated and the cavity closed, otherwise rest, tuberculin and general antituberculous methods are to be resorted to.

Where a chest lesion also exists there need be no hesitation in removing the entire gland if deeply involved and the lung affection is not in an advanced stage, provided the urine is free of tubercle bacilli.

OSMIDROSIS—**see Perspiration and Bromidrosis.**

OSTEITIS DEFORMANS.

This condition, also known as Paget's disease, is beyond the reach of remedial agents. In the early stage of this mysterious malady something may be done by relieving the yielding long bones from the weight of the trunk, as in rickets and osteomalacia, but the permanent deformity and the sarcomatous growths, when these are present, cannot be dealt with surgically. The respiratory embarrassment which supervenes owing to the thoracic deformity may be palliated by Oxygen inhalations.

The treatment of the Osteitis Deformans of Von Recklinghausen (*Osteomyelitis fibrosa*) is equally unsatisfactory, though in a few cases benefit has followed the operation of trephining and curetting the medullary canal when the disease was limited to a single long bone. The liability to fracture may be lessened by the use of a leather casing or splint applied to the diseased bone. Fractures which occur are liable to be followed by great deformity unless treated with much skill and patience, as union is very slow.

The treatment of Hypertrophic Pulmonary Osteo-Arthropathy or Marie's Disease consists in the use of agents directed against the primary malady—empyema, fibroid phthisis, congenital heart disease, bronchiectasis, &c. As all but the first-mentioned affection are incurable, this form

of trophoneurosis must be regarded as beyond the reach of art, save when the disease is controllable by a radical operation performed for the removal of chronic empyema.

OSTEO-ARTHRITIS—see under Rheumatoid Arthritis.

OSTEOMALACIA—see Mollities Ossium.

OSTEOMYELITIS.

Acute inflammation of bone may originate either beneath the periosteum or in the medullary cavity; the modern view tends towards the acceptance of the theory that in most, if not in all, cases of acute osteomyelitis involving the shaft of the long bones formerly known as acute necrosis the diseased process originates in the medullary cavity by the introduction of pyogenic organisms carried in the blood-stream, the periosteum being invaded later on.

Absolute rest in bed and the usual palliative remedies to minimise pain, fever and constitutional disturbance are clearly indicated.

As soon as diagnosis has become established there should be no delay in relieving the abnormal tension of the tissues. A free and deep incision should be made over the centre of tension and tenderness. This incision should extend freely and should open the periosteum. If in 24 hours the pain, rise of temperature, and general malaise have not subsided, then the medullary canal must be opened up. There should be no hesitation in cutting out by the angular gouge a strip of bone, so as to make a long deep channel or gutter in the diaphysis in every case where pus is found on trephining the cavity of the bone. After the free evacuation of all pus and shreds of sloughing tissue, the medullary cavity should be flushed with warm saline solution or cleansed by the application of Peroxide of Hydrogen on wool or swabbed with solution of Eusol or Biniodide of Mercury (1 gr. to 1 oz.). The cavity may then be freely drained by the insertion of one or more tubes, or it may be packed loosely with gauze. No stitching of the wound is required or permissible.

As a rule it is not considered a safe procedure to strip back the periosteum at this early stage of the inflammatory action and to resect the whole or any part of the shaft, because it is usually impossible to determine the extent to which resolution may be aided by the incisions, but if the entire diaphysis is obviously dead and lying free in a large abscess cavity resection may be carried out after such delay as will allow a firm involucrum to be formed and to maintain after removal of the sequestrum the normal configuration of the limb. In all cases where the opening up of the medullary canal has been delayed till the disease has been permitted to advance, any loosened and dead bone should be removed at the operation, unless in the case of the femur or humerus, where it will be advisable to postpone sequestrotomy in order to encourage the outgrowth of new bone from the periosteum, so as to provide a strong casing for future support of the limb.

Should the mischief be found to have invaded the neighbouring joint,

which is especially liable to occur at the hip owing to the intra-articular nature of the epiphysis, the joint will require to be opened and the detached and dead epiphysis will require removal.

After operation the limb should be fixed upon a suitable splint and antiseptic dressings applied, and every means employed while waiting for the separation of the sequestrum whereby the natural resistance of the tissues may be strengthened against the *Staphylococcus aureus*, which is the chief agent in the infection. In addition to open-air treatment, improved hygiene, and careful feeding, Vaccine therapy may be employed, the culture used being obtained from the secretion of the wound.

In hopeless cases amputation may be demanded, but this should not be undertaken in the presence of symptoms indicative of a general infective or pyæmic state. In acute cases it is more likely to be required when the inflammation has led to extensive joint disorganisation; at a later stage the exhaustion caused by prolonged suppuration in the soft tissues and the plugging of important veins or where a flail-like limb has resulted from total destruction of the shaft of a long bone, amputation will be called for.

When evidence of separation of the sequestrum is obtainable by passing a probe into one of the sinuses and striking upon loose dead bone the operation of sequestrectomy should be considered. This should not be resorted to in a hurry when all is going well, for two reasons—the dead piece of bone, if small, being constantly submitted to the erosive action of the living phagocytic cells, may in some cases be entirely dissolved or disintegrated piecemeal without further operation; and, again, delay may be wise when a large portion of the diaphysis of the femur or humerus has been destroyed in order to enable the periosteum to manufacture a cylinder of new bone (the *involucrum*) from the osteoclasts which have escaped destruction before performing any extensive cutting operation for the release of the dead shaft. It is, however, a mistake to procrastinate too long till the sheath of new bone becomes hard and thick.

Considerable help may be obtained from a skiagram, especially if taken stereoscopically, and interpreted skilfully, which will show the magnitude of the sequestrum and the thickness of the involucrum. The operation of sequestrectomy will be described later on.

Chronic or subacute osteomyelitis, like the so-called "quiet necrosis" of Paget, may commence insidiously and terminate in the separation of the sequestrum, or eventuate in a circumscribed collection of pus (Brodie's abscess) at the epiphysial junction or in any portion of the bone. These cases are allied to relapsing osteomyelitis where a pocket of pyogenic infection from the original staphylococcic invasion or from the typhoid bacillus may remain latent for many months or years. In such cases there is usually a considerable degree of thickening of the periosteum, hyperostosis and sclerosis, and much mechanical difficulty may be experienced in setting free the closely imprisoned sequestrum.

Sequestrectomy is performed after rendering the limb bloodless by elastic bandaging and the application of Esmarch's tourniquet. A free

incision should be made down to the periosteum guided by the situation of the sinuses and the information obtained by a skiagram. The periosteum is to be freely divided and elevated from the shell of new bone by a stout elevator till the cloaca is laid bare. The chisel, gouge or trephine will be required to remove enough of the involucrum to permit of the removal of the sequestrum. Sometimes the old-fashioned plan of trephining at two spots, including in each disc a cloaca, is the best, a Hay's saw being employed to connect the trephine openings so as to remove a small rectangular plate of bone through which the piece of dead bone may be delivered entire or in two portions, after being snipped with a cutting bone forceps.

After the removal of all dead bone the velvety granulations which line the cavity in which it has lain are to be scraped away with a sharp spoon and the bony walls swabbed with a disinfecting liquid—Eusol, Carbolic Acid, Hydrogen Peroxide or Perchloride of Mercury 1 in 1,000. The cavity is then packed with gauze and permitted to heal from the bottom by granulations. Mosteig-Moorhof's plan allows of the sealing up of the wound without drainage, the cavity having been sterilised by a jet of hot air and filled with a heated mixture of powdered Iodoform, Spermaceti and Sesame Oil.

Acute osteomyelitis affecting the flat bones of the skull is to be treated upon the same principles. This is liable to follow infected wounds of the scalp with depressed fractures; the presence of pus between the dura mater and bone (Potts' Puffy Tumour) calls for an immediate incision through the pericranium and the application of the trephine. Syphilitic lesions of these bones may require similar treatment; commencing often in the periosteum, gummata may break down and lead to suppuration, involving the diploë or dura mater, the inflammatory process being further intensified by the introduction of pyogenic organisms.

Under Periostitis will be described the treatment suitable for those cases of acute and chronic inflammation in which the periosteum appears to be primarily affected. Some of these cases are doubtless examples of osteomyelitis, the mischief having originated in the medullary cavity and the pus ultimately finding its way beneath the periosteum. But since there cannot be any difficulty in accepting the frequency of injury (contusions, &c.) as a direct cause of a simple periosteal inflammation, either acute or chronic, and of syphilis and rheumatism attacking the periosteum without invading the medullary cavity, the treatment of periostitis will be described under its own heading.

The so-called "Growing Pains," or Growth Fever, occurring in childhood can hardly be regarded as having a septic origin, though some surgeons consider the condition as allied to a mild form of osteomyelitis and due to the micro-organism of rheumatism. The affection may eventuate in increased growth of the long bones, but when suppurative results follow the diagnosis may be considered as in error. As a rule rest in bed till the tenderness disappears is all that is necessary in the way of treatment. Should the pains continue severe, small doses of Aspirin may be administered.

OTALGIA AND OTITIS—see under Ear Disease.

OTORRHŒA.

The treatment of purulent discharge from the ear will depend upon the removal of the cause when possible and the carrying out of a rigid antiseptic system. The subject has been already dealt with under Ear Diseases (p. 242).

OVARIAN TUMOURS.

At the present day it is scarcely necessary to say that the treatment of ovarian tumours may be shortly stated in the words—complete removal as soon as practicable. No drugs, whether administered *per os* or applied locally, can have any beneficial effect on the tumour, and short of complete removal, surgical interference such as tapping does more harm than good by inducing inflammatory changes in the tumour or in its surroundings, with the certainty of forming adhesions and the possibility of setting up a fatal peritonitis or giving rise to a dangerous collapse.

Ovariotomy in an uncomplicated case of tumour, whether mulilocular proliferating or papillary cyst, dermoid cyst, unilocular cyst or fibroma of the ovary, is one of the simplest and safest of major operations. The results are almost uniformly satisfactory, recovery is usually speedy and uneventful, and unpleasant after-effects are almost unknown. The best time to choose for the operation is about a week or 10 days after a menstrual epoch. The patient should be prepared beforehand by a course of aperients administered for 3 or 4 nights in succession, so as to empty the bowels thoroughly. She should have a vaginal douche of 1 in 4,000 Perchloride of Mercury on the 3 nights preceding the operation, and if there is a purulent or muco-purulent discharge measures should be taken to get rid of it before she is operated on (see under Leucorrhœa and Endometritis). The preparation of the patient and of her surroundings are detailed in the article on Operations, Treatment of, which should be consulted by the practitioner in default of special instructions from the operating surgeon.

The steps of the operation consist in an incision through the abdominal wall between the umbilicus and the pubes just to the left of the middle line. The earlier ovariotomists made a short incision of about 3 inches in length, tapped the cyst with a trochar, and after evacuating most of its fluid contents drew the collapsed tumour through the incision and proceeded to secure the pedicle. The trend of modern surgery is in the direction of dispensing with tapping altogether and enlarging the incision so as to permit of the cyst being delivered intact through the abdominal wall. In this way there is no possibility of the abdomen being soiled with the cyst contents, and there is therefore no possibility of grafting on the peritoneum living cancer cells, should the growth turn out to contain malignant elements. With the modern technique of closure of the abdominal wound the risk of subsequent ventral hernia is reduced to a minimum, and as it is possible to operate more rapidly and to deal more easily with

adhesions by this method, it seems likely that it will continue to gain adherents. In several instances in which I have incised the abdominal wall from the pubes practically to the ensiform cartilage, convalescence has been as rapid and the after-results as good as with a 3-inch incision. When the tumour has been delivered it will be seen to be attached to the pelvis by a pedicle consisting of the suspensory ligament of the ovary with the ovarian artery, the Fallopian tube and the ovarian ligament with the anastomosis between the uterine and ovarian arteries, enclosed between the peritoneal layers of the broad ligament.

The classical method of dealing with the pedicle is to transfix it with a pedicle needle, avoiding the large venous trunks. The ligature with which the needle is armed is divided into two halves, which are interlocked, and each half is then tied separately. The pedicle is then cut across between the tumour and the ligatures, leaving an ample button of tissue on the stump above the ligature to prevent slipping. Many operators reinforce the ligature by picking up the vessels on the face of the stump and tying them separately. A few points of suture may be inserted so as to lessen the raw surface of the stump, and after the peritoneal cavity has been sponged clear of blood, the other ovary inspected to make sure of its healthiness, and the stump finally looked at to see that all bleeding is controlled, the suturing of the abdominal wall is begun.

This method of securing the pedicle is in my opinion inferior to that about to be described, first because it is difficult to tie a sufficiently tight ligature *en masse* with catgut, which is now almost universally employed, so that there is distinct danger of the ligature slipping after the catgut has been softened by the peritoneal fluid; and, secondly, because such a stump can scarcely be covered in with peritoneum so as to avoid leaving a raw surface. Both these drawbacks are avoided by securing the severed pedicle with a continuous suture applied as follows: A curved needle threaded with catgut takes up the ovarian artery in the first stitch, which is tied around the artery and suspensory ligament. The pedicle is then cut through with successive snips close to the tumour, and the needle takes up each successive portion of the broad ligament as it is severed, the final stitch being tied around the Fallopian tube and utero-ovarian arterial anastomosis. The stitches cannot slip off, and practically no raw surface is left; even the line of suture can be buried for the most part by bringing the suspensory ligament and the stump of the tube together with a single stitch. In suturing the abdominal wall the peritoneum should first be united with a continuous catgut suture, then interrupted silkworm gut sutures should be inserted through all the remaining tissues of the abdominal wall at intervals of an inch, and before these are tied the anterior wall of the rectal sheath should be brought together with a continuous catgut suture. A much neater scar will be obtained if a continuous catgut suture either subcuticular or through the skin edges is added.

The after-treatment of an ovariotomy differs in no respect from that of any other operation, and will be found in detail in the article on Operations, Treatment of (*q.v.*). It may be mentioned here that the inability of

patients to pass water after operations such as ovariotomy is often due to want of training in the use of a bedpan; it is well to see that such training is given in the days during which the patient is being prepared for operation. If any real difficulty exists, no harm will be done by allowing the patient to go on for 18 to 24 hours before the bladder is relieved; failing the well-known expedients of warm water in the bedpan and the application of a warm sponge to the vulva, the catheter must be passed with proper aseptic precaution and under the guidance of the eye.

Ovarian Tumour with Complications.—Ovarian tumours are liable to certain complications. Of these, the most common is superficial *inflammation,* which shows itself by pain and tenderness in the area affected; there is often some interference with the function of the bowels, and some rise of temperature and pulse-rate. Such a condition is best treated by rest in bed with hot applications to the affected area. If the pain is severe Lin. Belladonnæ and Lin. Chloroformi in equal parts may be sprinkled on cotton-wool and applied to the skin. It is very seldom that morphia is required, and if it be given the dose should be very small for fear of still further encouraging constipation. The bowels should be carefully regulated by the daily use of an aperient. As the inflammation almost invariably causes the formation of peritoneal adhesions, which are soft and fragile at first and become firmer and more ligamentous with time, operation should be undertaken as soon as the temperature and pulse-rate have come down to normal and the acute symptoms have subsided.

Another fairly common complication is axial rotation or *torsion of the pedicle,* which is accompanied by obstruction to the venous return, causing rapid increase in the size of the cyst, with partial necrosis of its walls; this is followed by adhesive peritonitis, causing adhesions to develop between the cyst and its surroundings. The accident is accompanied by pain, which is more acute the more tightly the pedicle is twisted, and may cause collapse and vomiting. The sudden increase in size of the tumour often leads to its detection for the first time, and as the symptoms in an acute case are those of an "abdominal catastrophe," these cases are often operated on at once under the mistaken diagnosis of acute appendicitis, rupture of a viscus or the like. Cases so treated as a rule do very well, but if the true diagnosis is arrived at it is as well to tide over the initial shock and collapse by giving small doses of Morphia with rectal injections of saline solution (Oj. with brandy ℥j.), repeated every 3 or 4 hours, and to operate at leisure on the following day. If operation be postponed for some weeks or months the tumour will be found surrounded with dense adhesions.

Rupture of the Cyst may occur with disappearance of the tumour and escape of its contents into the abdominal cavity. Any shock or collapse caused by the accident should be treated and the cyst removed as soon as this has passed off.

Suppuration of the cyst is a dangerous and troublesome complication, but fortunately not common. A suppurating cyst is always densely

adherent to its surroundings, and in many cases its cavity communicates with the bowel, bladder or exterior. It is hopeless to attempt to cure such a case unless the cyst is excised, but it is permissible to make an endeavour to improve the general condition before operating if the patient is much worn out and emaciated. For this purpose general hygienic measures, fresh air and sunlight, good feeding and rest may be tried. It is possible that vaccine treatment might assist, but in view of the difficulty of deciding what particular microbe is causing the suppuration such treatment had best be handed over to a specialist, as the injection of a vaccine in the dark is likely to do harm rather than good. The attempt to improve the patient should not be too prolonged, and if after a week or two no strength has been gained it is well not to delay operation lest her condition should become so low as to put it out of the question. In desperate cases where a prolonged operation would evidently be fatal an attempt might be made to drain the suppurating cavity through an abdominal incision, and so to relieve the patient to some extent from septic absorption.

Ovariotomy with Complications.—While few operations are simpler than an uncomplicated ovariotomy, there is probably no abdominal operation which demands more skill and resource than the removal of a cyst with dense and short adhesions, especially when on the posterior and pelvic aspects of the tumour. Adhesions to the anterior abdominal wall, the omentum and the transverse colon may be dealt with by wiping them off the tumour surface with a gauze sponge if soft and filamentous or by ligaturing and dividing if tough and stringy. When the bowel is closely and firmly adherent to the cyst a careful dissection should be made, the outer fibrous layer of the cyst wall being peeled off it and left adherent to the bowel. If the tumour is densely adherent to the pelvis it may be impossible to remove it, and the adherent outer fibrous layer of the wall may be left behind, the epithelial lining being dissected off or destroyed by the cautery; drainage must be provided in such a case. Communications with the bowel or bladder, if present, demand the suturing of the viscus, which may also be called for in the event of a tear resulting from the incautious use of force in separating adhesions.

Ovarian Cysts in Pregnancy and Labour.—When a patient with ovarian cyst becomes pregnant, or when a pregnant woman is found to have an ovarian cyst, the proper treatment will depend upon circumstances. The risks of such a condition are, first, that the tumour will interfere with delivery by becoming impacted in the pelvis; and, secondly, that torsion of the pedicle of the tumour will occur in all probability either before the labour or shortly after it. If torsion has occurred, if the tumour has been discovered before the middle of pregnancy, or is of such a size that it and the enlarging uterus are likely to cause dangerous pressure symptoms, it is wise to remove it, as recovery is usually good and the pregnancy often continues without interruption. On the other hand, if the tumour is not discovered until the latter half of pregnancy, and if it is not causing symptoms, I should wait and see. If it obstructs labour, Cæsarean section and ovariotomy should be done at an early stage; if torsion occurs,

ovariotomy may be done at once; if labour passes off without incident, ovariotomy can be done in the later weeks of the puerperium.

Follicular and Lutein Cysts of the Ovary.—Many cases of what may be called clinically "ovarian trouble" are due to the presence of cysts originating in distension of a Graafian follicle or lutein body. These cysts may be single and attain a considerable size. They are more usually multiple, forming what is known as a "small cystic ovary." Pain is a prominent symptom, a point of distinction from true ovarian tumours, which only cause pain through pressure or when complicated by inflammation or torsion. The pain is sometimes relieved by treatment on the lines laid down for chronic inflammation of the ovaries (*q.v.*), but in most cases resection ultimately becomes necessary. The ovary is delivered through a 3 to 4 inch abdominal incision, or through the anterior fornix of the vagina, according to the preference of the operator, and a wedge running in the long axis of the ovary is excised. This portion should as far as possible contain all the cysts, and if any are cut through the portions left in the stump should have their epithelial lining removed by wiping with a gauze swab. The gap in the ovary is then united by a continuous catgut suture and the ovary dropped back into the abdomen. Large solitary follicular or lutein cysts may be treated as an ovarian cyst and the whole ovary removed.—R. J. J.

OVARY, Inflammation of.

Acute ovaritis occurs as a rather rare complication of certain infectious fevers, scarlatina, smallpox and mumps. It is more common as an extension of an inflammatory process in the uterus or tubes, either gonorrhœal or puerperal. The inflammation may affect the surface of the organ (perioöphoritis), leading to the formation of adhesions between it and its surroundings, or may invade the Graafian follicles and result in the formation of an ovarian abscess.

During the acute stage the most prominent symptom is pain, and this is usually referred to the front of the abdomen above Poupart's ligament, the "ovarian spot." For its relief hot applications, poultices or blisters to the lower abdomen may be tried, and absolute rest ordered. The warm applications may be reinforced by the sprinkling of a few drops of Laudanum or of a mixture of equal parts of Lin. Chloroformi and Lin. Belladonnæ on the surface, but if the pain is severe Morphine must be given either in $\frac{1}{4}$-gr. doses hypodermically or in the form of a $\frac{1}{2}$-gr. suppository. A smart saline purge should be given at the onset of the affection, and care should be taken to keep the bowels active during its course. The ovarian trouble is usually an incident in the course of a fairly general pelvic inflammation, and the same treatment that is applicable to the one is indicated for the other. Copious hot vaginal douches, mildly antiseptic (say Tr. Iodi M., ℥xxx. to Oj., or Boracic Acid, half-saturated solution) should be given twice or thrice daily, 4 to 6 quarts of solution at a temperature of 110° to 114° being used on each occasion. This relieves the pain and promotes resolution of the inflammation. As the acute stage subsides,

Glycerin of Ichthyol (10 per cent.) or Boroglyceride tampons may be introduced into the vagina every other night and allowed to remain for 8 to 12 hours, the hot douching being resumed on their removal. At the same time measures should be taken to eradicate the infection from the endometrium (see under Endometritis), as there is no doubt that persistence of the endometritis will tend to perpetuate the ovarian mischief.

In a number of cases the ovaritis does not resolve, but terminates in suppuration, and the resulting abscess may form either in the substance of the ovary through infection of a Graafian follicle (ovarian abscess) or in such a position that the ovary forms part of the abscess wall. Such an abscess causes more or less constant pain and disability, and forms a focus from which a renewal of the acute inflammation may arise. When there is evidence of its presence it is sound practice to evacuate the pus as soon as possible, as full restoration to health cannot be hoped for until this has been done. The abscess may be attacked either from the abdomen or from the vagina. When the pus is encysted in the substance of the ovary, and it is desired to remove the organ entire—the most satisfactory plan—it is best to use the abdominal route, as the adhesions which are certain to be met with can be more easily dealt with from above. On the other hand, where collections of pus exist outside the ovary or tube, the better plan is to incise through the posterior vaginal fornix and to make a blunt dissection with the fingers until all the pockets have been opened up. Gauze drainage should always be provided through the posterior fornix of the vagina; if an abdominal operation has been done, and the peritoneum much soiled, it is well to provide drainage through the lower angle of the abdominal wound as well. (See also Pelvic Inflammation.)

Chronic inflammation of the ovary is found as a sequel to acute inflammations. It may be associated with a gonorrhœal salpingitis or pyosalpinx; it may be found in connection with a torn and chronically inflamed cervix, or with a retroverted and congested uterus. The affected ovary is enlarged and almost always prolapsed; it gives rise to pain in the back and hip, and is markedly tender on pressure. Considerable relief will be given by adopting measures for the relief of the pelvic congestion and for the treatment of any chronic endometritis that may be present. Thus the uterus should be swabbed with iodised Phenol or Formalin. Boroglyceride or Glycerin of Ichthyol (10 per cent.) tampons should be inserted in the vagina twice a week and a daily hot douche instituted. The bowels should be carefully attended to, and benefit will be found from tonics tending to improve the general health. Many of these cases are anæmic and run down, and should have a mixture containing Iron. An excellent general tonic is the old-fashioned:

℞ *Decoct. Aloes Co.*
Mist. Ferri Co. āā ℥iv. *Misce.*
Fiat mistura. *St.* ℥ss. *ter in die ex aq. p.c.*

Arsenic, Strychnine and Nux Vomica are also very useful. A valuable combination of tried remedies is the Syrup. Hypophosph. Co., which may

be given in ½ to 1 dr. doses thrice daily. Hydropathic treatment is of considerable benefit in many of these cases, and probably the change of air and scene plays no inconsiderable part in assisting to re-establish the general health, and so exercise a favourable influence on the local trouble. Practically all the leading hydropathics now cater for female pelvic disease, and the patient should be sent with a note to the attending physician from her own doctor.

In many cases of chronic inflammatory disease of the adnexa I have found considerable benefit to follow the administration of small doses (say 2,000,000) streptococcal vaccine repeated at intervals of a week. This form of treatment is very useful when adhesions are likely to be present, whether due to the disease or as a result of operation.

Rest forms an important part of the treatment. As the symptoms are always aggravated by the pelvic congestion attendant on menstruation, rest in bed during the period should be insisted on, and complete abstinence from sexual intercourse should be the rule while the symptoms persist unabated.

When the ovarian trouble is not relieved by general and local treatment, or when it returns as soon as treatment is intermitted, the propriety of operative interference may be considered. What is to be done will vary, of course, according to the individual case. The operation should have as its aim the complete cure of any outstanding endometritis by curetting, suturing a torn cervix or removing part of a hypertrophied cervix, and by closing a gaping vulva by perineorrhaphy. If a retroversion of the uterus is present, measures must be taken to remedy it by some form of suspension. Lastly, the ovary itself may be resected, a larger or smaller portion of the oöphoron being removed. *Complete oöphorectomy* should be discouraged, as the effects of total removal of the ovaries on a patient's mental and physical health are apt to be disastrous, and the removal of a portion of the ovary will be as beneficial as its complete excision. (See also under Ovarian Tumours and Pelvic Inflammation.)

There is, lastly, a group of cases in which there is complaint of pain and tenderness referred to the ovary. In some of these the pain is truly a referred one, and is due to some condition, such as erosion of the cervix, totally unconnected with the ovary. In others the ovary is smaller and firmer than normal, and is deeply scarred—a condition described as sclerotic ovary, and assumed to be due to fibrous inflammatory changes. In others the presence of small cysts either of the Graafian follicles or lutein bodies may be demonstrated. Where any obvious lesion, such as erosion, exists, its removal should be the first treatment adopted. In the class of cases where no such lesion is found the affection is often a very intractable one. It is often more or less neurasthenic in type, and should be treated on the lines laid down for neurasthenia (*q.v.*). It is a moot question how far local treatment is likely to be of benefit. In the majority of cases it seems to do no permanent good, and may do harm by establishing a fixed idea of incurable ovarian trouble. Operation is not to be recommended, and above all removal of the ovaries should never be

practised, as this operation never relieves the pain and exposes the patient to the risks of a premature menopause. Some of these patients do well if taken into hospital, operated upon, and then put on Weir Mitchell treatment, with the assurance that the root of the trouble has been removed and that any persisting pain will rapidly disappear. In others no good effect whatever is produced by operation, and in others the relief of the pain is merely transitory, and lasts for no more than a week or two. My feeling is that the good effect of operation in most of the cases where a good effect has been produced is due to the strong mental impression caused by it. On the other hand, the patient must not be allowed to get the idea that no treatment is being given to the ovaries either through carelessness or despair of doing good. The battery may be used. It strikes the patient's imagination, and there is no need to make use of intra-uterine or intravaginal electrodes, often very objectionable in these cases. One pole may be placed over the sacrum and the other over the ovary in front, and the constant current allowed to pass for 10 to 15 minutes.—R. J. J.

OXALURIA.

Excess of oxalates in the urine is determined by various causes, the appreciation and detection of which will afford indications for their removal.

Temporary oxaluria sometimes of a severe type is well known to follow the ingestion of certain vegetables and fruits, as rhubarb, sorrel, strawberries, tomatoes and spinach. Such oxaluria is promptly arrested by discontinuing the offending article of diet.

Oxalates constantly appear in the urine when no article of diet containing oxalic acid has been ingested. This type often requires prolonged and rigid dietetic treatment. The formation of oxalic, like that of uric, acid is believed to be derived from the oxidation of the purin bases of the food. Hence the diet should be as free from purin bases as possible, and milk, cheese, eggs, butter and rice, with a limited amount of red meat, fish or poultry, constitute a suitable regimen. Milk is especially valuable as a staple food, since it contains no oxalic acid.

The mere selection upon chemical principles of a dietary does not, however, meet all the difficulties of the case. Rose Bradford drew attention to the fact that the origin of the oxalates in many cases is due to fermentation of the food in the stomach usually caused by diminished production of hydrochloric acid, the carbohydrates, especially sugar, being the most prolific factor. In this connection arises the consideration of the intimate relationship of oxaluria with several neuroses of the neurasthenic, hypochondriacal, dyspeptic, neuralgic and spermatorrhœic types. Whether these are the cause or the result of the perverted metabolism still requires investigation. In either case the indications for treatment are equally clear; the underlying neurotic condition will demand suitable treatment.

As the stomach suffers in all such depressed conditions of the nervous

system, the digestive process should be hastened, and Hydrochloric Acid or Nitrohydrochloric Acid administered in conjunction with Pepsin. Where organic acidity is a prominent symptom this may be aggravated by mineral acids, in which case Alkalies—Sodæ Bicarb. or Magnesia—should be administered with 5-gr. doses of Papain 2 hours after eating. At the same time any violation of the established health laws, as irregularity in the hours of meals, curtailment of sleep, mental pressure, absence of physical exercise, &c., will require correction.

Not only will it be necessary, therefore, to rearrange the dietary on the scale already mentioned, but the eating habits of the patient should also be changed. Thus the heavy dinner indulged in after partially fasting all day may be the cause of oxaluria, and by getting the patient to dine in the middle of the day, and to take a light meal in the evening, the oxalates rapidly diminish. Large eaters should take simple carbonated or aerated water instead of tea or coffee; concentrated soups are not to be recommended.

Free open-air exercise is a powerful corrective of the perversion of metabolism, and a change of life in this respect may lead to the speedy disappearance of oxaluria when the ill-ventilated office or workroom is abandoned for the fresh breezes of mountain or seaside resorts. Sleeping-room ventilation should be looked after, and the bedroom window left open all night. For the anxious, over-worked city clerk who drives to his small office in the morning, and drives home again in the evening to spend the hours till bed-time in the close atmosphere of a gas-heated room, cycling is a good practice. Sleep should be sound and natural, and all conditions interfering with this must be attended to, neuralgia, insomnia, overwork, or high pressure being remedied as far as this is possible.

Sea-bathing and the Turkish bath, or a good shampooing after perspiration has been induced by brisk or even violent exercises, are of use. The morning shower bath is to be recommended, and the clothing should be warm and light.

Bicarbonate of Potassium should be prescribed when the signs point to gastric irritation, and the Mineral Acids when atonic dyspepsia is present. A combination of these methods is more rational, the acid with a little pepsin being administered immediately after meals and the alkali given when symptoms of acidity follow from fermentation owing to delay in the digestive function. Hagge advises that plenty of water should be taken in the morning fasting, and he extols Urotropine as the best of all drugs.

OXYURIS VERMICULARIS—**see under Threadworm.**

OZÆNA.

Chronic foul-smelling purulent discharge from the nose, accompanied by the formation of offensive crusts, is almost always the result of an Atrophic Rhinitis which has commenced in early life. Though the atrophy which has widened the nasal passages and caused the destruction of the ciliated epithelium can never be expected to disappear, nevertheless a

rigidly conducted plan of continuous cleansing with mild antiseptics will procure freedom from the intolerable fœtor of the patient's breath, of which, however, he is usually himself unconscious from atrophy of the terminal nerves of smell.

In dealing with ozæna the essential point is to remove the thickened secretion upon whose presence the fœtor depends. Every crust should be washed away, and no mucus be allowed to accumulate. As long as secretions are permitted to remain, decomposition speedily sets in, and the diseased surface is never free from irritation. Hence the necessity for the persistent use of the nasal douche, which consists of a soft rubber tube, with a nosepiece at one end and a lead-sinker at the other. This latter is dropped into a jug of warm water, in which a teaspoonful of common Salt or Bicarbonate of Soda and Borax is dissolved, and after starting the fluid to run siphon-wise through the tube, the jug is elevated as the end of the douche is inserted into one nostril. By keeping the mouth wide open the soft palate is raised and the posterior nares cut off from the mouth and pharynx, and as the water flows in through one nostril it courses round the nasal chambers and flows from the other nostril. At the start of treatment till the nasal passages have been freed from all old crusts it will be desirable to use the ordinary rubber Higginson's enema apparatus, and any adherent crusts which withstand the strong stream of saline solution must be removed by friction with cotton-wool on a stout probe. The patient soon learns to use the syringe or douche himself, and he should be directed to resort to it at least thrice daily till an impression is made upon the case. He should be made to blow forcibly down each nostril to clear away all septic matter from the Eustachian orifices.

Lack advises after each thorough cleansing of the nasal passages by the syringe that the nose be lightly packed with a strip of Cyanide Gauze about 1 inch wide and 1 foot in length. This is to be done twice daily and the packing maintained day and night for several months, after which it may only be resorted to at night.

Most surgeons rest content with thorough cleansing by the Borax and Soda solution followed by the use of a stream of any of the antiseptic solutions to be presently mentioned.

The most efficient cleanser and deodoriser is Peroxide of Hydrogen, swabbed over the diseased membrane by cotton-wool; the brisk effervescence which follows when the liquid is brought into contact with pus assists greatly in the detachment of crusts and reaches hollows inaccessible to fluids.

After each thorough cleansing the interior of the nose may be smeared over with Diluted Citrine Ointment or sprayed with an oily solution of 1 dr. of the strong ointment or 10 grs. Menthol dissolved in 1 oz. Liquid Paraffin.

The following antiseptics in the quantities mentioned may each be dissolved in 1 pint of tepid water and used as a disinfecting douche after syringing with the alkaline borax solution:

Carbolic Acid, 1 dr.; Liq. Sodæ Chlorinatæ, 2 drs.; Sulphurous Acid,

4 drs.; Permanganate of Potash, 5 grs.; Jeyes' Fluid, 2 drs.; Sanitas, 1 oz.; Glycerin of Borax, 1 oz.; Chlorate of Potash, 1 dr.; Tincture of Iodine M., 40 mins.; Boric Acid, ½ oz.; Perchloride of Mercury, 1 gr.; Zinc Sulphate, 1 dr.; Zinc Chloride, 5 grs.; Nitrate of Silver, 10 grs.; Chloral Hydrate, 10 grs.

Dry insufflation of Iodoform, Alum, Tannoform, Boric Acid, Calomel, Bismuth, Aristol, or any of the iodoform substitutes may be employed when the discharge is excessive, but as a rule antiseptics either in powder or in strong solutions should not be employed, the aim being to keep the diseased membrane moistened so as to prevent the spread of hard crusts, and this is best effected either by packing or the use of oily solutions; hence also astringents are not advisable as a routine. Löwenstein, however, uses insufflation of Aristol and claims excellent results. A good method for keeping a moist and antiseptic condition of the nasal membrane is to plug loosely with cotton-wool saturated with equal parts of water and Glycerin of Borax, when for any reason oily solutions applied by the atomiser cannot be tolerated.

Rault employs β-naphthol, using a teaspoonful of a solution consisting of 1 dr. dissolved in 1 oz. strong alcohol, which he adds to each pint of the alkaline borax wash, and after irrigation he inserts plugs moistened with 12 grs. of the β-naphthol, 90 mins. Tincture of Quillaia and water to 1 oz.

After irrigation the surgeon should occasionally use the speculum and touch lightly any ulcerated spot with a strong antiseptic, as Nitric Acid, Iodised Phenol, Carbolic Acid, Solution of Pernitrate of Mercury, solid Silver Nitrate, or any of the organic Silver preparations, or with the cautery.

Hunter Mackenzie advises the scraping away or curetting of the diseased membrane with the view of its being replaced by new tissue.

Ozæna due to syphilis is not, strictly speaking, to be regarded as an atrophic rhinitis; diseased bone will often be found present. This must be removed by seizing the loose sequestrum by stout forceps and delivering it through the nostril. When this is not practicable Rouge's operation should be performed; this consists in turning up the lip and dividing the mucous membrane and all the tissues above the front teeth by a horizontal incision. After detaching the cartilaginous septum from the anterior nasal spine, the finger may be passed into the nasal cavity, and by the aid of suitable forceps any diseased structures may be removed along with the sequestrum.

Perchloride of Mercury (1 gr. in 1 pint) should be freely used as an irrigation and Mercury with Iodides freely administered.

Atrophic rhinitis is often associated with a marked degree of anæmia, and Iron is then clearly indicated, and in every case the general health is to be maintained by good food, pure air, tonics, Cod-Liver Oil, Iodides, Arsenic, Quinine, sea-bathing, &c.

Carreras has recently proved that high-frequency currents have a powerful effect upon the diseased membrane, and his results show that when they are employed with other local measures rapid and permanent results are obtainable.

Ionisation has proved successful in many cases. Vaccine therapy has been of undoubted benefit in loosening the crusts and diminishing the fœtor.

PANCREAS, Diseases of.

Cystic disease of the pancreas is comparatively rare. It is usually a false cyst and is due to traumatism often of a severe character. The fluid is therefore blood-stained and the swelling follows the outlines of the lesser sac of peritoneum. Excision is therefore not possible, but opening the sac and drainage is generally followed by rapid and complete cure. The operation is little if at all more dangerous than the average abdominal section. The writer has seen several cases which were diagnosed beforehand, operated on, and cured completely thereby.

In one case where a large tumour closely simulating an aneurism formed after a severe localised injury to the abdomen, the writer tapped the tumour, the contents of which were found by Professor Matthew Hay to consist of pure pancreatic juice. Gallons of this fluid were removed from time to time, but the patient did not suffer from any of the symptoms supposed to always follow the arrest of the secretion of the gland, though the enormous quantities of fluid possessing in a very active form all the physiological qualities of undiluted pancreatic juice continued to be removed by the aspirator for many weeks. The tumour, after one of the tappings, rapidly filled up with a bloody liquid. Symptoms of peritonitis supervened, but the patient made a rapid and complete recovery, and remains perfectly well, now 35 years since the tappings.

Acute pancreatitis, whether of the hæmorrhagic, fat-necrotic, parenchymatous, gangrenous or suppurative types, must be met by opening the abdominal cavity as soon as the stage of shock has passed away. Any free fluid in the abdomen must be removed and the exudation and blood cleared out from the smaller peritoneal sac and surrounding areolar tissue, and free drainage provided. The pancreas is reached through an anterior incision in the abdominal wall after freely incising the gastro-colic omentum. When the stomach is retracted upwards and the colon pulled downwards the peritoneum forming the small sac lying on the anterior surface of the gland is to be divided. The important point is the provision of the freest possible drainage, and the route to be selected for this purpose will depend upon the conditions found present. A large tube as well as a gauze drain should be passed down to the gland, and in some cases it may be necessary to incise the capsule in order to lodge this in the pancreatic tissue. The drains may be brought out through the wound in the abdominal wall, or a counter-opening should be made in the loin communicating directly with the lesser sac of the peritoneum. When a gangrenous condition of the organ is found, the dead portion may be removed by curetting and the cavity packed with sterile gauze, but the outlook is usually hopeless.

Chronic pancreatitis being nearly always associated with blocking of the common duct by gall-stones or of the pancreatic duct by calculi, the

indications for treatment are usually clear, and this will consist in the removal of the obstruction and the establishment of free drainage of the bile-ducts. Where the surgeon finds no such obstruction present, or if any irremovable constriction or tumour is found, the proper course to pursue will be to establish free drainage of the bile-ducts by performing a cholecyst-enterostomy. Operation should not be delayed till the inflammatory action has invaded the islands of Langerhans; when such has already occurred, the only resource left will be the administration of pancreatic extract in a Keratin-coated pill or tabloid to supply the absent or diminished internal secretion of the cirrhosed organ in order to prevent, if possible, the advent of glycosuria.

Some cases of chronic pancreatitis are of syphilitic origin, and rapid relief of symptoms follows the exhibition of anti-syphilitic remedies. One such case demonstrated at operation in a young congenital syphilitic reacted at once to mercury and Iodide of Potash, and regained good health almost at once.

Cancer of the Pancreas.—The last-mentioned operations afford the only practicable method of dealing with malignant disease of the gland. Since removal of the neoplasm is as a rule impossible, the surgeon must content himself with relieving the jaundice by draining the bile-ducts.

Coffey suggests that the operation of pancreato-enterostomy should be performed when the duct of Wirsung is found occluded, as gastro-enterostomy is employed in pyloric obstruction. He advises that the cut end of the pancreas should be implanted into a loop of intestine, as it was found impracticable to implant the stripped pancreatic duct directly into the intestine.

PARALYSIS—see under Hemiplegia, Apoplexy, Meningitis (Spinal), Myelitis, Caries of Spine, etc.

PARALYSIS AGITANS.

Though this disease must be regarded as progressive and incurable, nevertheless much may be done to relieve the rigidity, to minimise the tremors and even to arrest the progress of the muscular weakness.

As soon as the diagnosis is certain, the patient should be urged to give up active business pursuits if these involve much brain-work or the worry of finance and competitive struggling. A quiet and retired life, such as has been sketched for the victim of arterio-sclerosis, should be recommended. By these means there is every prospect of at least lengthening the periods during which the degenerative process tends to remain at a standstill.

The only drug of any real value is Hyoscine Hydrobromide, and by its judicious administration the wearying oscillating tremors may be reduced in intensity, and in the later stages of the disease the writer is satisfied that life may be prolonged considerably by its use. As regards dosage, a good routine is to commence with $\frac{1}{250}$ gr. thrice daily by the mouth; this may be gradually increased till double the amount is taken, and some patients can tolerate three times the above dose (*i.e.*, $\frac{1}{80}$ gr.). It may be

combined with bromides, which are often of some value, but as the effect of the hyoscine tends to diminish after a time it is advisable to suspend its administration periodically for several days or a week. The drug is liable to vary in purity, and when a large dosage has been reached it is a wise procedure to diminish the dose when a new specimen has been dispensed by the chemist in order to insure uniformity of result.

The effect of hyoscine appears to be intensified by the addition of a moderate amount of Antipyrine, especially when the general restlessness is very distressing, and the following mixture may be prescribed in courses of about 14 days at a time:

℞. *Hyoscinæ Hydrobrom.* *gr.* ¼.
Phenazoni ʒij.
Aquæ Chlorof. *ad* ℥xx. *Misce.*
Ft. mistura. *Cpt.* ℥ss. *ter in die post cib.*

(The dose of hyoscine in the above mixture is $\frac{1}{120}$ gr. in each tablespoonful.)

Arsenic has long enjoyed some reputation in the treatment of paralysis agitans, but there must be room left for doubting any truly specific action of this drug. It may be given in full doses (5 to 7½ mins.) of Fowler's Solution *ter die*, and Gowers combines Strychnine and Indian Hemp with it. Parathyroid gland feeding has been recommended strongly by Berkeley and the injection of Pituitary Extract is on its trial; a host of agents have been from time to time recommended, but they are all valueless. Formic Acid is stated to have a very beneficial effect upon the tremor; 5 to 10 mins. may be given, or as many grains of Sodium Formate many times a day. Massage, resistance movements, passive exercises and electricity have been recommended. If the latter agent be employed, it should be in the form of a weak continuous current. Friedlander advocates a systematic attempt on the part of the patient to restrain the oscillating tremors by a strong mental effort twice or thrice daily.

Danzer urges the advantages obtainable by prolonged immersion (2 hours daily) in a bath at 90°-98° F.; the rigidity rapidly diminishes, and the tremors are markedly lessened, the improvement, though temporary, being superior to results obtainable by drugs. In the type of the disease where the tremors are entirely absent, the writer's experience has been that the rigidity is greatest, and persevering massage and passive extension movements should be performed in order to prevent the approach of the chin to the sternum. By careful practice of extension movements tending to counteract flexion of the neck and spine, and by walking very slowly with a wide stride, the patient may be able to considerably alter his festinating gait.

PARALYSIS, Alcoholic—see also under Neuritis.

The treatment of peripheral neuritis with its paralytic phenomena has been already discussed upon p. 600. In the alcoholic and arsenical types

of the affection when seen early, if indulgence in the toxic agent is strictly prohibited, paralysis need not result. The regulations introduced in the preparation of pure beer have rendered the incidence of alcoholic paralysis much less frequent, and it appears certain that many of the typical cases of alcoholic neuritis of the past were cases of combined alcohol and arsenical poisoning. Recovery may be even expected where the disease has lasted over a year. If, however, the muscles fail to respond to the interrupted current, and the reaction of degeneration be present, Suckling points out that treatment must be very perseveringly tried before benefit begins to appear. Treatment in all cases will consist in total abstinence from every form of alcohol, rest in bed, the judicious use of the continuous and interrupted currents with daily massage and counter-irritation by means of a series of flying blisters over the course of the affected nerve. Strychnine is the only remedy to be relied upon, and it should be administered hypodermically. The general management of the case may be carried out upon the lines mentioned in the article following.

PARALYSIS, Diphtheritic.

This condition is due to a peripheral neuritis, as in the case of poisoning by alcohol and arsenic. Though the patient is certain to recover the use of the paralysed members, provided he can be kept alive till the poison is eliminated, nevertheless the danger of sudden heart failure from involvement of the cardiac nerves and muscular fibres adds gravity to this type of paralysis. In the very onset of the paralysis, occurring sometimes within a few days after recovery from diphtheria, or during the course of the disease, the heart muscle may be the first to suffer from weakness, and when the first symptoms of this are overlooked by the physician, sudden death may unexpectedly follow.

As soon as the pulse and temperature of the chilled extremities show any evidence of weakness of cardiac muscle the patient must be treated with promptness. He should be put to bed and warmth with friction applied to the limbs, whilst a small sinapism is applied over the heart, and whiskey or brandy given in warm milk, both by the mouth and by the rectum. A full hypodermic dose of Strychnine ($\frac{1}{15}$ gr.) should be given without delay, and Ammonia, in the form of strong liquor, may be applied to the nostrils, and Sal Volatile in full doses, well diluted, may be administered every 15 or 30 minutes, whilst Faradisation of the præcordial region may be resorted to in severe cases. Where paralysis of respiration threatens, artificial respiration and Duchenne's plan of reflex stimulation of the respiratory centre by Faradism of the back and chest may be resorted to.

When the paralysis, as is usually the case, begins in the lower extremities or in some of the peripheral muscles, as in the eye or palate, the paralysis comes on at a later period during convalescence; though the danger of sudden cardiac failure is much less, these cases are apt to be very tedious, and before recovery almost every muscle in the body may become paralysed. Feeding should be rigorously attended to, and as soon as swallowing becomes difficult or impossible rectal alimentation or feeding with the

nasal tube must be instituted, and the hypodermic administration of horse serum may be resorted to in desperate cases where vomiting persists. In every way that is possible the nutrition of the body is to be improved, and when the appetite is weak, tonics, such as the well-known combination of Quinine and Diluted Nitrohydrochloric Acid, are to be resorted to. In the later stages of the neuritis moderate exercise may be indulged in, but absolute rest in the early stage is essential. Where walking is difficult, the patient should be carried out to sit or recline in the sunshine, or be pushed in a bath-chair. Where these are impossible, as in the middle of winter, indoor exercise and general massage may be tried, and the appetite coaxed in other ways, as by unusual variety of choice and carefully cooked foods administered often and in small amounts at a time.

Where the gastric function gives up, all food must be peptonised or a small quantity of Pepsin with Hydrochloric Acid should be given after each meal. Rectal enemata should be peptonised before administration, or Pepsin, Trypsin or Papain may be added to each dose immediately before its injection into the bowel. The patient should always be wakened during the night for nourishment at least once, and in the case of children two or three times. When fluids regurgitate through the nose or cause choking sensations by trickling into the larynx, pultaceous food as blancmange may be easily swallowed.

By the above measures (feeding by the nasal tube, rectum and hypodermic use of horse serum) life can be saved when nearly every muscle in the body has become paralysed and when artificial respiration and Oxygen inhalations may be necessary at times to keep the blood aerated.

Drugs are of secondary importance to feeding. As already stated, in all urgent cases threatening life by cardiac paralysis Strychnine should be given hypodermically without delay. In ordinary peripheral diphtheritic paralysis it is not considered advisable to give strychnine in the early or acute stage, and though this may be a wise precaution, nevertheless the drug should be promptly administered upon the first suspicion of cardiac failure. It is at least doubtful if strychnine possesses any reliable cardiac tonic action when given in ordinary safe doses by the mouth; for the treatment of an emergency, like the one under consideration, the drug must be given hypodermically. In very chronic cases the advisability of injecting strychnine into the paralysed muscles has been seriously questioned, since it is argued that the alkaloid had no action upon the muscular fibre unless through the spinal nerve cells. The subject need not be discussed, since in any case the injected drug will ultimately reach the anterior cornua of the cord.

Next to strychnine come Iron and Quinine, and a combination of the three drugs, as in Easton's Syrup, affords the best routine method of prescribing these agents in the later stages of all types of diphtheritic paralysis. Arsenic is recommended, but the peculiar dangers of the case should prohibit its administration, since this drug of itself produces a form of peripheral neuritis akin to the diphtheritic.

Belladonna is supposed to counteract the action of the poison on the

cardiac nerves and muscle, and may be given in full doses alone or with strychnine.

Electricity is valuable, but, like massage, exercise and strychnine, it should not be resorted to in the very early stages of the neuritis. It may be used in different ways.

(1) A weak continuous current may be passed from the spine to the affected muscles. (2) The healthy contractility and irritability of the muscles should be maintained by placing the kathode of a continuous galvanic battery upon the skin over the motor points, and then rapidly making and breaking contact by alternately applying to and withdrawing the anode from the skin over some indifferent place near to the affected muscles. (3) Local Faradisation of the muscles may be practised with beneficial results. (4) A weak continuous current may be sent through the peripheral nerves of the affected limb or region. The applications of electricity should be only made from 5 to 10 minutes once daily. (5) Static electricity may be employed. Massage and exercises may be resorted to in chronic cases where the wasted muscles fail to respond to electrical treatment. The best results are obtainable, as in all other forms of muscular wasting, by resistance exercises, the resistance being gradually increased till true hypertrophy is made to take the place of atony. These exercises may be carried out in conjunction with electrical treatment and small parenchymatous doses of strychnine.

Counter-irritation by Chili Paste, or other suitable skin irritant, may be tried, and some practitioners believe in repeated blistering by Cantharides.

PARALYSIS OF FACIAL AND OCULAR MUSCLES—**see under Paralysis, Peripheral.**

PARALYSIS, General, of the Insane.

The close association of this incurable malady with a previous syphilitic invasion leaves no doubt that the preventive measures accepted as operative in syphilis should be maintained as regards general paralysis.

As in tabes, there are good grounds for believing, according to the views of Edinger, that the organic lesions are the ultimate result of over-exertion of certain nerve paths in the tertiary stage—hence in the consideration of preventive measures in a subject who has suffered from syphilis the dangers of high mental pressure and prolonged intellectual strain should not be overlooked. Whilst the treatment of the primary disease by Mercury, Salvarsan and other reliable agents should be prolonged and thorough with the view of effecting the destruction of the spirochæta, the possible advent of general paralysis—especially in those patients whose family histories supply evidence of instability of the nerve centres—should suggest to the physician the desirability of recommending the syphilitic patient to select, when possible, a non-strenuous life.

The early removal of the patient to a properly equipped lunatic asylum is necessary in the majority of cases in order to protect the victim himself and his family from the serious consequences liable to follow from the

perpetration of crime or financial disasters caused by his giving way to his grandiose delusions. The quiet and rest which asylum treatment affords have certainly some retarding influence upon the rapidity of the progress of the disease through the diminution of the excitement kept up by his restless delirium.

The experience of all trustworthy observers has proved the futility of Salvarsan and Mercury when employed by the usual methods once the disease has declared itself. But there are good reasons for believing that the failure of salvarsan when given intravenously is due to the fact that owing to its large molecule the drug is unable to reach the nerve cells, hence a new method of treatment has been introduced and it promises to become a valuable advance in the therapeutics of this hitherto incurable malady. This new method consists in the intraspinal injection of Salvarsanised Serum, and two plans are employed. One—the Swift-Ellis practice—consists in the intravenous administration of a full dose of salvarsan or of neosalvarsan by the veins; one hour afterwards a small quantity of blood is withdrawn from the patient, and after 24 hours 15 c.c. of the blood-serum mixed with an equal amount of normal saline solution is injected by lumbar puncture, the dose being repeated within a fortnight.

Ogilvie obviates the necessity for repeated intravenous injections by directly mixing $\frac{1}{4}$ mgrm. salvarsan *in vitro* with 50 c.c. of the patient's blood, which after incubation is introduced into the spinal canal in doses of 10 c.c. whilst salvarsan is occasionally given by the veins. Upon the same principle Bichloride of Mercury Serum is prepared and administered. Both these serums have been administered by the subdural method, and they have been injected into the cerebral ventricles after a preliminary lumbar puncture which reduces the tension of the cerebro-spinal fluid. Whilst in advanced cases, owing to the destruction of the neurons, nothing can be hoped from this treatment, in early and recent cases the results have beyond doubt been most encouraging.

Symptoms as they arise must be treated on recognised principles; thus insomnia should be relieved by simple hypnotics like Trional; opium or morphia should be used sparingly; Hyoscine is a drug of much value in many cases. The paralytic seizures, accompanied by apoplectiform symptoms, are best met by hydropathy and the use of the ice-cap, and epileptic convulsions should be treated by Bromides alone, or with Chloral when the psychic phenomena are severe.

The type of case recognised as Tabio-paralysis or Cerebral Tabes is best managed upon the lines suitable for the treatment of advanced locomotor ataxia, and bladder symptoms, bedsores and Charcot's joint signs will require attention. The various methods of establishing drainage with the view of maintaining a low degree of intracranial pressure by trephining, whilst often suitable for the immediate relief of serious symptoms, are not justifiable as a routine plan of treating general paralysis.

As the victim of this disease passes into the helpless paralytic condition, which in his demented condition deprives him of the possibility of doing harm to himself and his relations, the remainder of his days may be

permitted to be spent amongst his friends when careful nursing is within the reach of his means.

PARALYSIS, Infantile.

This affection, which is also known by its old name of Poliomyelitis Anterior Acuta, and by the newer and still more cumbrous title of Polio-encephalo-myelitis Acuta, has of late years been surrounded by much interest since the recognition of its frequent appearance in severe epidemic form.

Preventive measures, in the epidemic types of the disease, consist in rigid isolation of all affected children and the thorough disinfection of the naso-pharynx, through whose discharge the mirco-organism is communicated.

Prophylaxis is, however, rendered most difficult if not impossible by the fact that "carriers" are numerous since these show no evidence of the disease though they may disseminate it extensively.

The disease has been produced experimentally in monkeys, and communicated from one animal to another by injection of the spinal fluid. The outcome of these researches has demonstrated that monkeys can be rendered immune when injected with small and rapidly increasing doses of the cerebro-spinal fluid of affected animals. The serum from such immunised monkeys has the power of neutralising the toxin *in vitro* and of rendering a healthy animal immune to large doses of the virus. The blood-serum of human patients who have recovered from an attack of infantile paralysis has been proved to confer immunity upon monkeys. This serum, like the antidiphtheritic serum, is believed to have marked therapeutic properties and has been extensively employed in recent epidemics, being more readily obtainable than the monkey serum. As only a small quantity of such serum can be injected by the spinal canal route it has been given by the veins at the same time in doses up to 50 c.c. It must be given as soon as the diagnosis is cleared up. Normal Human Serum has been similarly employed and good results have been claimed but Ulrich maintains that these injections are valueless, as are also injections of the patient's own serum once paralysis has supervened. Adrenalin Chloride (2 c.c. 1 in 1,000 solution) has been injected intraspinally by Meltzer after relief of tension by allowing escape of the spinal fluid with the view of contracting the bloodvessels and preventing congestion, exudation, and hæmorrhage in the canal.

Absolute rest is essential from the onset, and whilst it would seem advisable from some points of view to keep the patient upon his face, so that the congestion of the inflamed spinal cord might be reduced to a minimum, it is wiser not to enforce such a routine unless this posture should be naturally assumed by the restless sufferer. A water-bed is a desideratum in treatment. The various heroic measures sometimes advocated in this stage of the disease should be abandoned, such as dry-cupping, blistering the spine, applying leeches, the thermo-cautery, spinal ice-bag, &c. The child should be permitted to rest in whatever position gives most relief, and small quantities of milk should be given at short intervals.

Fever may be reduced by small doses (1 gr.) of Antipyrine or twice as much Salicylate of Soda, alternating with cold or tepid sponging. Any simple diaphoretic mixture may be administered, as the time-honoured combination of Mindererus Spirit with Sweet Nitre such as is suitable in all cases of febricula whilst awaiting a positive diagnosis. One smart dose of Calomel (2 grs.) followed by a mild saline purgative should be given as soon as possible, but repeated purging is contra-indicated owing to the restlessness, which is always aggravated by the frequent changes of posture caused by the bowel disturbance. The repetition of the antipyrine at short intervals if combined with Bromides will relieve pain and restlessness and do away with the necessity of administering morphia or opiates, which are contra-indicated when the cerebral motor centres are involved. Ergot, Belladonna, Iodides and a host of internal remedies have been commended with the view of diminishing the congestion or inflammatory action in the cord, but there is no real evidence that these drugs exercise any such action. Upon the dissipation of the fever, usually some decrease in the extent of the paralysis may be observed, and the flaccid paralysis often will be found confined to certain groups of muscles, though the entire limb may appear to be paralysed; this may be demonstrated by a careful examination of the Faradic irritability.

Massage must not be attempted till all tenderness has disappeared. This should be combined with passive movements and voluntary resistance exercises, gradually increased when the age of the patient permits of an intelligent appreciation of the employment of this valuable means of strengthening the muscular contractions.

Many cases do not come under observation until the paralysis has been thoroughly established, and as the remedy to be relied upon in the treatment of infantile paralysis is Electricity, the question at once crops up, What is the earliest period at which the use of this agent is justifiable? Gowers advises the end of the third or fourth week; the writer has with benefit applied a weak current earlier. The current has no effect upon the cord, but upon the muscles, which rapidly waste and suffer from degeneration of their nerve fibres. When nerve cells and fibres are ***destroyed*** the agent can be of no use, but where only *damage* has occurred it is most valuable. It acts by its influence on the *muscular* tissue, and only voltaic electricity can stimulate this tissue after the reaction of degeneration has become established. The Faradic current only causes pain and irritation, and the paralysed muscles do not respond to it; those muscles which respond to it, however, will improve by it, and should be brought into action occasionally by its application.

The constant or galvanic current should be applied to the affected muscles by placing the anode on the spine or upper part of the muscle, whilst the kathode is passed over the muscles, contact being made and broken frequently by a gentle stroking process forty to sixty times per minute. Sometimes muscles which fail to contract by this method may be brought into action by reversing the position of the electrodes. At first a few minutes daily, gradually extending to 10 or 15 minutes daily

for many weeks may be carried out. Excellent results follow even when this treatment has been delayed for many months, and some authorities have reported great improvement even after 12 months, but the greatest perseverance and patience must be exercised and the current must not be strong. Gowers advises as many cells to be gradually used as will cause the affected muscles to swell up in slight contraction as soon as the sponge is placed upon the skin. He only acts on those muscles in which Faradic irritability is lost or lowered. The others recover perfectly without stimulation. At a later stage the continuous may be suspended for the Faradic current from time to time, and this applies also to the treatment of the chronic form of atrophic paralysis as well as to the acute, whether occurring in children or adults.

It is a mistake to actively stimulate the flexors of a limb when these readily respond to faradisation whilst the extensors are considerably weakened: the treatment should be perseveringly applied to the restoration of the atrophied extensors in order to minimise the danger of permanent contractures, and the use of electricity should be persevered with for a period of 2 years or more. During the intervals between the applications of the current, douching and vigorous friction should supplement the massage and kneading of the flaccid muscle groups, after which the limb should be carefully protected from cold and kept warm by cotton-wool or a lightly applied flannel bandage. Mechanical vibration may often be advantageously employed to supplement or take the place of the pétrissage, effleurage, fulling and tapotement manœuvres of massotherapy, but there is no method of improving the tone and strength of the weakened muscular fibres equal to voluntary exercises carried out systematically against a resistance which is gradually increased from day to day till a genuine hypertrophy is established.

Lovett insists upon the vital necessity of Muscle Training. The object aimed at in this rational method of treatment is to establish a new route between the nerve centres and muscles through the partially destroyed centres, since each muscle is always in connection with several centres. The patient is taught to bring a particular muscle into action by the aid of his instructor, who places the limb in the most favourable position before the attempt is made, care being taken never to induce fatigue. Strychnine is undoubtedly of service, though its reputation has suffered much by the injudicious laudation of its advocates. Whilst it is held to be irrational to inject the drug deeply into the paralysed muscles, since it is maintained that its only beneficial action can be upon the cord, nevertheless its influence is unmistakable when so employed, and is more marked than when given by the mouth; $\frac{1}{50}$ gr. may be administered daily, half the dose being injected morning and night into different weakened muscles. Like electricity and massage, it should never be employed in the acute stage of the disease.

Whilst the above details of treatment are being carried out the general nutrition of the body should be stimulated by a liberal diet, open-air treatment, with the administration of Cod-Liver Oil with Malt Extracts,

Iron, Arsenic, Quinine and other tonics when necessary. But it must never be forgotten that the most important element in the recovery of a paralysed muscle is the prevention of overstretching. This is insisted on by Sir Robert Jones, the greatest living authority on the care of sufferers from Infantile Paralysis, who by splints or other appliances keeps the affected muscle shortened and the normal opposing muscle elongated.

The treatment of the deformities caused by the contraction of the unopposed muscles must be carried out upon generally accepted orthopædic principles. From the start the position of the affected limb, the influence of gravity and the weight of the trunk on the weakened leg muscles and relaxed ligaments must be carefully watched in order to correct any faulty attitude which would eventuate in permanent contracture.

Heavy mechanical supports when possible should be avoided, as they always interfere with the action of the weakened muscles, and if used continuously during the period in which recovery is slowly taking place their application is certain to do harm. In chronic hopeless cases where the muscles are destroyed an appliance may be necessary to aid locomotion or enable the patient to stand. When a mechanical appliance or splint is necessary to prevent deformity from faulty posture of a limb its adjustment should never be permitted to interfere with the fullest exercise of the weakened muscles.

Where the power of performing certain movements is lost and the affected muscles are past recovery the operation of transplantation of tendons is often useful in restoring to some extent the lost movements. Certain points must, however, be kept in mind: (1) The muscle transplanted must be sufficient for the new work required of it. (2) The tendon must be transplanted into a groove in bone cut with a chisel and the periosteum sewn to the tendon. (3) The line of pull of the tendon must be in the line of movement of the attachment. (4) Deformities must be corrected by tenotomy, tendon lengthening, &c. (5) Movements of the limb must be prevented until the unions are sound.

The achievement of transplanting the pectoral muscle by Hildebrand is an example of what may be accomplished by surgical methods. In 1905 he substituted an unparalysed pectoralis major for a paralysed deltoid by loosening the great pectoral muscle from its thoracic attachments, at the same time preserving the anterior thoracic nerves and vessels supplying them, and by turning the muscle through an angle of 90 degrees he sutured it to the acromion and adjoining end of the clavicle so that it ultimately functioned as a deltoid. Sachs repeated this procedure with success in infantile paralysis; Bosse and Rosenberg have in this manner treated a case of Erb's paralysis successfully.

PARALYSIS, Landry's.

The treatment of this malady will be that of the acute stage of infantile paralysis or of myelitis, which see on p. 576.

PARALYSIS, Lead—see under Plumbism.

PARALYSIS, Peripheral.

The treatment of the toxic paralysis which affects the peripheries of the motor nerves has been discussed in the article on Neuritis, Peripheral. The present article deals with the local paralysis which follows injury, pressure of disease affecting the trunks or chief branches of the various cerebral and spinal nerves.

Diligent search should be made in every case for any compression of the nerve in its course. Tumours of various kinds and abscesses may, by pressing upon the nerve trunks, produce both sensory and motor paralysis, and in such cases removal of the cause must be accomplished before any improvement can be expected. Reflex causes as carious teeth are to be treated upon similar principles. Blows, over-exertion, exposure to cold and damp and other common causes will also afford obvious indications for treatment.

The routine management of the paralysis is such as has been already mentioned under Paralysis (Diphtheritic) and Paralysis (Infantile)—viz., massage applied to the affected muscles, counter-irritation to the nerve trunk and entire limb, Strychnine hypodermically in the later stages of the affection and Electricity.

The most suitable method for the application of galvanic electricity will be found in placing the anode over the nerve trunk on the skin above the lesion or over some indifferent part, and applying the kathode over the motor points as contact is rapidly made and broken. The " labile " method may be used with great advantage by placing the anode over an indifferent part, as the kathode is slowly moved over the skin covering the affected muscles and nerves, or the " stabile " method may be tried. Large moistened sponge electrodes should be used. In any case the Faradic current may be occasionally employed, and it may be used throughout in those cases where the muscles respond to its application.

At a later stage many apparently hopeless cases of local paralysis may be improved or entirely cured by resorting to the operations of nerve anastomosis or implantation (p. 602).

Paralysis of the first and second cerebral nerves leads to anosmia and blindness, the treatment of which is detailed in the articles on Olfactory and Optic Nerve Disease.

Paralysis following disease of the third, fourth and sixth nerves is nearly always due to syphilis and must be met by Mercury in the earlier stages or Iodides in large doses administered during the tertiary period.

Facial or Bell's Palsy will require treatment suitable for the primary cause. Thus, when this nerve suffers in syphilis, which is seldom, the proper treatment will be found in Mercury and Iodides. When the paralysis is due to suppurative disease of the middle ear involving the nerve, active surgical measures are indicated, and in chronic cases nerve implantation should be resorted to, as will be described farther on.

Paralysis of the nerve caused by fracture of the skull and by hæmorrhagic or other lesions causing hemiplegia requires no consideration other than that necessary to meet the indications for the primary serious condition,

When the nerve is cut across in wounds of the face and in stabs behind the angle of the jaw, suturing of the divided ends should be performed without delay.

In the great majority of cases facial paralysis is due to exposure of the side of the face to a current of cold air; this constitutes the "rheumatic" type of Bell's paralysis.

In the early stage leeches may be applied behind the ear and to the auricle. One large blister applied over the mastoid process is, however, likely to be followed by better results than local blood-letting. Hot fomentations and poultices are to be avoided, as are also sinapisms. After leeching or blistering a very large and thick pad of absorbent cotton-wool is to be applied over the side of the head, and kept in its place by a bandage or night-cap with strings. One large saline purgative having been administered, Aspirin in 15 gr. doses or the following mixture should be commenced if there is much pain present:

℞. *Phenazoni gr.* lxxx.
Potassii Bromidi gr. clx.
Syrupi Aurantii ℥iss.
Aquæ Camphoræ ad ℥viij. *Misce.*
Fiat mistura. Capiat ℥ss. *ter in die ex aqua post cibos.*

In the absence of pain, Iodides may be substituted for the antipyrine, and this may be continued during the first 3 weeks of the affection. This is also the best routine treatment in the small percentage of the affection recognised as "Relapsing Cases."

Difference of opinion exists regarding the time at which electrical treatment is to be commenced, and also regarding the form of electricity. The writer believes that the best results are obtained by commencing early (within the first week). He bases his conclusions upon a limited number of cases, but of one of these he was himself the patient, having suffered from a severe attack after exposure in a snowstorm.

Faradism does good in improving the nutrition and preventing atrophy of muscles. The positive electrode should be placed below the zygoma and the muscles stroked with the negative. When from paralysis of the chorda tympani and the filaments going to the stapedius and palate muscles it is shown that the seventh nerve is affected high up, the weak continuous current may be passed through the head by placing an electrode over each mastoid process.

The variety of current to be adopted is that to which the muscles respond. The sinusoidal current may be advantageously employed, since it produces no pain or irritation. Faradism is believed to produce "over-action" if persevered in for a long time, and it should certainly be suspended when muscular contracture declares itself.

Massage of the facial muscles in combination with mechanical vibration may be advantageously carried out during the intervals of electrical treatment.

Strychnine is of value in all cases which do not resolve within 6 or 8 weeks; $\frac{1}{20}$ gr. daily may be injected into the substance of the muscles or in the neighbourhood of the chief branches of the nerve in the face whilst 10 gr. doses of Iodide of Soda with $\frac{1}{32}$ gr. Perchloride of Mercury are being administered by the mouth.

When the paralysis persists for many months, operative procedures are clearly indicated. Such cases are, however, most frequently met with in association with diseased bone from middle-ear disease or after recovery from fracture of the cranial base, but they sometimes are the outcome of a severe so-called rheumatic attack of Bell's palsy.

Two operations have been recommended, one of which consists in exposing the spinal accessory nerve, and whilst avoiding the branch going to the sterno-mastoid muscle, the nerve to the trapezius is cut across and its proximal end is connected with the facial trunk. The objection to this procedure is that afterwards when the shoulder muscles are brought into action there is a corresponding contraction noticed in the facial muscles. Hence the method of reinforcing the seventh nerve by forming an anastomosis with the hypoglossal is preferable. This is accomplished by dividing the hypoglossal at its bend and the facial close to the stylo-mastoid foramen, the proximal portion of the ninth being secured end-to-end with the distal extremity of the paralysed seventh nerve. The wasting and weakness of one-half of the tongue which follows causes as a rule little if any difficulty in speech.

Paralysis of the nuclei of the eighth and ninth cerebral nerves occurs in conjunction with a portion of the seventh in glosso-labio-laryngeal or bulbar palsy, and its treatment will be referred to in the succeeding article.

Paralysis of the various spinal nerves is to be treated upon the general lines already indicated. The most serious form of spinal nerve paralysis is that affecting the *phrenic* which supplies the diaphragm. When the nerve on one side only is paralysed, as from the pressure of tumours, or wounds involving the fourth cord of the cervical plexus or the trunk of the nerve, little interference with the breathing results. Where both nerves are paralysed the case becomes a very grave one, but if the cause be a removable one treatment if promptly and judiciously applied may save life. Thus, in bilateral phrenic paralysis which is a part of a general peripheral neuritis of toxic type as in diphtheria, a fatal issue may be averted if the patient can be kept alive by judicious feeding till the poison is eliminated, whilst the constant current is frequently applied to the nerve trunks and diaphragm and Strychnine is perseveringly administered hypodermically.

When the diaphragmatic paralysis is the result of a compression myelitis due to tuberculosis or fractures of the bodies of the vertebræ laminectomy may be resorted to.

PARALYSIS FROM PROGRESSIVE MUSCULAR ATROPHY.

As this form of wasting palsy is due to a sclerotic degeneration of the entire motor tract, especially of its lower segment, little can be expected

from any form of treatment. Nevertheless, by general attention to health laws, careful feeding and judicious nursing the fatal issue may be retarded. Gowers believed that by the hypodermic administration of Strychnine the degenerative process may be arrested for a considerable period, and the writer has satisfied himself of the truth of this statement, though the ultimate fatal issue is always to be counted upon. In the spastic type of the disease massage and passive or resistance movements are sometimes beneficial, though useless in the atrophic form of the disease.

Progressive Bulbar or Glosso-labio-laryngeal Paralysis, showing itself as a primary degenerative process commencing in the bulbar nuclei or appearing as an extension upwards of the disease in the motor tract which afterwards invades these centres, is practically beyond the reach of treatment. The degeneration attacks the nuclei of the hypoglossal, spinal accessory, vagus, portions of the seventh and sometimes of the fifth nerves. An immediate danger to life is always present owing to the difficulty in deglutition, whereby food may find its way into the air passages. Hence the necessity of the most careful attention to the feeding of the patient; pultaceous food should be skilfully administered, solids and liquids being more liable to enter the larynx and produce suffocation or aspiration pneumonia. When liquids are necessary they should in the advanced stages of the disease be administered through the nasal tube.

Strychnine hypodermically and a galvanic current applied to the medulla by placing the electrodes over each mastoid process sometimes improves the power of swallowing, or the positive pole may be placed over the nucha and the negative applied to the affected muscles. Atropine or Belladonna checks the secretion of saliva, but generally produces much discomfort from drying the mucous membrane of the mouth and pharynx.

The treatment of Acute Apoplectiform Bulbar Paralysis should be conducted upon the same lines as apoplexy or cerebral hæmorrhage. This remark also applies to the treatment of pseudo-bulbar paralysis seen in lesions of a bilateral type attacking the motor path in the cerebral hemispheres and leaving the medulla intact.

PARALYSIS, Pseudo-Hypertrophic.

The treatment of this form of primary muscular atrophy, like that of the other types of progressive muscular dystrophy—viz., the Infantile, the Juvenile, Facio-scapulo-humeral and Hereditary—is practically hopeless, though Duchenne, Henoch and Bourdel believed that they had seen a few cases where the disease was permanently arrested by electrical treatment. Both forms of current may be employed, and the weakened muscles should be assiduously massaged and exercised voluntarily as long as they are capable of acting. The course of the atrophy is always greatly accelerated as soon as the patient takes to his bed permanently, hence it is advisable to correct the contracture of the calf muscles by tenotomy so as to enable him to walk about as long as possible.

PARALYSIS, Spastic.

This type belongs to the group of cerebral or centric paralyses which include a number of different organic lesions produced by disease of the neurons in some portion of the upper motor tract, though the lower extremities are most frequently the seat of the tonic spasm.

The treatment of Spastic Paraplegia (primary lateral sclerosis), which may be taken as the most typical example of this group, until recently has remained in a most unsatisfactory state. Rest is essential whilst the disease is passing through any of its stages of severe spasmodic activity. Massage is desirable, as is also passive movement. Both these agents must, however, be most gently applied, and never to the extent of inducing fatigue. Electricity and Strychnine, so useful in the treatment of the flaccid and simple functional types of spinal paralysis, are as a rule harmful, and should be always avoided as a routine in the treatment of the cerebral type of palsy with spasticity. As primary spastic paraplegia is of long duration and does not tend to shorten life, the various deformities which arise from contractures will require treatment by approved orthopædic methods as tenotomy, tendon transplantation, the application of splints, &c., to enable the patient to keep moving about as long as possible. This remark especially applies to the type of spastic paralysis appearing soon after birth, and known as Little's Disease, in which the primary lesion is probably a cerebral meningeal hæmorrhage, which eventually may cause a spastic condition of the upper extremities in addition to cross-legged progression and athetosis. Well-regulated gymnastic exercises with passive movements and massage may for a long time stave off the necessity for severe orthopædic or root resection operations in such cases.

The secondary spastic paralysis which supervenes upon chronic myelitis, caries of the spine, ataxic paraplegia, disseminated sclerosis and injuries of the pyramidal tract must be treated upon the above-mentioned plans, electricity, strychnine and active gymnastic or resistance movements being avoided.

In severe degrees of spastic paralysis two methods of late years have been practised which promise to afford relief in what has been hitherto regarded as a condition practically beyond the reach of curative agents. Schwab and Allison inject strong alcohol into the nerve trunks going to the spastic muscles—a plan of destroying the conductivity of the nerves which has proved successful in the treatment of severe neuralgia of the different divisions of the fifth. The results in several cases have been satisfactory but transient.

Spiller's operation of resecting the posterior roots of the spinal nerves has given satisfactory results in Little's Disease and in other forms of spastic paralysis as in primary lateral sclerosis, and the spastic paraplegia which follows myelitis and spinal caries, and the rigidity which sometimes accompanies long-standing hemiplegia and other cerebral lesions.

The operation is most clearly indicated when there is evidence that the degenerative process has already reached its limits as in Little's Disease, and where locomotion is impossible or when severe involuntary spasmodic

movements (athetosis) exist. Laminectomy having been performed, resection of the posterior roots of the second, third and fifth lumbar nerves is carried out in cases of paraplegia, and resection of the posterior roots of several of the cervical nerves when the upper extremities are involved. If orthopædic measures are at the same time carried out, patients who have been unable to stand or walk for years may be enabled to move about after the spasticity has thus been removed by the division of the posterior roots.

PARAPHIMOSIS.

The sooner the strangulation is reduced the easier will the operation be, and if attempted immediately after the foreskin has been drawn back a cutting operation is very seldom required.

The surgeon, grasping the penis behind the glans between the middle and index fingers of his interlocked hands, pulls the foreskin forward, whilst at the same time he presses back with both thumbs the swollen glans till it slips behind the constriction. This is the usual method. The writer prefers to grasp the penis behind the glans, between the index and middle fingers of the left hand, near to the metacarpo-phalangeal joint, whilst with the index finger and thumb of the right hand, or with the last joints of all the fingers of the right hand, he surrounds the swollen glans, and patiently reduces the swelling by gentle continuous pressure till its bulk becomes greatly reduced, when it generally slips through the constricting band, sometimes painlessly. The success of the ordinary method is chiefly due to the forcible traction of the prepuce forwards, and in the latter method to the reduction of the glans through the strictured ring almost by the same gentle manipulation as in hernia. The cause of difficulty in reduction is the œdema of the glans. When the œdema disappears under pressure reduction follows.

When reduction by taxis fails, chloroform narcosis being induced, the operation may be again tried, and if reduction is not easily accomplished the surgeon should divide the constricting orifice of the tight prepuce upon the dorsum of the penis by a vertical incision close to the glans behind the swollen collar of preputial tissue, after passing a fine grooved director under it, which prevents the risk of injuring the penis or of dividing any of the large subcutaneous veins.

The glans should be forcibly depressed by the tip of the left thumb as the incision is being made, and as the narrow preputial orifice is divided reduction is easily accomplished.

The gap made by the incision is liable to lead to some deformity of the prepuce, and some surgeons always remove a ring of the reflected mucous membrane with a thin circle of skin, after which the skin of the prepuce is sutured to the ring of membrane surrounding the corona. This method of circumcision also prevents a recurrence of the strangulation, and is generally done at the time.

PARAPLEGIA.

As this is usually the result of inflammation of the spinal cord the treatment to be pursued is that described in the article on Myelitis.

The treatment of Spastic Paraplegia and of the various spastic conditions which are found associated with diseases of the upper motor path causing paralysis of the lower extremities has been detailed under Paralysis, Spastic.

Ataxic Paraplegia, caused by a combined degenerative sclerosis of both the pyramidal tracts and the posterior columns of the cord, may be regarded as beyond the reach of remedies, and the allied condition known as " Putnam's Disease " must be regarded from the same point of view, but the resulting spasticity may be dealt with in some cases by operative procedures.

The varieties of ataxic paraplegia known as " Pellagra " and " Lathyrism," which are supposed by some observers to be caused by a specific infection or to the toxic effects of certain farinaceous foods, yield when the patient is at once separated from his unhealthy environment, but if the use of the poisonous maize or vetch has been long continued the sclerosis of the lateral and posterior columns ends in permanent destruction of their function.

Senile paraplegia, as its name implies, is a slow degenerative disease beyond the reach of medicine, though by careful nursing and attention to the sphincters life may be considerably prolonged during the bed-ridden stage.

PARATYPHOID FEVER.

The treatment is for all practical purposes identical with that of Typhoid Fever. Little can be said in favour of vaccine treatment even when this is carried out with a vaccine made from the specific virus, and probably the same amount of success follows prophylactic injection as is seen in the preventive treatment of typhoid when the specific organisms for each disease are employed, and much can be said for a mixed prophylactic vaccine made from typhoid and the two paratyphoid bacilli, A and B.

PAROTITIS—**see Mumps** (p. 573).

PEDICULOSIS, OR PHTHEIRIASIS.

The ordinary body louse is seldom seen upon the skin, and as it resides in the seams and creases of the clothing, it cannot be destroyed until the garments are subjected to the action of heat or reagents which kill the parasite. It must also be kept in mind that agents which are destructive to the pediculi may have no effect upon their ova; and since these are not hatched till after the expiration of nine or ten days, the case cannot be regarded as cured till after this period has elapsed. After the total destruction of the parasites and their ova it may be necessary to treat the eczema, impetigo, dermatitis, &c., which the scratching by the finger-nails has produced.

Pediculus Capitis.—In mild cases which have not been long neglected there is no necessity to cut or shave the hair, but in hospital this must often be done, and when once thoroughly accomplished there is no trouble

afterwards, as the ova are also removed adhering to the hair shafts. Shaving is, however, almost impossible owing to the numerous crusts and scabs. Close clipping by sharp scissors answers every purpose, and a good washing with soft soap completes the destruction of any straggling vermin or adhering ova.

A local remedy should be prescribed which, though capable of destroying the pediculi rapidly, should not be of such a nature as to injure the patient, even if injudiciously applied. This is a matter of vital importance in charity schools, where mercurial preparations should not be used. The favourite, old-fashioned remedy is a safe one—viz., the Ointment of Staves acre B.P. This, when rubbed into the roots of the hair or used as a pomade, effectually destroys the lice, but does not destroy the ova contained in the nits. If the application be continued for a fortnight every trace of the vermin is removed, the young pediculi being killed as soon as they are hatched. Where there are many crusts a soft linseed meal poultice, smeared over with Carbolic Oil (1 in 10), speedily destroys the mature parasites; a few minutes under the Carbolic Spray is still more efficacious.

If common Lamp Paraffin mixed with an equal amount of Olive Oil be employed as an ordinary hair oil in charity schools, pediculi soon disappear from the hair, and from the clothing and body. The objectionable odour of crude paraffin may be overcome by making it into an ointment or pomade with lard or vaseline, and adding some Balsam of Peru.

Where a rapid effect is desired and where skilled nurses are entrusted with the management of children, as in a children's hospital, a weak solution of Perchloride of Mercury may be employed; but one of the best of all applications is the Ointment of the Ammonio-Chloride of Mercury or White Precipitate (1 in 10), as it not only destroys the parasite, but effectually relieves the eczema or impetigo which has resulted from the scratching and irritation caused by its presence. When there is much secondary skin affection present, the crude petroleum should be largely diluted with oil.

For the removal of the nits or egg-cases, the hair may be well soaked in Methylated Spirit after washing with soft soap, or Vinegar or Solution of Borax may be applied; and after they have become loosened from their moorings by these solvents, a very fine comb, followed by a stiff brush, easily clears the hair of them.

Many other agents are employed, such as Naphthol, solutions of Tobacco and Cocculus Indicus, Chloroform, Dalmatian Flowers, Peppermint, Cajuput, Anise or Clove Oils, Decoction of Laurel Leaves, Quassia, Pellitory, Creolin, &c., which possess no advantages over the more commonly used remedies.

Pediculus Corporis can be abolished by cleanliness. As a preventive measure for pediculosis in elderly persons, it is a good plan to dust a little Flowers of Sulphur over the inside of their flannel garments, and these should be changed frequently. As the parasites live and deposit their ova in the seams of the clothing, the most effective method of dealing with them is to place the clothing for a few hours in a hot chamber or disin-

fecting-room, so as to thoroughly bake the pediculi and their eggs. Boiling the clothes answers equally well. A dry heat of 125° F. is quite sufficient. Bacot impregnates the clothes with a 5 per cent. solution in water of a compound made by heating equal amounts of Soft Soap and Crude Carbolic Acid.

In treating school children for itch by sponging their bodies over with the Solution of Pentasulphide of Calcium, the writer found that pediculi also disappeared when the clothes were immediately put on again. The White Precipitate Ointment may be smeared over the shoulders and armpits; and if it does not speedily cure the accompanying eczema or prurigo, other measures, such as Alkaline baths and inunctions of Oilve Oil, may be prescribed. Sometimes the nits of the body louse are found attached to the fine hairs on the front of the chest, and in such cases the ordinary Sulphur Ointment may be freely applied.

Pediculus Pubis or the Crab Louse may prove very difficult to eradicate, especially when the parasite infests the various regions of the body in hairy men. When confined to the pubes a few applications of strong Carbolic Lotion (1 in 20) may destroy them, but the eggs are not likely to be affected by this. The writer has seen them effectually abolished by painting the parts once with the Glycerin of Carbolic Acid, but this is a severe remedy, and only applicable where the parasite is limited to a small area. Solution of Corrosive Sublimate (1 gr. to 1 oz.) may be freely applied where the beard, whiskers, eyebrows, or chest are affected. The most manageable application, however, is an Ointment of White Precipitate (25 or 30 grs. to 1 oz. Lard). This may be frequently smeared over the affected regions, and if a little Paraffin Oil be added a most efficacious parasiticide may be obtained. A 5 per cent. Calomel Ointment is also generally efficacious.

℞. *Hydrarg. Ammon. Chlor.* *gr.* xxxx.
Olei Petrolei ℥iv.
Bals. Peruviani ℥ij.
Lanolini ad ℥ij. *Misce.*

Fiat Unguentum.

Bernbeck advises a bath of 4 drs. of Corrosive Sublimate in 30 gallons of water as a remedy for all pediculi. Of all the mercurial preparations, the speediest and at the same time the safest is that of Brocq. He uses a solution of 1 gr. of Corrosive Sublimate dissolved in 1 oz. Vinegar, and states that this kills both the parasites and their ova at the same time. The common practice of rubbing in the strong mercurial ointment over extensive regions of skin is objectionable and dangerous.

Iodoform Ointment, or even the application of Iodoform gauze, is often effective. Chloroform destroys both the parasite and ova by one thorough application, but it is liable to cause serious cutaneous inflammation or irritation. Ether spray is efficacious and very much less irritating, and it

may be applied over the front of the chest and pubes without danger if no light is near.

PELVIC ABSCESS AND PELVIC CELLULITIS—see following article.

PELVIC HÆMATOCELE—see under Hæmatocele.

PELVIC INFLAMMATION IN THE FEMALE.

Acute Pelvic Inflammation.—When an infection of the genital organs spreads beyond the organs themselves to the peritoneum or to the connective tissues in their immediate neighbourhood, the resulting inflammation is termed broadly *pelvic inflammation*. In most cases such a condition arises from the spread of a gonorrhœal or puerperal septic infection upwards through the uterine cavity and along the tubes to the fimbriated abdominal ostium, and septic fluids escaping thence cause *a pelvic peritonitis* by direct extension. In other cases, especially in puerperal sepsis, the invading organisms spread from the infected surfaces by the lymphatic channels; and the connective tissue around the neck of the uterus and in the base of the broad ligaments is infected—*pelvic cellulitis*. In most cases, whichever be the original mode of onset, both pelvic peritoneum and cellular tissue are ultimately involved together, and the cardinal symptoms of pain, rise of temperature and pulse-rate are present in both.

The course of the infection varies with its virulence and to some extent with the tissues which bear the brunt of the attack. Thus in pelvic peritonitis more or less serous or sero-purulent inflammatory exudate is poured out and accumulates at the bottom of Douglas's pouch, while fibrinous lymph glues together the ovaries, tubes, uterus and coils of intestine above it. Should the infection be a mild one this exudate may become absorbed, and the only sign of the infection left may be some adhesions around the ovary and tube. More commonly, however, the exudate persists as loculated collections of serum or pus (*pelvic abscess*) shut in by dense adhesions. In most of these cases the tube is occluded and distended with pus or serous fluid (*pyo-* or *hydro-salpinx*).

When the cellular tissue is mainly affected, the inflammation first shows itself as a brawny, tender indurated mass, which may surround the cervix like a collar, or may extend out into the base of the broad ligament. The tendency of such an exudate is to spread in the tissues at the side of the pelvis, and it may overflow into the iliac fossa, or pass forwards between the uterus and the bladder or by the side of the vagina. Sometimes the exudate becomes absorbed, leaving perhaps tender cicatricial bands which may cause some alteration in position of the uterus. In other cases the mass breaks down in the centre and an abscess is formed, which may point in the vagina or above the pelvic brim in the groin.

The extension of the inflammation either to the peritoneum or to the connective tissue is marked by the patient becoming distinctly worse, and by a rise in her temperature and pulse-rate. Heroic measures as a rule are entirely out of place, and the indications for treatment are to relieve symptoms and to support her strength.

For the relief of pain warm applications are of the greatest value. External applications such as hot stupes, an india-rubber hot-water bag, or a shaped hot-water tin, if the pressure can be borne, or hot poultices over the lower abdomen are useful. Sometimes an ice-bag affords more relief. Internally, a copious vaginal douche of hot saline solution (drachm to the pint), lasting for 15 to 20 minutes, and as near 120° F. as the patient can bear, may be given three times a day. If vaginitis or endocervicitis is present the douche may be made faintly antiseptic (Tr. Iodi M. ℥xxx. to Oj., or half saturated Boric Acid solution).

Small doses of Morphia may be required at first to control the pain, but it should be given with the greatest discretion and its use discontinued as soon as possible. Absolute rest should be insisted upon, as movement seems to encourage the spread of the inflammation. The bowels should be opened by a saline aperient (Black Draught ʒij. or Mag. Sulph. ʒss. in ginger-ale first thing in the morning). It should not be forgotten that an appendicitis may simulate or be associated with pelvic inflammation. Should this be suspected on account of the pain and tenderness being right-sided and situated rather higher up in the abdomen, aperients should *not* be given at this stage (see under Appendicitis). Plenty of nourishment should be given—milk, milk-puddings, whey, eggs, beef tea and beef juice, strained chicken or mutton broth. Rise of temperature above 103° F. should be met by cold sponging.

If rigors occur they should be met by the administration of warm stimulants and external heat, hot-water bottles, &c. For sleeplessness, give Sulphonal grs. xx. to xl., or Paraldehyde ʒj. in Aqua Chlorof. ʒij. If sickness and vomiting are marked it may be necessary to give nutrient enemata by the rectum in order to keep up the patient's strength. Stimulants should be reserved for use if the patient's strength is failing and the circulation is beginning to flag. In such a condition half a glass of champagne or a tablespoonful of good whiskey or old brandy may be given every three or four hours. There is no drug treatment that can be relied on to influence the inflammatory process. Quinine in 3 to 5 gr. doses every 4 to 6 hours enjoys a certain reputation and sometimes seems to do good. Salicylates and Aspirin promote sweating and have some influence in reducing the temperature, but it should not be forgotten that profuse sweating may give rise to collapse, and measures should be taken to guard against such an effect.

When the pulse-rate is above 110, Strychnine and Digitalis should be given as in the following mixture (S. Blakely):

℞ *Tr. Digitalis* ʒij.
Tr. Nuc. Vom. ʒiij.
Spt. Æther. Nit. ʒj.
Spt. Chlorof. ʒss.
Aquæ ad ʒviij. *Misce.*

Fiat mist. Cpt. ʒss. *4tis horis ex aquâ.*

In puerperal cases benefit seems to follow the injection of 20 c.c. of Polyvalent Antistreptococcic Serum. I think the best results are obtained by waiting 24 to 48 hours before repeating the injection, and I believe that I have seen harm done by neglecting this precaution. It is quite possible that the next few years will see great advances in the treatment of all forms of acute infection through the use of vaccines. At the present time, however, there is so much danger of doing irreparable damage by vaccines during an acute attack that the administration of them should be left entirely in the hands of a specialist in the subject.

Lastly as regards operative measures. Probably the best thing for the practitioner to do is to avoid all operative interference, including even the intra-uterine douche. If vaginal examination shows the presence of a fœtid fragment of placenta or membrane in a puerperal case it may be removed as gently as possible with a blunt curette and a copious douche of warm saline given afterwards, but if there is no fœtor I think that interference with the highly absorbent and easily abraded surface of the uterus should be taboo, on account of the grave risk of inoculating the patient with a further and possibly fatal dose of virulent bacteria. In gonococcal inflammation there is absolutely no indication for curettage. The one form of surgical interference which has seemed to me to give good results is indicated in early cases of pelvic inflammation, which on examination give evidence of the presence of a fluid exudate in Douglas's pouch. In these cases an incision through the posterior fornix gives vent to a quantity of sero-pus; drainage is instituted by a loose gauze pack, which is removed every 48 hours, and the result is usually to cut short the attack and to inaugurate a speedy convalescence. The method is most likely to be successful in gonorrhœal cases.

Subacute Pelvic Inflammation.—When the acute symptoms have subsided, the patient is left with masses of inflammatory exudate in her pelvis, and very probably with collections of pus in the tubes, in the ovary or confined between adherent pelvic viscera. The indications for treatment are to restore the general health as far as possible, and to promote resolution of the exudate. When pus is present, an operation for its removal is practically inevitable, but it is seldom a matter of immediate urgency.

The convalescent patient should be encouraged to be in the open air for as much of the day as possible, but rest should be strictly enjoined and all active movements forbidden, as these have a great tendency to keep up the inflammatory process. Light nourishing diet should be given, and general tonics are advisable. There is often a considerable degree of anæmia in these patients, so that a combination containing an easily digested form of Iron is of service—*e.g.:*

℞. *Ferri et Quin. Cit.* ℥ij.
Spt. Chlorof. ℥ij.
Inf. Calumbæ ad ℨx. *Misce.*

Fiat mistura. St. ℨss. *ter in die ex aqua post cibos.*

Locally the administration of prolonged hot douches should be continued, and Boroglyceride or Glycerin of Ichthyol (10 per cent.) tampons should be inserted into the vagina every other night and allowed to remain *in situ* for 8 to 12 hours. It is recommended to paint the vaginal vault with Iodine in order to promote absorption, but this is a measure of doubtful utility. Small doses of Mercury and Iodide of Potassium seem to do good in many cases. Hot sitz baths or radiant heat baths applied to the lower part of the body are also useful in promoting absorption. Pelvic massage has at different times been recommended, but it is a remedy that is best avoided by the practitioner. There is a strong probability that it will do more harm than good by lighting up the process again, and it is objectionable from other points of view.

Chronic Pelvic Inflammation.—Cases of chronic pelvic inflammation may be divided into two classes. In one, the presence of pus and visceral adhesions causes a constant aching and pain with menstrual exacerbations; in the other, extensive adhesions and large collections of pus may be present without causing any marked discomfort. In both, however, the general health suffers and loss of weight, anæmia, and a more or less hectic appearance show that septic absorption is taking place. In addition to this a patient with tender adhesions or collections of pus is always liable to an acute recrudescence of the inflammation, so that even where symptoms are practically absent and the disease has been discovered almost by accident, measures should be taken for its cure.

A thorough trial may be given to the remedies suggested in the last paragraph on subacute pelvic inflammation. In addition an attempt should be made to eradicate any chronic endometritis that may be present by swabbing out the uterus with Iodised Phenol, pure Carbolic or Formalin (40 per cent.). In doing so the practitioner should avoid anything but the most gentle traction upon the uterus, and he will be well advised to leave curetting, if indicated, to a specialist, as rough handling of the uterus is very likely to induce a return of acute inflammation and may possibly cause rupture of a pyosalpinx or pelvic abscess into the peritoneal cavity. A change of air either to the seaside or to a hydro where pelvic hydrotherapeutics can be carried out is often very serviceable.

Operative Treatment of Chronic and Subacute Pelvic Inflammation.—In most cases the question of operation arises sooner or later. It may be postponed while symptoms are improving or are in abeyance and if the patient is improving in general health or maintaining her improvement. It arises at once if there is no improvement or if the patient is losing ground after a fair trial of non-operative measures; if it is important that she should be put in a position to resume active life as soon as possible, and if her circumstances are not such as to permit of her receiving the careful nursing and the opportunities for rest that can alone make non-operative measures successful. It need scarcely be said that when an abscess or pyosalpinx has ruptured into the peritoneal cavity operation is urgently indicated to save the patient. As regards the question of operating while rise of temperature and pulse-rate show that the infection is still active it

may be laid down as a general principle that if a collection of pus is present and is in such a situation that it can be easily reached and easily *drained* it should be opened at once. This condition is most commonly fulfilled in the case of pelvic abscess arising in the connective tissue or in Douglas's pouch. On the other hand, where operation means an extensive separation of adhesions leaving large raw absorptive surfaces, as in the removal of a pus-tube, all signs of active inflammation must have ceased for some time if the operation is to be safely undertaken. An excellent method of judging on this point is to make a careful bimanual examination in the morning and take the temperature the same evening. If it is raised, operation should be postponed. The two methods may sometimes be combined with advantage; a large pus-tube or pelvic abscess may be incised through the posterior fornix and drained, and when the temperature and pulse-rate have come down to normal, the radical removal of the infected pus-tube may be undertaken.

What the actual operation should be in a case of pelvic inflammation depends so much on the condition actually present, which is often only disclosed when the pelvic viscera are in view after the preliminary incision, that nothing like definite rules can be laid down for its performance. One or two general questions may be briefly discussed.

Should operation be carried out by the abdominal or by the vaginal route? It may be broadly stated that where the opening and drainage of an abscess cavity is alone aimed at the vaginal route is best, except in the case of an abscess in the iliac fossa, which must be opened above Poupart's ligament. Where the aim of operation is to break down adhesions, to remove disorganised ovaries or tubes distended with pus or when there is a suspicion that the appendix may be implicated, it is better to operate through the abdomen, as adhesions can be dealt with under the guidance of the eye and injuries to bowel or ureter can be more easily dealt with. Should the abdominal route be chosen, drainage through the posterior fornix should be secured, otherwise there is grave risk of disaster.

Should an attempt be made to save ovaries and tubes? If at all possible it should be the aim of the operator to save at least one ovary, or, if that be not possible, a portion of one ovary, and this can usually be accomplished. If there is one moderately healthy tube it should be saved, even if upon the opposite side from the ovary that is kept. If both tubes are diseased, there is little use in attempting to save one, as even if it does not give rise to trouble afterwards it is unlikely to become capable of performing the function of an oviduct. Speaking generally, the younger the patient and the more easy her circumstances the farther may one justifiably go in the direction of conservatism, while in a patient approaching the menopause or under the necessity of working for her living it is foolish to imperil the success of the operation from a sentimental desire to save an organ which will probably remain functionless. If both ovaries or tubes have to be removed it is wiser to remove the uterus as well, as in nearly every case it is already diseased and will probably give rise to further trouble, while its function under the circumstances is gone.

Lastly, before closing the abdomen the appendix should be examined, and if it has been involved in the inflammation, it should be removed.

In this field of pelvic surgery the method of hypertonic saline treatment introduced by Sir Almroth Wright has materially simplified and bettered the position of the surgeon. In cases where the pelvis has been unavoidably fouled with pus in the removal of pus-tubes or the treatment of ovarian abscess, I have had excellent results by abdominal drainage, the tube being blocked at the lower end with a strand of gauze, and two or three sodium chloride and citrate tablets being inserted above. Such patients, formerly always an anxiety, have recovered under this treatment without a bad symptom.

It should be remembered that these patients, half poisoned with pus as they are, require very careful nursing, good nourishment and plenty of rest and fresh air to enable them to make a satisfactory recovery after any operation that may have been done.

Tuberculous Pelvic Inflammation.—Tubercle starts as a rule in the tube, and spreads to the surrounding organs. In a case of some standing the tubes are moderately enlarged and filled with caseous tubercular material, the ovaries are superficially involved and tuberculous peritonitis has usually caused more or less extensive adhesions between the original focus and the coils of bowel lying in contact with it. The counsel of perfection in these cases is to remove the affected organs, but operation for this purpose is nugatory or dangerous when the necessity arises to break down firm adhesions with bowel whose wall has been weakened by tuberculous infiltration, since perforations, which it is almost impossible to suture satisfactorily, are practically certain to be made. I should therefore be in favour of giving a very thorough trial to general antituberculous treatment combined with the injection of small doses of tuberculin in every case before resorting to the aid of surgery. The dose to be injected should be $\frac{1}{2000}$ milligramme at first, and if this produces too much reaction and makes the patient worse, half the quantity may be used at the next injection, which should in no case be given at shorter intervals than a fortnight. During the interval, at least for the first month or two of the treatment, the patient should rest absolutely, and afterwards should have absolute rest after each inoculation until the reaction produced by it has passed off.

Non-infective Pelvic Inflammation.—Besides the inflammations already described, the practitioner not uncommonly meets with the non-infective adhesive inflammation which is set up in the pelvic cavity around a blood effusion, whether resulting from the rupture of an extra-uterine pregnancy or of a lutein cyst, or from the tearing of an adhesion. Very dense and firm adhesions are formed between the viscera surrounding the blood-clot, and if this should chance to become infected a true suppurative inflammation supervenes, which must be treated on the lines laid down above. Where no infection has occurred, the condition should be treated as described under Extra-uterine Pregnancy and Hæmatocele, Pelvic.—R. J. J.

PEMPHIGUS.

Pemphigus neonatorum is now regarded as being of the same nature as impetigo contagiosa, an infection commencing possibly as a streptococcic invasion, but which rapidly passes into the staphylococcic; doubts are held about *pemphigus vegetans* being a true pemphigus.

Pemphigus Vulgaris.—The treatment of this affection, in which bullæ arise upon otherwise healthy skin, should immediately be commenced by the administration of Arsenic in gradually increasing doses till the maximum amount tolerated by the stomach is reached. Where there is any gastric irritability, Cacodylates may be administered hypodermically or by the rectum. In the majority of cases the drug appears to possess a specific action over the diseased process.

Cod-Liver Oil, Malt Extracts, Quinine, Iron and other tonics, together with nutritious feeding, are always indicated in a disease which shows remarkable tendency to become chronic.

Where arsenic fails a host of internal agents has been recommended, as Iodides, Phosphorus, Antimony, Guaiacum, Belladonna, Mercury, Chlorate of Potassium and Strychnine, but there is no real evidence of the value of any of them.

Local treatment at the best is but palliative and symptomatic. In acute cases characterised by great tension in the bullæ these may be pricked with a sterilised needle or lancet and dressed with Boric, weak White Precipitate, or Zinc Ointments, or any bland unirritating antiseptic salve. Powders freely dusted over the weeping surface are in some cases better, especially when excoriations are present. Amongst dry applications of this sort are finely powdered Fuller's Earth, Bismuth Carb., Oxide of Zinc, Chalk, Starch, Prepared Calamine, Oleate of Zinc, &c., either alone or mixed in such proportions as the appearance of the parts indicates.

The following paste is a convenient application both in simple chronic and in the foliaceous variety of the disease:

℞. *Zinci Oxidi*
Cretæ Præparatæ
Olei Lini
Aquæ Calcis ana ʒi. *Misce.*

It is advisable to employ lotions at intervals so as to effectually soften and cleanse away any crusts or cakes which are liable to form when powders or ointments have been used for a long period. One of the best of these is a 1 per cent. Carbolic Solution applied over the excoriated surface on compresses; 1 per cent. Borax may be added to it. Carron Oil with 2 per cent. Carbolic Acid relieves itching and smarting.

Pemphigus Foliaceus.—In the treatment of this most chronic and obstinate disease, Arsenic is usually of no value. Whilst constitutional agents are required to combat anæmia, dyspepsia, constipation &c., highly nourishing food should be pressed in order to meet the long drain upon the patient's strength. Local treatment should consist, as in the simple

chronic variety of the disease, in snipping the flaccid bullæ and dressing the raw surface with any of the bland antiseptic preparations already mentioned.

The best plan is to permit the patient to lie in a tepid bath for several hours daily, after which the excoriations may be dressed with Zinc Ointment to which 5 or 10 grs. of Calomel per ounce may be added. 1 drm. of Corrosive Sublimate may be added to 30 galls. of water as a Mercurial bath, but the patient should not rest in this for any considerable length of time. Baths are fitted up in which the patient can eat and sleep, and these are of the greatest benefit in very chronic cases associated with much prurigo or itching. Picric Acid, Gelatin, Carbolic Acid, or Permanganate of Potassium may be added to them. Müller's Fluid, which consists of 2½ per cent. of Bichromate of Potassium and 1 per cent. Sodium Sulphate, has been recommended as an agent for hardening the skin.

The constant use of the Glycerin of Borax gargles of Chlorate of Potassium, or tablets of the Chlorate with Borax are the best local applications when the mucous membrane of the mouth is affected.

Pemphigus Vegetans is invariably fatal. The only treatment available is the symptomatic, and will consist in the continuous application of antiseptics to the warty ulcerating surface and of constant disinfection of the mucous membrane of the mouth and throat.

Pemphigus Neonatorum is to be treated as Impetigo contagiosa with a bland antiseptic as Boric, Zinc or weak Calomel Ointment. In syphilitic cases Mercury is clearly indicated, and the most scrupulous cleanliness must be maintained in all cases by frequent bathing in weak Permanganate of Potassium solution.

PERFORATING ULCER OF THE FOOT.

The primary disease, which is usually either locomotor ataxia, spina bifida, peripheral neuritis, diabetes or leprosy, should receive due attention.

Mild cases may be made to heal completely by a persevering use of the continuous or galvanic current; this is best applied by dropping one electrode into a warm foot-bath whilst the other is placed over the sciatic region. A large corn-plaster with the perforation over the sinus of the ulcer should be worn and the foot should be rested.

The thickened margins of the ulcer should be pared, and any flabby granulations scraped away, after which the sinus may be filled with Bismuth jelly or injected with Friar's Balsam and the sore dressed with any stimulating ointment, as the Unguentum Resinæ, or by very weak Nitric Acid, Perchloride of Mercury solution or Spirit lotion by means of a piece of lint covered with tinfoil or thin sheet-lead. Rest during the slow healing process is essential. Stretching the posterior tibial and plantar nerves has given excellent results in many cases.

Diseased bone should be removed by the gouge or forceps, and if the wound is very sluggish it may be occasionally brushed over with a strong solution of Nitrate of Silver, or touched with strongest Nitric Acid, or Acid Nitrate of Mercury Solution, or even brought into light contact with the

thermo-cautery, or scraped thoroughly with a Volkmann's spoon, and the thickened cuticle round the edge of the ulcer should be frequently pared by a sharp scalpel or corn knife. When all these measures fail and the sinuses refuse to heal, a Syme's or a Teale's amputation may then be seriously considered, but the incisions must be made above the level of any anæsthesia which may be present.

PERFORATION OF STOMACH AND BOWELS—see under Gastric Ulcer, Peritonitis, and Typhoid Fever.

PERICARDIAL EFFUSION.

The treatment of *hydro-pericardium* in ordinary cases is that of the primary disease causing the dropsy. Thus, in Bright's Disease Diaphoretics, Saline Purgatives and, to a lesser extent, Diuretics will be indicated.

Large *fibrino-serous* or *simple effusions* are the result of inflammatory action in acute rheumatism or in the terminal stage of renal disease. An attempt may be made to cause the absorption of effusion by the administration of the diuretics mentioned under Pericarditis.

When the diagnosis of great distension by fluid has been established by the recognised signs aided by the X-ray screen, and the detection of an area of cardiac dulness to the left of the apex-beat and below it, an exploratory puncture should be made with the long needle attached to a large hypodermic syringe. The needle should be inserted through the sterilised skin over this dull area in the fifth or sixth space outside the vertical line of the nipple slightly upwards and to the right in the direction of the apex-beat. Some surgeons advocate puncturing the sac close to the sternum in the fifth space on the left side, or 1 to 2½ inches beyond it in order to avoid wounding the internal mammary artery.

Epigastric Puncture.—Marfan's site is in the median line below the apex of the ensiform cartilage whilst the patient is placed in a semi-sitting posture, and the trochar is directed upwards very close to the posterior surface of the ensiform.

The site selected for the preliminary puncture, if fluid has been struck, should be rigidly adhered to for the paracentesis. An aspirator needle or a flat Curschmann's trochar and canula should be inserted, and the fluid slowly siphoned off till about 30 oz. are withdrawn. The needle or canula should be held steadily by the fingers whilst the fluid is flowing in order to avoid injury to the ventricular walls.

Pyo-pericardium.—Should the preliminary puncture reveal pus, this may be drawn off by siphonage as in simple effusion, and in the case of children there is a hope that it may not reaccumulate. It is, however, always better to provide drainage, for which purpose a flap of skin should be turned up exposing the fourth and fifth left costal cartilages. The fifth cartilage should then be carefully excised, opening of the left pleura being avoided, and the internal mammary having been secured the pericardial sac is freely opened, and after the removal of the purulent accumulation a drainage-tube is inserted. Owing to the difficulty of breathing general

anæsthesia is usually contra-indicated, and the incisions can be made under cocaine.

Where a left empyema complicates the situation the pericardial sac may sometimes be opened and drained through the incision made for the empyema.

Injuries as stab-wounds of the heart may be also reached and sutured through the above-mentioned incision, but usually it will be found necessary to remove the fourth or sixth costal cartilage in addition to the fifth in order to thoroughly expose the wounded organ, and these operations should when possible be performed under differential pressure in a suitable chamber.

Hæmo-pericardium.—Blood in the pericardium when the result of wounds is best treated by free incision of the sac and ligature of the injured vessels. Blood-stained fluid, the accompaniment of disease of the membrane, may be removed by paracentesis, but the blood effusions occurring in purpuric and scorbutic conditions are best left alone surgically, Chloride of Calcium being administered freely by the mouth.

Pneumo-pericardium.—As this never occurs in the absence of fluid, blood or pus in the cavity, the treatment will consist in aspiration or incision, with provision for free drainage.

PERICARDITIS.

Inflammation of the pericardial sac is usually associated with endocarditis, and is only a part of a general rheumatic carditis, the special treatment of which is detailed in the article on Endocarditis. This may be here briefly summarised for convenience: Absolute rest in bed in the horizontal position, changed to the sitting posture should the sac become distended with effusion. Ice should be applied to the præcordial region, and if this does not afford comfort poultices or warm compresses should be applied. Leeches, cupping (dry or wet) and blisters may be used, Morphia being occasionally necessary to relieve severer pain. When the ice-bag is used its application should not be continuous. Wynter strongly recommends the local application of Salicylate of Methyl (1 in 4 of oil or lanolin).

Internally Salicylates may be continued in *moderate* doses combined with Alkalies, and many authorities recommend inunction with 15 per cent. Mercury or Créde's Colloid Silver (Collargol) Ointment. This silver salt (1 gr. in 100 mins. water) may be injected intravenously or given *per rectum* where there is any reason to suspect that ulcerative endocarditis complicates the case.

When extensive effusion has occurred, diuretics like Iodides in 20-gr. doses, Agurin, Diuretin or Uropherin in 15 gr. doses or the stronger Theobromine derivatives—Theophylline, Theocin, Euphyllin—may be administered in 5-gr. doses.

If the effusion continues to increase paracentesis of the sac should be carried out by the methods mentioned in the preceding article.

Poynton has drawn attention to the fact that very rarely, if ever, does

the distension of the sac require tapping in simple rheumatic cases, the dyspnœa, &c., being caused by the great dilatation of the heart, which should be relieved by Digitalis or Strophanthus, or by Strychnine hypodermically.

Adherent Pericardium.—When this condition can be diagnosed and the hypertrophied heart can no longer continue to carry on the circulation against the serious handicap of the adhesions the operation of cardiolysis or thoracostomy should be resorted to. It consists in the removal of a portion of the overlying ribs with their costal cartilages, and sometimes of the lower part of the sternum. The operation has been rendered less fatal by the method of performing it under differential pressure, which reduces the dangers arising from opening of the pleura to a negligible quantity.

PERIHEPATITIS.

This condition is always secondary to some chronic disease of the liver, as syphilis, cirrhosis and hepatic abscess, or it may be due to the extension of inflammatory mischief of an adhesive nature arising about the gall-bladder. The indications for treatment in the earlier stages of the condition are clearly those suitable for the primary malady. The perihepatitis which is the result of a previous attack of peritonitis will seldom require treatment.

When the condition has become established, ascites will demand relief, and periodical tappings will enable the patient to live for years in comparative comfort, a result in marked contrast with that experienced in the treatment of ascites caused by ordinary alcoholic cirrhosis, in which a fatal issue usually follows within some months after the first tapping.

Omentopexy may be carried out in selected cases with some hope of successfully diverting the circulation of the blood into the systemic veins as described in the article on Liver Cirrhosis.

PERINEPHRITIS.

Inflammation attacking the areolar and fatty tissue surrounding the kidney is nearly always of the infective type ending in suppuration, and constituting the affection usually known as Perinephritic Abscess. Preventive measures directed to the primary condition are clearly indicated, as in pyonephrosis of septic or tuberculous origin, pelvic cellulitis, appendicitis, intestinal ulceration, psoas abscess or empyema. As soon as the presence of local œdema and doughiness of the tissues raises the suspicion of suppuration, without waiting till the pus has declared itself a free oblique incision should be made in the lumbar region posteriorly sufficient for the admission of the finger to explore the condition of the kidney and to break up isolated collections of pus. Free drainage should be established.

When the kidney is found to be involved in the infective process it should be freely incised and drained, and a vaccine prepared from the Staphylococcus, Streptococcus, or *Bacillus coli* may be resorted to with the view of strengthening the defensive resistance of the tissues, and Urotropine should be administered by the mouth.

PERINEUM, Rupture of.

Lacerations of the perineum at childbirth should be immediately sutured; this may be done while waiting for the placenta to be expelled from the uterus. When the rupture is an *incomplete* one—*i.e.*, not extending through the sphincter ani—the torn surfaces should be carefully sponged clear of blood with mops of cotton-wool soaked in 1 in 2,000 Perchloride of Mercury lotion before suturing. A large half-circle needle is the most convenient to use, and three of these, threaded with strands of stout silkworm gut, should be boiled and in readiness. The first suture is introduced near the anal end of the tear. It passes through the skin, takes a deep bite under the torn surface, and emerges just short of the apex of the laceration in the vagina; it then passes in the reverse order underneath the other half of the torn surface and pierces the skin opposite its point of entry. Further sutures, if required to close the wound, are passed in the same way at successively higher levels. Before tying the sutures, the wound should again be sponged clear of blood and clot, and care should be taken that a fragment of membrane is not included in the loop of the suture. If the rupture has been a *complete* one, extending into the rectum, the rectal wall should be sutured with a continuous catgut suture, just missing the mucous membrane, and special care should be taken to bring together the two ends of the sphincter ani, which can be readily identified on either side of the anal margin. When that has been done the remainder of the laceration is sutured with silkworm gut exactly as in the case of incomplete rupture. It is easier to insert the sutures if the patient is on her back with the legs held well apart, but the operation may be done quite well with the patient on her side, provided an assistant holds up the right leg and buttock. If for any reason the suturing of a torn perineum is omitted at the confinement, it can be undertaken with fair hope of success during the first days of the puerperium, provided the torn surfaces are neither sloughing nor suppurating.

The successful result of a suture of the perineum depends as much on the nurse as on the operator. Bathed as it is in a highly albuminous and decomposable fluid—the lochia—and exposed to constant risk of contamination from the anus, only the strictest attention on the nurse's part can insure the absence of suppuration. The nurse should be specifically told to keep in the room a basin of 1 in 2,000 Perchloride with a dozen cotton-wool mops lying in it. Every 4 hours for the first three days the genitals should be exposed and the wound washed free from lochia with the mops dripping from the solution. The same precaution should be repeated each time the bladder or bowels act. From the fourth day to the tenth the wound need only be bathed night and morning, and after defecation or micturition. On the tenth day the sutures may be removed. There is no need to hobble the patient by a bandage round the knees, which has no effect in promoting union.

It is a mistake to bind up the bowels in these cases. An aperient should be given on the second night, even where the tear has extended into the rectum, but special care should be taken in this case to cleanse away all

particles of fæces from the anus with mops of cotton-wool soaked in antiseptic.

A torn perineum which has not been sutured or which has failed to unite leaves the patient with a gaping vulva and some protrusion of the anterior and posterior vaginal walls, if the levator ani has been injured, as is usually the case. If the tear has been a complete one, the discomfort of the patient is increased by more of less loss of control over the bowel. The operative treatment of these injuries is a large question, the discussion of which would be out of place here. Lawson Tait's operations for the relief of incomplete rupture and that for complete rupture may be briefly described.

Perineorrhaphy (*Lawson Tait*).—An incision is made along the skin margin of the scar in the perineum. This incision is **U**-shaped when completed, and corresponds to the junction of the lower half of the vulval opening. The posterior wall of the vagina is then seized with forceps and is dissected up with scissors from the anterior wall of the rectum for a distance of 1 to 2 inches, care being taken neither to buttonhole the vagina nor to cut into the wall of the rectum. The oval-shaped raw surface thus produced is united by silkworm-gut sutures which pass transversely across it, being introduced through the skin margin on one side, passing deep under the surface of one half of the raw area to emerge just short of the middle line, where they are immediately reintroduced to emerge again on the opposite side at a point corresponding to their point of entry. About four silkworm-gut sutures are required, and the wound is treated as described under immediate suture. This method provides a skin apron which protects the exposed vaginal walls.

For complete rupture, an incision is made along the line of scar at the junction of the rectal and vaginal mucous membranes, and the incision is carried backwards on either side of the anus, and thence upwards on either side of the vulval opening. The vagina is dissected up from the rectum for an inch above the apex of the tear in its wall, and the dissection is carried backwards to expose the torn ends of the sphincter ani, whose position may be identified by two small dimples in the skin on either side of the anal margin. The rectal wall is then sutured with catgut, and special care taken to insure apposition of the ends of the sphincter. The operation is then completed as described above for Lawson Tait's perineorrhaphy. The after treatment is as for immediate suture.—R. J. J.

PERIOSTITIS.

Under Osteomyelitis is detailed the treatment of acute septic inflammation of bone of which periostitis is always a part, so that the affection is known sometimes under the names of "Acute Infective Periostitis" or "Acute Necrosis," though probably the causal organism (*Staphylococcus aureus*) first starts the inflammatory mischief in the medullary cavity.

Periosteal inflammation does, however, occur and remains fixed in the membrane or layer of immediately underlying bone without manifesting any tendency to spread to the medullary canal.

The treatment in all cases should embrace the internal agents indicated for the primary cause, as syphilis, rheumatism or tuberculosis.

Acute localised periostitis is usually the result of blows, kicks or violent contusions, and should be met promptly by local measures. Absolute rest and immobility of the limb should be secured by a suitable splint which will permit of local applications being made directly to the skin over the inflamed membrane. The limb should be well elevated on a pillow as the patient lies in a comfortable position in bed. The surgeon has the choice of cold or warm applications; these should be selected by the sensations of the patient. The pain, tenderness and swelling which usually follow direct trauma of limited or circumscribed extent, as in kicks or blows on the crest of the tibia, are best dealt with by Spirit lotion (1 in 3) applied upon a double layer of lint covered with oiled silk and held in position by a light bandage or stocking.

Severer cases will require hot or warm fomentations or poultices, and when these fail to afford relief ice, Leiter's tubes or evaporating lotion may be tried, or leeches may be applied, and bleeding encouraged by fomenting the bites afterwards. Should these measures fail to relieve pain, one or two small incisions may be made through the periosteum down to the bone. This plan effectually prevents the injurious effects of prolonged high tension, and thus minimises the after ill-effects of the inflammation, and may prevent necrosis.

It is a mistake to wait for signs of fluctuation in severe cases when pain and tension are excessive. Strict aseptic precautions should be taken, and if pus is present the same treatment may be adopted, but the incision should be a bold and free one, and the knife should be felt to reach the hard bone beneath the inflamed periosteum.

The wound should be lightly packed with gauze; antiseptic poulticing should be continued. This may be simply carried out by dressing the wound with boracic fomentations, covered with oiled silk upon the top of which large deep pads of cotton-wool may be secured by a light bandage.

Internal treatment will depend upon the severity of the case and the symptoms present. Where there is much fever a simple diaphoretic preceded by a brisk saline cathartic as 1 oz. of Rochelle Salt is a good plan. Where syphilis exists, large doses of Iodides are most efficacious in relieving pain and cutting short the disease, and the older surgeons still employ Calomel and Opium in every case. The iodide often relieves the dull nocturnal pains in cases which are not specific, and there is generally no reason why it should not have a trial in every case. The following is a good combination in the early stages; at a later stage the aconite may be omitted:

℞. *Sodii Iodidi* ʒij.
Tinct. Aconiti ℥xxx.
Liquor. Ammon. Acet. ʒij.
Syr. Aurantii ʒiss.
Aquæ Camphoræ ad ʒviij. *Misce.*

Fiat mistura. Capiat ʒss. *post cibos ter in die et hora somni.*

When the temperature runs high, large doses of the iodide as a rule are not well borne, and then a mixture containing 5 grs. of Antipyrine and 15 grs. Salicylate of Soda may be given every 4 hours. It often relieves the pain markedly.

Where the periostitis is *diffuse* it invades the entire length of a long bone; the serious tension which supervenes rapidly may terminate in the death of the bone unless prompt measures be taken to relieve the local and alleviate the constitutional disturbance. The first step in the treatment, as soon as the diagnosis warrants, is to make a series of deep and free incisions parallel with the shaft of the affected bone. These should pass through all the tissues and periosteum down to the bone, and should be extended into the medulla if the temperature does not fall within 24 hours by gouging or by inserting a Hey's saw into the wound as in osteomyelitis.

Acute diffused periostitis or ostitis may be by these means prevented from running into acute necrosis, and the shaft of the bone may be saved and the patient's life rescued. The constitutional treatment will consist in absolute rest, a highly nutritious liquid diet, and large doses of Quinine with alcoholic stimulants. After the making of the incisions warm antiseptic poultices should be applied every few hours, and as the progress of the case indicates the formation of new collections of pus further incisions from time to time may be required. Where the death of the shaft occurs in spite of free and early incisions, and it becomes separated from its epiphyses, the measures indicated under Osteomyelitis, to which category such cases belong, are to be carried out. Sequestrectomy will be indicated later on unless where an obviously dead shaft of bone is found lying loose in a bed of pus under the inflamed periosteum, in which case it may be removed at the primary operation.

Subacute periostitis following muscular exertion, and most commonly met with in athletes, especially footballers and cricketers, is best met by the application of a series of flying blisters.

Chronic periostitis is generally syphilitic. It is to be treated upon the same general principles—rest, counter-irritants, and Mercury with Iodides in very large doses, and incisions when these measures fail. It is not unusual to come across patients suffering from chronic and painful periostitis or nodes who have been taking mercury or iodides in a desultory way for months without benefit. Such cases generally yield rapidly to large doses of the iodide (20 to 30 or 40 grs.); full doses of Mercury just short of salivation may be also employed during the intervals in which the iodide is suspended.

Where syphilitic nodes fail to respond to the above measures, the thickened periosteum should be freely incised and a piece of the dense compact bone removed by the gouge, trephine or Hey's saw.

The treatment of tuberculous periostitis is to be carried out upon the lines described under Caries.

PERITONITIS.

Acute diffuse inflammation of the peritoneum is seen in its most typical form after perforation of some portion of its gastro-intestinal tract, and

must be treated on the basis of its being a septic process. Even when a perforation does not exist the infective nature of the inflammation must be accepted.

As soon as a diagnosis has been made the abdomen should be opened with the least possible delay, as the result of innumerable statistics prove that the mortality rises with each hour of delay. Morphia should not be administered, because of the masking of the symptoms which invariably occurs, and results in procrastination of operative procedure till too late. Nothing must be given by the mouth when possible, and the rectum should be washed out by a copious warm enema. The bladder should be evacuated, and if foul-smelling matter has been vomited the stomach should be irrigated and a large hypodermic of normal saline administered. A general anæsthetic may be employed when the patient's condition permits. Some surgeons prefer to operate under spinal anæsthesia, and the operation has been often performed under the local anæsthesia produced by hypodermic injections of Stovaine or other local anæsthetic.

Where the exact diagnosis of the primary lesion is doubtful, the best plan is to make a median incision midway between the umbilicus and pubes, and to proceed at once with an exploration of the abdomen in order to discover the site of perforation, beginning in the right iliac fossa.

Should the appendix be found to be the septic focus, this is to be dealt with by the measures described under Appendicitis. Perforation of the stomach or intestine will require closure by the methods detailed in the articles dealing with these lesions, evisceration being when possible avoided. Should the intestines require to be drawn outside the abdominal cavity, they must be carefully protected by compresses soaked in hot saline solution. The utmost expedition compatible with efficiency should be aimed at in order to minimise shock, and all uninfected regions of the peritoneum should be protected from infection by gauze tampons.

The toilet of the peritoneum is carried out in various ways according to the fancy and experience of the operator. The practice of scrupulous mopping out of all traces of exudation and scrubbing off lymph and flushing the entire abdominal cavity with weak antiseptics or sterile saline solution with the view of afterwards sealing up the abdominal wound is steadily giving way to the more rational method of rapidly removing exudation by gentle friction with gauze and the establishment of efficient drainage.

This latter routine has unquestionably reduced the mortality enormously when combined with the postural method of drainage introduced by Fowler, and rectal saline alimentation as carried out by Murphy. In localised peritonitis the introduction of a wide rubber tube when this can be introduced directly and kept *in situ* at the septic focus, as in appendicitis, answers all the requirements of efficient drainage, especially when combined with gauze or "cigarette" drains. But in most cases of diffused septic peritonitis the best procedure is to place the patient in bed immediately after operation supported by pillows in the Fowler position—*i.e.*, in a half-sitting posture—so that all fluid gravitates into the pelvis,

from which it can effectually escape through a large drainage-tube passed down into Douglas's pouch. In pelvic peritonitis the peritoneal cavity may be drained through the vagina.

Murphy's method of *continuous proctoclysis* should be employed; this has reduced the mortality to about one-eighth of its former rate. A reservoir or fountain syringe capable of holding about 3 pints to which is attached a rubber tube with a long rectal nozzle is all that is required. The nozzle on being inserted within the sphincter is left *in situ* for a few days, and the reservoir is elevated from 6 to 12 inches above the level of its extremity in the rectum and the fluid is permitted to trickle into the rectum at the rate of about 30 oz. in the hour. By putting this charge into the fountain every 2 hours it flows into the rectum within 60 minutes, which gives the bowel a rest of over 1 hour between the fillings and secures the administration of 18 pints or 360 oz. fluid in the 24 hours, all of which may be absorbed. The liquid should be at a temperature beyond the normal body heat to allow for cooling as it flows through the tube. Paterson's irrigator is provided with an electric heater, which secures a temperature of 100° F. in the Saline solution as it enters the bowel. Murphy's fluid consists of 90 grs. each Chloride of Calcium and Chloride of Sodium to the 30 oz. water; ordinary normal saline 80 grs. Chloride of Sodium to each pint of water is generally employed. This continuous rectal infusion with saline flushes the skin and kidney, and promotes elimination of the toxins, at the same time secures restoration of the blood-pressure and retardation of the absorption of toxic products by the peritoneal surface. Beef tea may be added to the saline after the expiration of 24 hours in many cases with advantage.

Should a nurse trained in the technique of Murphy's method of proctoclysis not be available to superintend the operation, very good results may be obtained by rectal injections of ½ to 1 pint of normal saline every 2 hours, the injection being given slowly through a rubber catheter and funnel so as to avoid inducing reflex movement of the rectum.

When for any reason the rectal route is not permissible, the saline should be administered hypodermically or in urgent cases intravenously.

If vomiting continues after operation, the stomach should be washed out, and as paralysis of peristalsis leads to great distension of the bowel with gas it is often necessary to empty the colon by a series of doses of a saline purgative (1 dr. sodium sulphate every hour) preceded by a full dose of Calomel. In these cases of distension the injection of Pituitrin (1 c.c.) is often of great value.

Some surgeons recommend the routine performance of *appendicostomy* in diffuse septic peritonitis before suturing the abdominal wound. The appendix having been removed, all but the sphincter at its base, any quantity of saline solution can be injected through a syringe introduced into the stump so as to flush out the entire colon several times a day. This method is especially valuable in the case of children whose restlessness prevents the satisfactory adoption of Murphy's rectal infusion.

In some cases it will be necessary to incise a distended coil of bowel

when there is much difficulty in returning the intestines within the abdominal cavity, and it may be imperative to insert a glass T-tube with an attached rubber tube, which is to be secured in the abdominal wound in order to permit the accumulated flatus to escape slowly from the paralysed bowel, especially when the diffuse peritonitis is the result of intestinal obstruction.

After operation, pain and restlessness may be so severe as to call for Morphia hypodermically. When this drug is employed, it is a good routine to combine Strychnine with it, and some surgeons in the after-treatment of peritonitis affirm that the action of strychnine is of itself quite as satisfactory as the results of a narcotic when the symptoms are those of severe restlessness.

As little fluid as possible should be administered by the mouth for the first day or two. The rectal infusion usually effectually relieves thirst, but when this remains intense small quantities of ice or hot water may be permitted.

In cases where the desperate condition of the patient does not permit of immediate operation saline should be injected hypodermically by the veins or by Murphy's rectal method, and after an attempt at rallying or reaction has occurred the abdomen can be opened with a better prospect or recovery.

Deaver, whilst acknowledging that the only hope of saving a patient suffering from perforation of the stomach, duodenum or intestine or from rupture of the gall-bladder, liver and spleen lies in immediate operation, believes that the peritonitis caused by cholecystitis and pancreatitis should not be immediately subjected to operation; he prefers, if the patient has been already ill for 48 or 50 hours, to wait for localisation of the signs.

Pneumococcal Peritonitis.—This form of acute inflammation of the peritoneum is commonly seen in childhood, and is often part of a general infection associated with pleuritis, pneumonia or pericarditis, the micro-organisms reaching the abdomen through the blood-stream or by extension from the diaphragm. The treatment should consist in speedy laparotomy and the evacuation of the copious amount of fluid usually present, irrigation of the cavity with hot saline and the introduction of a free drain down deep into the pouch of Douglas.

Post-operative Peritonitis.—The form of acute peritonitis which sometimes supervenes upon abdominal operations as ovariotomy, gastro-enterostomy, &c., must also be treated as of septic origin, being as a rule either the result of leakage into the sac of intestinal contents or of accidental admission of septic organisms owing to imperfection in the technique of the operation.

The treatment will consist in the employment of rectal infusion by Murphy's method, and after alleviation of the symptoms of shock the abdominal wound should be opened up, irrigation of the sac with hot saline solution and the introduction of a drainage tube deeply into the pouch of Douglas should be effected, and such other procedures as the local conditions associated with the primary operation demand in order to prevent further leakage and soiling of the peritoneum.

Acute Localised Peritonitis.—When this is obviously of septic nature the best rule is to act upon the same principles as in the diffuse form of the disease. The urgency of operative interference is less exacting than in the diffuse form, and when the local conditions warrant delay, the wisest course will be to closely watch the progress of the case, leaving to nature the limitation of the infective process by adhesions which shut off the septic focus from the general peritoneal sac. Afterwards operative procedures for the evacuation of pus and the establishment of efficient drainage will be indicated by the nature of the local conditions present, as detailed under Appendicitis, Gonorrhœa, Gastric Ulcer, Gall-Bladder, &c.

Subphrenic Abscess.—This form of localised acute peritonitis may be due to duodenal or gastric ulceration, appendix trouble, pancreatic, renal, pleural, pulmonary, hepatic or gall-bladder suppuration, Fallopian tube or pelvic abscess, &c.

The treatment is modified by the site of the abscess, but the principle of early incision and the evacuation of pus and the establishment of efficient drainage is to be applied in all cases. The diagnosis should when possible be assisted by the X rays, and before attempting incision an aspirator or very long hypodermic needle should be inserted under the influence of a general anæsthetic, the surgeon being prepared to proceed with the evacuation of the pus as soon as the presence of this is detected by the needle. The needle may be entered at any spot where pus is most likely to be found; the best routine, however, is to penetrate the ninth or tenth intercostal space in the mid-axillary line, traversing the pleural cavity as the needle is thrust home till pus is reached. To prevent infection of the pleural sac, when the pus must be evacuated and the abscess cavity drained through the transthoracic route, some surgeons resect a portion of a rib, and pack the wound with gauze for 30 hours to insure adherence of the parietal and diaphragmatic pleura as in operating for hepatic abscess. As a rule, however, the urgency of the case demands completion of the operation at a single séance, which must be accomplished by carefully stitching the diaphragm to the intercostal muscles. When the case has been one which has lasted several days the chances are that the pleural cavity has been already obliterated by adhesions, and the subsequent procedure is much simplified. Each case must, however, be dealt with according to the local conditions found to be present. Often a subcostal incision meets the difficulty, and in the extra-peritoneal variety of abscess the subhepatic and kidney pouch can be reached and drained without opening the peritoneal sac.

Subphrenic abscess on the left side is usually due to posterior gastric ulcer, and the peritonitis soon invades the lesser sac of the peritoneum; if the pleura is not involved, the best routine is to open the abdomen in the middle line in the epigastric region. When the pleura is already the seat of an empyema, it may be possible to remove a portion of the ninth rib and drain the subphrenic abscess through this opening. Abscesses of splenic, duodenal and pancreatic origins are to be treated upon similar lines.

Chronic Diffused Peritonitis.—This when of the suppurative type must be treated by laparotomy and drainage as in the acute variety. *Adhesive* or *Proliferative* chronic peritonitis, whether diffuse or localised, is best left alone unless the pain caused by adhesions becomes unbearable, or when the functions of the stomach and bowel become seriously interfered with, in which cases it will be necessary to open the abdomen and break down the adhesions, or to perform an anastomosis operation in order to remedy the resulting obstruction. Occasionally good results have been obtained by injections of Fibrolysin, and this agent may be tried before laparotomy is undertaken, when the symptoms are not urgent in the localised adhesive peritonitis which so frequently occurs as a sequel to abdominal operations.

In those cases of chronic peritonitis arising from long-standing inflammation spreading from the capsule of the liver and spleen, and in the type of affection occasionally seen in arterio-sclerosis, Bright's disease, gout and other chronic toxæmic conditions the main indication afforded for treatment will be found in the removal of the accompanying ascites. Counter-irritation by flying blisters or Iodine may be tried when the amount of fluid is not great. Purgatives, diuretics, diaphoretics and alteratives like Mercury and Iodides are useless except when the ascites is part of a general dropsy; these agents cannot be counted upon for the removal of fibrino-serous or true inflammatory fluid. Paracentesis should be performed at suitable intervals as in the ascites of cirrhosis and mitral lesions.

The treatment of the chronic peritonitis caused by tubercle is considered in the article following.

PERITONITIS, Tuberculous.

Under Mesenteric Gland Disease the treatment of abdominal tuberculosis has already been discussed in some of its aspects. Two facts stand out in the etiology and pathology of the disease which should be clearly realised by the physician, as they have important bearings on treatment. The first is that in tuberculous peritonitis, mesenteric gland disease or abdominal tuberculosis seldom do the bacilli reach the peritoneum through the blood, as has been hitherto supposed. They enter the intestine in tuberculous milk or in swallowed sputum, and pass readily through the intact mucous surface without necessarily causing any injury at the site of their absorption. After being filtered out by the fine meshwork in the lymphatic glands they remain in these organs till the gradual infection of the peritoneal sac occurs. This fact has its bearing on *preventive* treatment; if all milk were sterilised primary tuberculous peritonitis would be rarely seen. Phthisical subjects should be taught not to swallow their sputum.

The second fact to be kept in mind is that once the bacillus has become lodged in the abdominal glands or peritoneal membrane it is placed at a great disadvantage as regards its future development. Its environment is in marked contrast to that which is afforded by the pulmonary tissue, and the natural tendency of abdominal tuberculosis is towards recovery. Hence the physician should approach the problem of treatment in a far

more hopeful spirit than is justifiable in the case of phthisis. Probably the natural tendency towards recovery is even greater in abdominal tuberculosis than in ordinary tuberculous adenitis affecting the cervical lymphatic glands.

Constitutional treatment should be identical with that pursued in phthisis; open-air life day and night when weather permits, over-feeding, Cod-Liver Oil, Malt Extract, and Creosote are all clearly indicated. Obviously since milk must enter largely into the diet of the tuberculous patient this fluid should be sterilised in every case where the animals supplying it have not been proved to be free from tubercle by test injections.

Vaccine treatment is unquestionably, as in cervical adenitis, of great benefit in all chronic cases. The human tuberculin should be used.

Where the infection of the peritoneum and of the abdominal glands is but a part of a general miliary tuberculosis, vaccine treatment is clearly contra-indicated, and little can be expected from open air or any other form of therapeutics.

In addition to the previously mentioned constitutional agents various local methods of treating the disease have proved useful.

The X rays have been demonstrated to possess an inhibitory action upon the growth of the bacillus, and should always be pressed into the service as soon as the diagnosis has been made clear, and they should be long persevered with in the adhesive form of the disease which does not lend itself to surgical measures.

Cod-Liver Oil inunction, when carried out by the continuous method described under Mesenteric Gland Disease, is an agent of great value, especially in the case of children. Wilcox dissolves Iodoform in the oil and reports favourably of its use; his formula consists of 1 dr. Iodoform, 10 drs. Ether, and Cod-Liver Oil 21 drs.

Counter-irritation by Iodine has still its advocates. Ichthyol, Oleate of Mercury, Iodoform, Iodol, Jothion and Iohydrin have been used as local applications, and Iodide of Sodium or Potassium has been employed by Kataphoresis to drive the iodine ions into the abdominal cavity. The intravenous and intraperitoneal injection of Iodoform and other iodine preparations is open to serious dangers, and should be abandoned.

Surgical Treatment.—When the disease has withstood the above-mentioned constitutional and local treatments for several months the question of surgical interference should be seriously considered. Two types of tuberculous peritonitis are recognised—viz., the *dry* or *adhesive*, and the *wet* or *ascitic* forms. The latter type is much more amenable to both medical and surgical treatment than the dry variety.

Surgical treatment consists in a simple laparotomy operation performed under chloroform or ether, the evacuation of any fluid present, and the separation of such adhesions as can be readily broken down by the fingers, after which the abdominal wound may be sutured, no drainage being usually necessary. Some surgeons insist upon a thorough irrigation of the peritoneal cavity with warm saline solution, whilst others entirely dispense with all flushing and seal up the wound.

The explanation of the excellent results obtainable by abdominal incision is yet to be supplied. Some surgeons record 75 per cent. of permanent cures after the simple procedure above mentioned. In reviewing the statistics of any lengthened series of successful laparotomies one is struck with the fact that the only element common to all the cases, in addition to the simple incision, is the condition of more or less prolonged anæsthesia induced by the chloroform or ether administered. The writer some years ago was led to the conclusion that this element in the empiric surgical treatment could not be ignored as a therapeutic factor in the satisfactory result. Without accepting any theory of the lethal action of the anæsthetic on the bacilli, it appears to be quite possible that the saturation of the blood by chloroform, ether or ethyl chloride may effect such changes in the blood-serum or phagocytes as is sufficient to turn the scale against the development of the bacillus already severely handicapped in its struggle for existence within the abdominal cavity. Simple tapping is of little use, and, moreover, though abdominal incision is only clearly indicated in the ascitic type, sometimes the operation has been undertaken in the adhesive form of the disease, and the surgeon upon realising the danger of attempting to separate the numerous adhesions found to be present has abandoned the operation and sealed up the wound by sutures, to find that ultimately the patient has been permanently cured.

To test the influence of the anæsthetic the writer has had chloroform administered after tuberculosis in the abdomen of guinea-pigs had been induced experimentally, but the results were always unsuccessful, because it was found to be impossible to limit the tuberculosis to the abdomen in these animals which are so susceptible to the invasion of the bacillus.

Though the routine resort to abdominal incision in the dry or adhesive type of tuberculous peritonitis is to be discountenanced, it will sometimes be necessary to open the abdomen for the relief of urgent symptoms as acute abdominal obstruction, suppuration, &c. The danger of tearing the attenuated and friable bowel in the attempt to break down firm adhesions renders it necessary to overcome the obstruction by short circuiting the bowel above the seat of the kinking to a coil below the block. Sacculated abscess and collections of tuberculous detritus between adjacent coils of bowel are to be cleared out and drainage provided. Where a localised tuberculous ulceration deeply involves a knuckle of bowel this may sometimes be successfully resected. Radical operations should not be undertaken when the lungs are already diseased. Pain, diarrhœa, fever, profuse sweating, constipation, &c., must be met as they arise by drugs administered on recognised principles. The most reliable astringent is Tannalbin in 10-gr. doses with 2 to 5 grs. of Dover's Powder administered in cachet form.

PERLÈCHE.

This is the name applied to the condition commonly seen in children who have contracted the habit of licking their lips, which leads to an invasion of the macerated surface by staphylococcic organisms. The

best routine is the application of a 15 per cent. solution of Nitrate of Silver daily, followed by smearing the parts with Zinc or Boracic Ointment. A. L. Smith in obstinate cases characterised by excessive amount of salivary secretion administers Belladonna till marked dryness of the mouth is kept up for several days.

PERSPIRATION, Excessive.

This usually will be found to be secondary to some primary affection which requires treatment, as phthisis or other form of tuberculosis, pyæmia, septicæmia, chronic alcoholism, influenza, obesity, acute rheumatism, ague, &c. The various drugs found suitable for the control of the profuse perspiration, often so distressing a symptom in pulmonary tuberculosis, may as a rule be employed in all other allied septic states. They are enumerated in the article on Phthisis.

Where hypersecretion of the sweat glands occurs, independent of any other affection, some abnormal condition of the vaso-motor nerve supply is probably present and may require treatment. The clothing should be light and absorbent, thin flannels being the best fabric for wear next the skin.

Where there is no elevation of cutaneous temperature, the skin should be bathed in very hot water to which vinegar is added. Cold douching alone or following hot sponging often is useful, and smart friction is afterwards to be employed. Unna then advises an ointment containing Ichthyol and Turpentine to be rubbed in before bed-time. This is to be washed off in the morning, very cold water is to be used and thorough friction, after which a powder containing mustard is to be dusted over the skin. In cases where the skin is warm he advises the use of the Ichthyol Ointment or Soap. Of the various powders the best consists of Starch 12 parts, Tannoform 4 parts, Boracic Acid 4 parts, and Salicylic Acid 1 part. This effectually deals with the miliary eruption or numerous sudamina often present. Some authorities recommend the inunction of the entire body with Sweet or Neat's Foot Oil.

Of internal methods of treatment, the writer believes that a very dry diet with the least amount of fluids gives the best results combined with 2 grs. sulphonal thrice daily.

Tincture of Belladonna 5 mins. or Atropine $\frac{1}{200}$ to $\frac{1}{150}$ gr. three times a day alone or with 15 to 30 mins. of the Liquid Extract of Ergot may be tried. Sulphuric Acid, Tannin, Quinine, Strychnine, Agaric, minute doses of Pilocarpine, Sulphate or Oxide of Zinc, and nearly every remedy found useful in diminishing the night sweating of phthisis have been used, but their effects are very transient. Crocker gives a teaspoonful of Milk of Sulphur in a little milk twice a day. The employment of the constant current along with the administration of Strychnine or Nux Vomica may be tried.

Excessive perspiration, when localised, usually presents itself for treatment in those cases accompanied by unpleasant odour or pronounced fœtor, in which examples the local hyperidrosis is known as "Bromidrosis." The treatment of this is detailed under its own heading.

PERTUSSIS, OR WHOOPING-COUGH.

Prevention.—As the mortality lessens markedly with the age of the patient isolation thus becomes a question of vital importance. This is to be decided upon by the peculiar nature of the patient's surroundings, and as it generally will be required for 8 or 10 weeks under ordinary circumstances, there is no use in beginning a system of isolation in a half-hearted way, nor is there any use in insisting upon it where it is almost certain to break down in a few weeks. Moreover, no plan of isolation should be accepted which will confine the patient to one room during the entire illness. As a rule in this country the patient's parents, who generally think that they know a good deal beforehand about such a common disease, refuse to carry out a system of rigid isolation. The writer's practice is to warn the patient's relatives of the danger which might arise if some weakly member of the family were to catch the contagion, and to urge upon them the advisability of placing two rooms in the house at the disposal of the invalid, and advise that the others should be sent away.

One large well-ventilated sleeping and one play-room, especially in the winter-time, and at all times when possible, should be provided for the invalid. This is a matter of more importance than nurses and parents can be made to see. As will be mentioned later on, disinfection being necessary during as well as at the termination of the illness, everything capable of being injured by the fumes of burning sulphur should be removed. The air of the room can be medicated by the methods to be mentioned later on; the temperature of the chamber is an important matter. In severe cases requiring to be kept indoors the temperature of the room should be *kept* at 60° F., but it is a serious mistake to do this and permit the child to go out into the cold air. The second room in these cases can be used as an " intermediate " chamber.

Open-air treatment is of vital importance later on, and when the season permits it may be started as soon as the disease declares itself. Moderately strong children, even in smart attacks, not only are safe, but are much better for being out all through the attack. *Plenty of fresh air* is really of more importance than medicine in the long illness. Of course, in severe weather, with rain and cold, or during the prevalence of the spring east winds, or in the presence of any bronchial complications, outdoor exercise must be forbidden. Cushing, whilst insisting that rest in bed greatly lessens the cough during the early stage, and as the paroxysms are more frequent at night, which he considers to be due entirely to the vitiated condition of the sleeping-room, urges that the best sedative to the cough and paroxysm is cold winter night air, which should be freely admitted through the widely opened windows of the bedroom. It would be both irrational and dangerous, however, to surround the patient in the daytime with an atmosphere at 60° F. and expose him at night to one below freezing-point. The best routine procedure is to open the windows and door of the adjoining second room to their fullest extent in order to keep the air at night as pure as possible, and at the same time to temper it by an open fire in the sleeping apartment. The most thorough and complete

ventilation must be always carried out, no matter what the temperature of the room, direct draughts being avoided.

Feeding is of great importance, and in the management of weakly young children will turn the scale for or against recovery. The usual fluid diet which experience has proved to agree best with the child is to be continued, provided it be wholesome and highly nutritious. A varied diet does best with grown-up children. After the paroxysms have become thoroughly established and the appetite begins to fail, the patient must be coaxed to take milk or other nutritious fluid nourishment as beef juices, beef jelly, or clear soups between meals.

When the paroxysms become attended by vomiting, the critical period in the dieting arrives. The nurse should be directed to withhold food for a short time in the presence of a threatening attack of coughing, and to aim at having the child feed *soon after an attack*, so as to permit the food to be as long as possible in the stomach before the next turn of vomiting. By attending to this hint lives may be saved by tiding the patient over the dangerous exhaustion which follows frequent acts of emesis.

Hard, indigestible food in the stomach as nuts, green fruits, bread-crust, &c., will increase the laryngeal spasm, and portions of unchewed beef and potatoes may give serious trouble during the act of vomiting. Hence, upon the whole a liquid or semi-solid farinaceous diet is to be preferred for small children, or the ingredients should be carefully comminuted by using a mincing-machine for the meat foods.

Clothing should be warm, and so arranged as to prevent over-heating at one time and chills at another, an even temperature and the avoidance of draughts being desirable. Light flannel underclothing is essential, except in very warm summer weather. Combinations should be avoided, owing to the frequency with which the urine and sometimes the fæces are voided during severe paroxysms of coughing.

During the paroxysms young children should be lifted on to the nurse's knee or lap, and every constriction about the neck or chest should be removed. Naegeli states that the paroxysms may be arrested by simply pulling the lower jaw downwards and forwards, and this is effective also during sleep. Abrams attaches a pleximeter over the lower cervical spine, and has this tapped for 5 minutes at a time thrice daily in order to arrest or diminish the paroxysms. Kilmer recommends that a laced belt with rubber gussets should be worn round the abdomen in order to compress or firmly support the viscera, and thus prevent vomiting and diminish the severity of the paroxysms of coughing. Voelcker applies a Martin's rubber bandage around the abdomen after friction of the chest walls with the view of aiding the thoracic respiration by impeding the abdominal muscles in weak rickety children liable to suffer from undue yielding of the parietes of chest and consequent pulmonary collapse.

Ice to the larynx by compresses or Leiter's tubes and blisters to the nape of the neck or along the course of the vagus have been tried to moderate the spasmodic coughing, but they are generally useless.

The presence of adenoids should be sought for, and removal of these in

the early stage of the disease should be recommended in all cases, and the necessary operation may be safely carried out even in protracted cases.

Drug Treatment.—This resolves itself into the local applications of sedative and antiseptic sprays, vapours, inhalations, gargles and swabs and the internal administration of substances which are believed to inhibit the growth or development of the specific micro-organism which causes the disease, or of agents which influence the respiratory centres and act also on the bronchial mucous membrane.

Inhalations are extensively employed, and provided that the heating appliances necessary for their production are not permitted to vitiate the atmosphere of the room, much benefit may be obtained from their use. The Phenol compounds are the most effective. Cresolin allied to crude carbolic acid, being a mixture of the three isomeric cresols, is the favourite. It is volatilised by the heat of a small lamp, the vapour being permitted to saturate the atmosphere of the sick-room, and it is less poisonous than pure Phenol and less irritating than the vapour of Creosote.

When pure Carbolic Acid is employed, however, it is best used as a hand-spray 1 in 100 dissolved in rose-water and sprayed in the immediate vicinity of the patient or at a short distance from his open mouth. Yeo, in addition to the volatilisation of the acid by heat, recommends that a 5 per cent. warm spray be also diffused through the air of the room, while a 1 in 40 spray is played before the face and nose. Godson employs Creosote by the method of continuous inhalation, the drug being sprinkled upon cloths hung up in the sick-room, and he states that it produces an immediate effect upon the paroxysms, which are rendered less frequent. It may also be diffused by the steam of the bronchitis kettle.

Oil of Eucalyptus or Eucalyptol is a most grateful antiseptic, and the following spray may be diffused through the room several times a day, or it may be sprinkled on cotton-wool and placed in contact with the patient's chest, or poured into boiling water for inhalation:

℞. *Olei Eucalypti* ℥ij.
Olei Terebinthinæ ℥j.
Thymol ʒj.
Creosoti ʒij.
Spiritus Lavandulæ ad ℥vj. *Misce.*

The air of the room can be rapidly purified by pouring a tablespoonful of Oil of Turpentine into a basin filled with hot water, or the oil may be sprinkled on vessels filled with dry sawdust so as to continuously keep the air saturated with its vapour. Terebene may be employed in the same manner.

Local applications to the fauces have been largely used, but there exists much scepticism about their real value. Any of the previously mentioned unirritating antiseptic sprays may be directly concentrated on the interior of the throat, as the 1 per cent. Carbolic. Masland employs a weak spray of pure Quinine directed to the interior of the nose. Dawson Williams

strongly advocates a 2 per cent. Resorcin spray. Peroxide of Hydrogen has been formerly much praised.

All of the substances used as sprays have been also employed as nasal douches and gargles for irrigation of the naso-pharynx, and in much stronger solutions they have been brushed or swabbed over the mucous membrane. The painful and barbarous routine of applying strong solutions of Carbolic Acid in Glycerin, Nitrate of Silver, Corrosive Sublimate and other powerful germicides is as irrational as it is dangerous.

Insufflations of dry powders as Quinine, Boric Acid, Iodoform, Ferrier's Snuff, Tannin and a host of other drugs are equally futile and discomforting, and the same may be said of ointments of all kinds for lubricating the nostrils. The least objectionable is an ointment which consists of 1 part of Iodoform and 1 part of Eucalyptol in 16 parts of Vaseline. Should any irritable condition of the upper air-tract exist which is not relieved by the 1 in 100 Carbolic spray it may be coated over by means of the nebuliser with a film of pure liquid Paraffin containing a few grains of Menthol or Thymol per ounce.

Cocaine sprays, solutions or swabs should never be employed owing to the dangers of absorption and their tendency to induce a dry state of the mucous surface.

Stimulating liniments are recommended to keep up hyperæmia of the skin over the chest. If volatile antiseptics like Camphor and Eucalyptus be compounded with these, and the parts covered over after friction with cotton-wool, the child may thus be made to breathe an antiseptic atmosphere continuously. Garlic poultices are unquestionably valuable.

The writer's routine application is the following:

℞. *Olei Eucalypti* ʒiij.
Olei Cajuputi ʒiv.
Olei Menthæ Pip. ʒij.
Linim. Camphoræ ad ʒvj. *Misce.*

Of internal drugs for administration the list is practically an inexhaustible one, but it may safely be affirmed, notwithstanding the host of vaunted specifics, that no known substance exercises any lethal or inhibitory action upon the causal microbe when administered in safe doses by the mouth.

Before referring to the commonly employed so-called specifics it may be pointed out that the most unobjectionable routine in most cases is to order a simple expectorant mixture to combat the bronchial catarrh which is invariably present, and which usually declares its presence before the characteristic whooping paroxysms have settled the diagnosis. The following mixture may be prescribed for a child of 6 to 7 years:

℞. *Vini Ipecacuanhæ* ʒv.
Tinct. Scillæ ʒij.
Tinct. Camphoræ Co. ʒiv.
Syrupi Tolutani ʒiss.
Aquæ Chloroformi ad ʒiv. *Misce.*

Sumat ʒj. *quater in die ex panlulo aquæ, post cibum.*

Such a simple combination will do something to ward off chest complications, as the administration of ipecacuanha appears to exert some influence in preventing further catarrhal trouble when the open-air treatment is carried out from the first.

When the bronchial mucus remains tough and adhesive, there is no expectorant equal to Iodide of Sodium or Potassium, and its administration certainly will in such cases minimise the tendency towards collapse of the air cells through plugging of the smaller bronchial tubes by viscid secretion; 1 dr. of either salt can be added to the above-mentioned mixture.

Garlic is a most invaluable expectorant, and Minchin has demonstrated its action in a number of respiratory conditions. Many authorities regard it as a specific germicide in pertussis. Teaspoonful doses of the juice may be given to children, and some affirm that by placing a few bulblets inside the patient's socks the absorption is so rapid that in a few hours it is eliminated freely by the pulmonary tract. As the paroxysms become severe and frequent—say up to twenty or more in a day—and when their intensity begins to tell upon the patient's strength, several drugs have a claim upon the physician's attention. These are Bromides or Bromoform, Chloral, Antipyrine, Belladonna, Heroin, Conium, Quinine or Euquinine. The writer names them in the order in which they will, in his opinion, be likely to proved of value.

Bromides are certainly not as efficacious as chloral or antipyrine in diminishing the frequency and intensity of the paroxysms, but they possess the advantage of being practically free from danger when given in moderately large doses; 5 grs. of the Ammonium salt may be added to each dose of the expectorant mixture, or 3 mins. Bromoform may be administered in syrup. The best combination is bromide of soda with the next-mentioned drug.

Chloral possesses marked power over the spasmodic element in the disease. The usual rule for dosage is 1 gr. for each year of the child's age, but it is better to give half this amount, and more frequently—say every 2 hours—and even then a still smaller dose suffices when bromide is added. It should, however, be always remembered that chloral is a dangerous drug in the presence of cardiac weakness, and in complicated cases it must be used with caution. Chloralamide and Chloralose have been also vaunted; they are probably not less dangerous when given freely.

Heroin is certainly preferable to morphia as a respiratory sedative, though Henoch extols morphia in pertussis above all other narcotics. The dose of heroin should not exceed $\frac{1}{100}$ gr. for a child 5 years old. Its advantage over morphia lies in its not drying up the sputum. Recently Triboulet and Boyé have revived the morphia treatment, and recommend the dose of $\frac{1}{20}$ gr. morphine hypodermically to infants under a year old, and double this amount to older infants. The writer believes that such treatment would probably be fatal where extensive bronchial catarrh is present.

Belladonna has been long claimed to be a specific; it is useless alone unless when given in doses sufficient to produce the physiological action

of the drug, but when pushed to this extent it often exerts a considerable influence over the severity and frequency of the paroxysms. In many cases it fails to exert any beneficial action, and must be abandoned owing to its tendency to dry up the sputum. Some authorities prefer Atropine, others the allied alkaloids—Hyoscine, Hyoscyamine or Duboisine. These powerful mydriatics should not be given to infants at first in doses exceeding $\frac{1}{600}$ gr.; after watching the effects the dose of atropine may be increased to $\frac{1}{300}$ gr. till the pupils dilate in the case of a child 1 year old. When the full effects of the drug have been produced the dose should be lessened, and though children bear belladonna or atropine much better than adults, nevertheless the use of such a powerful agent is always a source of anxiety to the conscientious physician, and unless in hospital practice, where the effects can be watched from hour to hour, this form of treatment is better avoided. Atropine may, however, be safely combined with several of the before-mentioned drugs as in the following recipe for a child of 12 months of age:

℞. *Liquor. Atropinæ Sulph.* ℥vj.
Sodii Bromidi ʒiss.
Chloral Hydratis ʒss.
Heroini Hydroch. *gr.* $\frac{1}{8}$.
Syrupi et Aquæ *ad* ʒiv. *Misce.*

Fiat mist. *Cpt.* ʒj. *quater in die.*

Antipyrine is a less dangerous drug than atropine, chloral or morphine, and it often proves useful in diminishing the number and the severity of the paroxysms, but falls far short in the efficacy reported when first introduced as a specific for whooping-cough. A child under 1 year may get 1 gr. every 3 hours, and it may be combined with bromides. Eulatin, which is a benzoin-antipyrine compound, has been recently extolled; it may be given in doses of $\frac{1}{4}$ to $\frac{1}{2}$ gr. 4 times daily to a 1-year-old child, and possesses marked influence in diminishing the tendency to vomit. Phenacetin and Antifebrin possess no advantages over antipyrine. Antipyrine may be given in the following combination to a child of 2 years of age:

℞. *Phenazoni* ʒj.
Ammonii Bromidi ʒj.
Sodii Bromidi ʒj.
Syrupi Chloral ʒvj.
Aquæ Chloroformi *ad* ʒiv. *Misce.*

Fiat mist. *Cpt. coch. min. tertiis horis.*

Conium is now seldom employed, being the least reliable of the remedies already mentioned, and being useless in all cases, unless, like belladonna, it be given in doses capable of producing its physiological effects.

Quinine is held by many authorities to possess specific bactericidal powers in pertussis. Its bitter taste is an insurmountable barrier to its

internal administration to children, and the writer has ceased to employ it on this account, except in cases where there is a high temperature, and where the previously mentioned remedies have failed. It tends to dry up the secretion of the bronchial tubes, and in this way it increases the difficulties of expectoration, and hence it should be very cautiously given where there is much bronchial catarrh. The sulphate, muriate, or tannate may be given *per rectum* in two full daily doses. A child three years old may get 4 or 5 grs. in this way in the 24 hours if the paroxysms are very frequent and severe. These doses appear to diminish reflex excitability. Baron gives 1½ grs. for each year of the child's life three times daily. It is most useful in the later stages of the affection. The plan of spraying the nostrils and fauces with a dilute solution of the drug has been already referred to. Euquinine is nearly tasteless, but weaker than the sulphate.

Butler extols Iodised Calcium (½ to 2 grs.), and Rothe uses a solution of Iodised Phenol for internal administration. The following is a modification of his formula:

Acidi Carbolici Purif., gr. xv.; Spiritus Chloroformi, ℥xv.; Tincturæ Belladonnæ, ℥xxx.; Tincturæ Iodi M., ℥x.; Syrupi et Aquæ ad ℥ij. Misce. Fiat mistura. Of this he gives a teaspoonful every two hours to children between 2 and 12 years. Of carbolic acid the dose seems a large one, and of belladonna the amount is too small. There is no doubt that small doses of carbolic acid are useful. 1 min. of the glycerin may be given every 3 hours to a child 2 or 3 years old. Creosote and Guaiacol are favourite internal remedies with many physicians.

Richardson advocated the administration of Peroxide of Hydrogen in the form of Ozonic Ether as almost a specific for whooping-cough, and Oxygen inhalation is recommended by Weill when the paroxysms are severe, and he maintains that it prevents the advent of broncho-pneumonia.

Yeo advocates a mixture consisting of Benzoate of Soda, 72 grs.; Bicarbonate of Soda, 48 grs.; Chloride of Ammonium, 24 grs.; Chloroform Water, 1 oz.; Anise Water to 3 oz., of which 1 to 4 drs., according to age, is given every 4 hours.

Alum, Sulphate and Oxide of Zinc, Chloride and Carbonate of Ammonia, Camphor, Valerian, Asafœtida, Ergot, Grindelia, Indian Hemp, Resorcin, are but a few of the host of internal agents now seldom relied upon. Indeed there is a difficulty in collecting any great number of the older drugs which have not at some time or other been vaunted as specifics for whooping-cough.

Gemmel's specific was Ouabaïn—a crystalline glucoside from ouabaio wood allied to strophanthin. When one reflects that its dose is only $\frac{1}{2000}$ gr. for infants the danger of prescribing such a potent agent is obvious. Aqua Fluoroform (2½ per cent.) is a supposed specific; it apparently is of little use even when given in drachm doses every hour.

Chloroform may be employed to induce light anæsthesia when the paroxysms are very formidable, and Nitrite of Amyl occasionally has been found to cut short a severe seizure of coughing.

Berguete discards all drugs, and relies upon the efficacy of the hot bath (102° to 107° F.) every 6, 8, or 12 hours, and maintains that this not only modifies considerably the severity of the paroxysms, but that when freely resorted to in the catarrhal stage it may cause the disease to abort.

During the declining stage of the disease with its protracted convalescence the most potent agent for hastening recovery is a change of air. This was fully recognised in the past when children were brought in numbers to the gas-works in order to inhale the odours of sulphuretted lime. The sulphuretted hydrogen may have had some beneficial action since it is a valuable expectorant, and possesses bactericidal properties, but probably the mere removal from the unhealthy, ill-ventilated sleeping-room was the more potent factor.

Various plans are in vogue for carrying out this treatment at home; the inhalation of coal gas and H_2S is attended with deadly peril, since coal gas is now charged with water gas.

The safest procedure is the method of Sulphurous Acid fumigation, as carried out by Mohn. This consists in removing the patient from his sleeping-room in the morning, after which Sulphur is freely burned in the room ($6\frac{1}{2}$ drs. per cubic metre of air space), with the door and windows closely shut for at least five hours. After opening all outlets and inlets, and ventilating the room till the air can be safely breathed, the patient, with clean linen garments, is to be brought back in the evening and put to bed, and Mohn maintains that he often awakes cured next morning. Certainly, sometimes the paroxysms appear to rapidly diminish after this procedure. Some authorities burn small quantities of sulphur constantly in the sick chamber all through the attack, but this must be done with great caution owing to the irritating action of the fumes on the bronchial membrane unless so largely diluted with air as to be useless, and this remark applies to Formalin fumigation, which is sometimes substituted for the sulphur process when the room is empty.

Vaccine treatment is still upon its trial, the vaccine being prepared by cultivating the microbes isolated by Bordet and Gengon, and Fleming reports favourably of this. The treatment of the various complications as broncho-pneumonia or capillary bronchitis, collapse of the pulmonary tissue, &c., must be promptly carried out on the approved principles laid down in the special articles dealing with the treatment of these conditions; Oxygen inhalations may be freely used in all cases in addition to the other remedies indicated.

Convulsions occurring during the disease may be treated by Lumbar Puncture on the recommendation of Eckert, who at the same time gives Chloral Hydrate by the bowel. During convalescence the diet must be most generous. Cod-Liver Oil, Malt Extracts, Syr. Ferri Iod. may be given, open-air life should be insisted upon, and the dangers of phthisis or other forms of tuberculosis occurring as a sequela must be guarded against by every agent which tends to improve nutrition and strengthen the defensive mechanism of the body.

PHAGEDÆNA.

This rare condition is to be treated on the same lines as gangrene and gangrenous stomatitis.

PHARYNGITIS, Acute.

Acute catarrhal sore throat is probably always a mixed microbic disorder. Local treatment is in the majority of cases only required, though the constitutional symptoms may in severe cases require the administration of Antipyrine, Aspirin or Salicylates, and the grave septic or phlegmonous forms of the disease will demand large doses of Quinine and Iron with stimulants. A weak solution of Carbolic Acid answers most of the indications. The following may be employed as a gargle or spray, and used every 2 or 3 hours:

℞. *Acidi Carbolici* ʒj.
Cocainæ Hydrochlor. *gr.* iv.
Glycerini Boracis ʒss.
Aquæ Rosæ ad ʒxij. *Misce.*

Where pain is severe, between the applications of the above spray or gargle, the throat may be steamed by causing the patient to hold his head over a basin filled with boiling water, with a large sheet thrown loosely over all. Any volatile sedative may be added to the water as Conium, Creosote, Friar's Balsam, Menthol, &c.

As soon as pain or difficulty of swallowing is relieved the cocaine should be stopped, as it tends to keep up a congestive state of the membrane; where it fails to speedily relieve the distress it should be discarded for a 5 per cent. Menthol solution in pure paraffin. After the subsidence of all acute symptoms the throat may be painted with Mandl's Pigment, which consists of Iodine 6 grs., K.I. 20 grs., Ol. M. Pip. 5 mins., Glycerin to 1 oz., or with 1 per cent. Formalin solution, or any astringent gargle (as Tannin, 1 in 50) may be used to tone up the relaxed membrane.

In the acute phlegmonous types of pharyngitis the inflammation causes much œdema of the mucous membrane, which spreads to the tonsils and, invading the larynx, may produce asphyxia. The application of strong Nitrate of Silver is dangerous. The best procedure is to freely scarify the swollen membrane by a fine pointed bistoury protected to within about ¼ inch from the point. Tracheotomy or laryngotomy may be needed.

Abscesses should be opened as soon as they appear. In the grave septic disorder known as *Ludwig's Angina*, or submaxillary cellulitis, caused by streptococcic invasion, antistreptococcic serum or vaccine should be injected and the brawny swellings in the neck and about the jaws should be incised and further opened up by thrusting a dressing forceps down into the wound and opening the blades.

Retropharyngeal Abscess is liable to appear in these grave forms of so-called erysipelatous pharyngitis. The abscess may be cautiously opened from within, the patient's head being brought hanging over the end of the

operating-table in order to avoid asphyxia by the pus entering the larynx and trachea. A safer procedure in Ludwig's angina is to make a short incision in the upper part of the neck, and by the blades of a forceps reach the abscess cavity from without behind the sterno-mastoid muscle as in dealing with the collections of pus in the retropharyngeal tissue which are caused by caries of the cervical vertebræ.

PHARYNGITIS, Chronic.

The treatment in the first instance will consist in the removal of the primary cause. Gouty, rheumatic, constipative and dyspeptic conditions should be met by the remedies indicated in each case. Alcohol, and tobacco especially in the form of cigarette smoking, should be prohibited, and an open-air occupation when possible selected. As the condition is aggravated and perpetuated indefinitely by the patient's voluntary efforts at hawking up the scanty adhesive secretion which keeps the relaxed membrane in a state of irritable unrest, the best routine is to employ a weak Carbolic gargle or spray, 1 in 100, which produces a considerable degree of local anæsthesia, putting a stop to the necessity of hawking and performing needless efforts at swallowing. A similar effect is producible by sucking Carbolic Lozenges and to a feebler degree by keeping some bland emollient jujube or pastille in the mouth. When the irritability is great and interferes with rest Bromides internally exercise a local anæsthetic action over the pharyngeal membrane after a few full doses, but cocaine should never be employed, as it invariably renders the relaxed membrane more irritable.

Where the pharyngeal membrane is constantly dry and crusts tend to remain on it, the best treatment is that so efficacious in atrophic rhinitis—*i.e.*, to swill the nasal and pharyngeal cavity several times a day by sniffing up a solution of 30 grs. each of Chloride and Bicarbonate of Sodium with Borax in half a tumblerful of tepid water or by thoroughly washing out the throat with this cleansing lotion employed as a douche, spray or gargle. Mucin solution, 5 grs. to 1 oz., with an equal amount of the Bicarbonate of Soda, is also very advantageous and keeps the membrane moist for hours.

Where the condition is simply that of relaxation of the membrane without irritability, one of the best routines is to paint the surface daily with Nitrate of Silver solution, 20 grs. to 1 oz., or with Chloride of Zinc in half this strength. Painting with the Glycerin of Tannin or of Alum can be safely and easily carried out by the patient twice a day, and sometimes affords considerable relief.

The following gargle is efficacious, and often enables the victim of relaxed sore throat to effectually get through a speaking or singing engagement without undue strain:

℞. *Acid. Tannici* ʒij.
Glycerini Aluminis ʒiv.
Tinct. Capsici ʒj.
Infusi Rosæ Acidi *ad* ℥xij.

Mandl's pigment, Glycerin of Carbolic Acid (1 part in 2 of glycerin and water) or Weak Tincture of Iodine with Glycerin of Alum (1 in 6) may be painted on the relaxed membrane night and morning.

Granular Pharyngitis.—The treatment of this form of chronic pharyngitis is most tedious and disappointing. Cathcart attributes it mainly if not entirely to faulty voice production, and the writer has witnessed its entire disappearance after a course of lessons by a good music-teacher.

As the condition is frequently met with amongst public speakers and clergymen it is sometimes called "clergyman's sore throat," but it is better to confine the use of this term to chronic laryngitis, with which, however, granular pharyngitis is often found associated.

No treatment will avail much until the patient is made to rest his voice by abstaining from singing or public speaking. Alcohol, smoking and over-eating must be forbidden, highly seasoned or spiced dishes being avoided.

A residence in a dry warm climate, a sea voyage or a sojourn at a bracing coast with daily bathing in the open sea are all most beneficial.

Whilst every known means of improving the general health is to be persisted in, the internal administration of drugs is of little moment, except in so far as it assists general building up of constitutional vigour. Iron is usually indicated; it may be given alone or in combination with Quinine, Arsenic, Phosphorus, Iodine or Cod-Liver Oil.

Free purgation by means of any of the natural mineral waters, or a sojourn at Carlsbad, Aix, Kissingen, Ems, or Harrogate may be beneficial, especially in gouty subjects.

Main reliance must, however, be placed in local treatment. This is to be carried out upon the same lines as in treating chronic pharyngitis, soothing Carbolic lotions or sprays being employed where there is much local pain or irritation. Any of the astringent gargles, sprays or swabs may be tried, but as a rule little may be expected from these measures in very chronic cases associated with much hypertrophy or numerous granulations. These must be destroyed if a radical and permanent improvement is to be aimed at.

The best method of treatment is to apply the galvano-cautery to each granule, and at the same time cause obliteration of any large veins in the diseased membrane, or Meyer's ring knife may be used.

Nitrate of Silver fused upon the end of a strong silver probe may be employed to destroy the granulations, only a few being operated upon at each sitting. A strong solution of the nitrate (1 dr. to 1 oz. of distilled water) is a favourite means of carrying out this object; but it is a mistake to paint over any considerable area of the pharynx with this at one sitting, owing to the irritation which may ensue, unless much ulceration is present. Every second or third day is often enough, and the Carbolic Lozenge or spray may be frequently used before and after each application.

In Rault's method of "Grattage" the pharynx is painted with cocaine; a hard brush with the hairs cut short is dipped into a 10 per cent. solution of Iodine and Iodide of Potassium in water, and the mucous membrane is

vigorously rubbed with this till bleeding occurs. After this has subsided, a softer brush is used. At the end of about five days, when the inflammation has subsided, the operation is repeated once, and these two sittings are reported to effect a cure.

Ehrman employs pure Crystallised Trichloracetic Acid by means of a probe and cotton-wool. This effective caustic destroys all diseased membrane without producing any pain or inflammation if cocaine be used previously. It can be applied to the nose and behind the palate. A solution (1 in 3) in Glycerin may be freely painted or swabbed over the granular surface.

Chloride of Zinc solution (15 to 20 grs. to 1 oz.) may be freely applied in mild diffused cases after local irritation has been soothed by any of the gargles or sprays or swabs already mentioned. As a rule, however, it may be said that the gargle is the least satisfactory of all the forms of local application in the management of chronic pharnygeal affections.

Weak Tincture of Iodine with Glycerin of Alum is a very excellent solution for daily application with lint or a large brush (1 in 6). It acts like Mandl's Pigment, and may be employed after the destruction of the granules by the cautery. Strong alcoholic solution of Guaiacol has been extolled.

Bromide of Ammonium solution (20 grs. to 1 oz.) has been found useful in subduing the irritability of the pharyngeal muscles, but the writer has had better results from its internal administration in full doses, the effects being much less transitory than when its local exhibition is relied upon.

The Chloride of Ammonium inhaler is of service in the later stages of treatment, and sometimes all through the ailment it affords relief, especially when laryngeal irritation is a prominent feature.

Where enlargement of the tonsils exists, this should be reduced by puncture with the cautery or by removing the hypertrophied organs with the guillotine.

Syphilitic pharyngitis is to be treated by remedies directed to the primary lesion—Mercury in the early stages and large doses of Iodide of Potassium (20 or 30 grs. three times a day) in the tertiary ulcerations.

Chlorate of Potassium 4 drs., Carbolic Acid 1 dr. in 20 oz. Rose Water, is an excellent application or gargle for habitually cleansing the surface of syphilitic ulcers in this region. They may be lightly touched with a small camel's-hair brush moistened (but not dripping) with a little Liq. Hyd. Pernit., care being taken not to approach the entrance to the larynx.

The solid stick of Argent. Nit. may be applied, or Iodised Phenol may be used, or the ulcers, when well within reach, may be insufflated with Iodoform.

The following liquid may be swabbed over the throat upon cotton-wool:

℞ *Hydrargyri Perchlor.* *gr.* j.
Ammonii Chlorid. *gr.* vij.
Glycerini Aluminis ℥j. *Misce.*

Fiat Solutio. *M. d. u.*

Where great pain and difficulty of swallowing is experienced, the pharynx may be sprayed by a nebuliser, using a 5 to 10 per cent. solution of Menthol in pure paraffin.

PHIMOSIS.

When the orifice of the prepuce is very narrow or the prepuce itself is very long, and when from the accumulation of secretion attacks of balanitis occur, the phimosis must be dealt with by surgical means. The irritation of a long foreskin may lead to the establishment of masturbation. The foreskin should be capable of being drawn back so as to completely uncover the glans in every boy, but in the great majority of cases where this cannot be easily accomplished it does not follow that a cutting operation should be decided upon. By forcibly pulling back the skin of the penis the glans may be gradually exposed and the narrow preputial orifice becomes dilated in the act, so that after a daily performance of this process, unless the foreskin is at the same time very long, the narrowing soon disappears and the prepuce shortens so as to leave the glans bare. During the retraction for the first time it will be often necessary to peel back the layer of epithelium lining the interior of the prepuce which has become adherent to the surface of the glans and to remove old accumulations of smegma around the corona.

In cases which do not readily yield to the above simple procedure surgical measures must be considered. These are (1) *mechanical dilatation*, (2) *slitting of the foreskin* on the dorsum of the penis, and (3) *circumcision*. The writer for many years has advocated a more frequent resort to dilatation than is usually considered to be orthodox. When practising as surgeon to a children's hospital he was surprised to find how seldom a cutting operation was necessary to remedy a congenital phimosis, and often has he been able to effectually deal with the acquired variety of the affection in adults by the same means.

In the case of a child whose narrow preputial orifice scarce admits a stout probe, a few sittings suffice to dilate the contracted opening by inserting the blades of a very fine forceps in the closed state, and gradually and very gently separating the handles till the tissues are thoroughly stretched. The ordinary old-fashioned phimosis forceps, opening by means of a finely threaded screw, answers all purposes. It is surprising to find to what extent dilatation may be pushed without causing pain, cracking or tearing of the prepuce. Once or twice a week is often enough, and frequently in young children the prepuce may be painlessly slipped over the glans after one or two trials with the forceps. When this has been accomplished with such ease as to render paraphimosis unlikely, the child's parents may be safely entrusted to periodically draw the prepuce back, and in the case of older children they see to this themselves. In a comparatively short period the elongated prepuce shortens, and the writer has seen several cases where a long narrow prepuce after dilatation has been found years subsequently to have almost disappeared, leaving the glans bare as if circumcision had been skilfully performed. In several

cases where an extremely narrow opening had existed from the time of birth, and caused no inconvenience till marriage, dilatation was found to effect a permanent cure in a few weeks.

Enuresis and symptoms of bladder irritation and of stone, depending upon the condition of the prepuce, rapidly disappear after gradual dilatation by the phimosis forceps. These symptoms, however, are rarely caused by the constricted orifice, as generally stated. They arise from the irritation produced by the partial or complete adhesion or growing together of the mucous surfaces of the lining of the prepuce and the covering of the glans with retained secretion, and this cannot be remedied till the orifice of the prepuce is dilated so as to permit of the foreskin being drawn back and peeled off the glans by forcible scraping with the finger-nail till the head of the penis is completely bared. Occasional drawing back of the foreskin in the act of micturition effectually prevents any further adhesion of the contiguous mucous surfaces, and tends to cause gradual shortening of the foreskin.

Circumcision as performed by the Jews upon the eighth day before the parts are developed would be a wise law for universal acceptance, but it is questionable if the surgeon is justified in chloroforming and performing a by no means trifling operation upon older children or adults when good results in many cases may be obtained by painless gradual dilatation.

Slitting of the prepuce is as a routine the best procedure in acquired phimosis. Though good results may be obtained by dilatation, this cannot be attempted in the presence of any acute inflammatory state of the foreskin or where there are warty growths or chancres. A sharp-pointed bistoury being passed under the prepuce by the aid of a director, it is split up to the corona in the middle line of the penis on its dorsal aspect, and the mucous membrane and skin along the margins of the gaping wound are united by fine sutures; sometimes it may be necessary to snip away any redundant tissue with the scissors. This has the disadvantage of leaving an ungainly dewlap.

Circumcision is the more satisfactory operation in congenital cases, and especially where the prepuce is long. It should be performed, like the preceding operation, under a general anæsthetic owing to the great sensitiveness of the parts. The elongated prepuce is pulled forwards and clamped by the blades of a pair of forceps applied by the Davies-Colley method in an oblique direction forwards and downwards, after which the prepuce is cut off by the sweep of a sharp bistoury in front of the blades, as the glans lies safely behind the latter. The lining membrane of the remaining prepuce is next slit up on the dorsal aspect of the glans almost as far as the corona and neatly trimmed, after which the remaining narrow frill or collar of mucous membrane is stitched by a continuous or by interrupted sutures to the skin margin. When the original incision is skilfully made, a pointed piece of skin remains, which can be sutured over the triangular area below the frenum. The surgeon frequently uses a subcuticular suture. Rapidity of healing depends on accuracy of suturing. With the subcuticular suture the edges are brought together neatly, and as the suture

is not tied and therefore "runs" there is no fear of œdema of the glans.

Some surgeons substitute a Clover's circumcision tourniquet for the blades of the dressing forceps, which are liable to slip, and scissors may advantageously be employed in the removal of the prepuce and in the slitting up of the mucous membrane which will be found to still cover the glans after the foreskin has been cut away in front of the tourniquet.

In very young subjects sutures are sometimes dispensed with, the edges of the skin and mucous membrane being brought into apposition and held by a narrow strip of lint or gauze wound round the penis. All bleeding vessels should be ligatured, and if the orifice of the urethra is found to be very narrow it should be enlarged by an incision directed for a short distance through its floor. Care should be taken that the frenum suffers no injury during the circumcision operation. Sterile Vaseline or Boric Acid Ointment makes a good dressing. The practice of sealing the wound up with collodion is a mistake, owing to the difficulty of removing the dressings. When these become caked with exudation or blood, the best plan is to place the patient in a warm bath till the lint or gauze becomes thoroughly soaked and softened.

PHLEBITIS.

Rest of the affected limb as the patient lies in bed is essential. Where the veins of the leg are involved, the entire limb from the toes to the trunk should be kept in a state of repose by sand-bags or, if necessary, by splints. The limb should be elevated by raising the foot of the bed, the mattress or palliasse. In mild cases strong Tincture of Iodine brushed over the course of the inflamed vein often affords speedy relief. In severe cases Iodine in weaker solution may be once brushed over the course of the affected vein, after which hot fomentations a few hours later on may be tried if the pain be very acute. The best routine method of treating severe cases of extensive phlebitis, arising out of varicose veins, is to envelop the entire leg in warm absorbent wool, over which a layer of thin mackintosh is spread so as to cover completely at every point the wool from the toes to the groin. This dressing is kept in accurate position by the even pressure of a many-tailed bandage, and once in every 24 hours is quite enough for changing the dressing.

Poultices and fomentations are certainly much inferior to this method, and should only be applied when suppuration occurs. When the pain remains severe, much comfort may be obtained by painting the skin over the inflamed veins with a cream made of Green Extract of Belladonna rubbed up with twice its weight of Glycerin. Friction and massage must not be employed, the great danger in simple non-septic cases being detachment of the thrombus, which may be swept onwards to the heart.

Fischer applies Zinc Gelatin, and over this a bandage is very firmly applied. Embolism during the application of the bandage is prevented by pressure of the finger on the vein. He states that notwithstanding the enormous pressure of the bandage it is astonishing how it is borne

without pain, even where there had been great tenderness. The patient is permitted to move about next day.

Ammonia possesses a solvent power upon the blood-clot, and it may be given in the following form:

℞. *Ammoniæ Carb.* ʒij.
Spiritus Ammon. Ar. ℥j.
Potassii Iodidi ʒij.
Hazelini ℥ij.
Glycerini et Aquæ ad ℥vj. *Misce.*

Fiat mistura. Signa.—"Two teaspoonfuls in a large wine-glassful of water four times a day, after food."

In the case of simple phlebitis of the leg where an operation is indicated otherwise, it may be undertaken after the inflammation has settled down provided the removal be begun by a ligature of the internal saphenous vein and that no instrument be used within the lumen of the vessel.

Where the phlebitis is septic the great danger is that of pyæmic infection from septic emboli. To prevent this the vein should be ligatured well above the inflamed spot. This having been done, the diseased patch may be excised, or if this be inadvisable it may be opened and the septic clot removed. Abscesses must be freely incised as they appear, and attention should be directed to the antiseptic management of any ulcer, wound or injury to which the phlebitis is secondary. Amputation of a limb may be the only resource open to the surgeon in order to save life.

After 3 weeks' rest, œdema and local thickening may be removed by the pressure of an india-rubber bandage. This is much to be preferred to the ordinary elastic stocking. Strapping the limb with Mercurial Plaster hastens the absorption of effused inflammatory products, and benefit may be obtained from the internal administration of large doses of Iron, Quinine or Iodides. The rubber bandage should be worn till long after the disappearance of all thickening, and in the case of varicose veins it should be used daily for the remainder of the patient's life, unless a radical operation for the removal of the veins be carried out long after the subsidence of the phlebitis.

In phlebitis of the lateral sinus from suppurative disease of the middle ear the first step must always be the ligature of the internal jugular vein, and then the mastoid cells should be freely opened up and all diseased tissue and thrombi removed.

PHLEGMASIA ALBA DOLENS.

This should be regarded as a septic phlebitis with plugging of the femoral vein, which must be treated on the principles mentioned in the preceding article.

It is usually met with as a complication of the puerperal state, and the general condition of the lying-in patient should receive careful attention,

and no harm can come of the physician insisting upon thorough irrigation of the vagina, and in special cases of the uterus, with some mild and unirritating antiseptic solution as weak Condy's Fluid or Boracic Acid, if such have not already been employed, provided always that its application does not interfere with the chief measure—*i.e.*, rest. This is to be as complete and thorough as possible. If the patient has already got up and moved about she must be put again to bed, and kept lying on the back with the limb elevated by raising the foot of the bed with blocks.

Fever should be met by full doses of Quinine, or a diaphoretic mixture containing 3 mins. of Tincture of Aconite and 3 or 4 mins. of Solution of Morphia, with Spirit of Nitre and Mindererus Spirit, should be prescribed. A good routine treatment will be to put the patient upon a pill consisting of $\frac{1}{3}$ gr. Extract of Opium, and $2\frac{1}{2}$ grs. of Quinine every six or eight hours. A smart Saline purgative should be administered from time to time, and in severe cases the child should be weaned.

Local treatment should not be too active; any method of treatment necessitating frequent manipulations or changes of posture of the affected limb is to be condemned, owing to the danger of dislodging clots or thrombi. The best method to pursue is that just mentioned under the head of Phlebitis. The limb is to be carefully covered from the toes to the groin with a uniformly thick layer of absorbent cotton-wool, after which one large piece of thin mackintosh is to be used to cover the entire limb, so as to permit of no part of the wool being visible. Over all a broad, soft, many-tailed bandage is to be evenly applied. This dressing need not be disturbed for several days if the effect of a poultice be desired, and when it is removed the skin of the limb will be found moist and wrinkled as if after long immersion in water. As a rule, where pain or tension is not very great, this maceration of the limb is not necessary, and the wool may be changed daily. In the great majority of cases the above treatment is all that is required, and if commenced at the earliest stages much pain and tension will be prevented. When the case is not seen till the swelling and discomfort are at their height, relief may be more quickly obtained by enveloping the limb in a double layer of flannel bandage wrung out of hot water, over which the mackintosh may be adjusted and kept in position by a light calico or stocking-web bandage. Belladonna, Chamomile, decoction of Poppy heads, or other anodynes may be added to the hot water, but they are seldom required.

As the acute stage passes off the wool is to be retained, but the mackintosh covering may be dispensed with when the firm, painless, doughy swelling has become established, the wool being firmly but comfortably bandaged by a woven fabric.

At a later stage, a soft dry flannel bandage may be applied and renewed morning and night, the limb being occasionally sponged over with a little tepid water, but friction with oils or liniments is to be forbidden for the reasons already mentioned. The patient may now be permitted to leave her bed for a comfortable couch, but exercise of the affected leg is to be very cautiously permitted till all danger of detaching clots has passed away.

After the patient begins to move about, if the swelling remains, there is no remedy so valuable as the India-rubber bandage applied every morning before getting out of bed, and taken off after she goes to bed at night, when a thin flannel roller may be substituted. This continuous elastic pressure will be found to speedily and permanently remove doughy swelling which had existed for many months. The rubber bandage is more valuable than the old-fashioned elastic stocking, which should be discarded. The woven rubber bandage may be used to great advantage in preference to the pure India-rubber bandage.

The continuous current is now of considerable use, and Massage may be most valuable, with the occasional use of Iodine applications for a few days, while the patient keeps her bed. Friction, with the Lin. Pot. Iod. cum Sapone, is also of great use. Occasionally a weak mercurial application may be tried, under a firm bandage.

Douches, sprays or other form of hydropathic treatment and sea-bathing are suitable in very chronic cases.

PHOSPHATURIA.

This term should be reserved for those serious cases sometimes called *Phosphatic Diabetes*, where the daily elimination of phosphate is much in excess of the normal (20 to 80 grs.), and where the calcium greatly exceeds the potassium and sodium phosphates. The mere presence of insoluble earthy or other phosphates in the urine does not constitute true phosphaturia; these may exist when the total output of phosphates is reduced below the normal, as when the urine is markedly alkaline.

The urine in the ureters may be quite normal in every respect, but upon entering the bladder it may be submitted to fermentative changes which render it highly alkaline with the deposition of triple phosphates. The obvious treatment in such cases is the remedying of the vesical conditions by catheterisation, irrigation of the organ, combined with the internal administration of such antiseptic drugs as Urotropine, Boric Acid, Creosote, Salol, &c., and such surgical measures as will rectify the obstruction to the urinary outflow.

Whilst it is easy to induce a high and constant degree of alkalinity of the urine by the administration of alkalies, it is often impossible to increase its acidity by the administration of acids. Acid Phosphate of Sodium is the only reliable drug, and it may be given in its pure state dissolved in water; as much as 1 oz. in 50 oz. water may be given in 24 hours to keep the urine acid and to dissolve phosphatic deposits and even small calculi of calcium oxalate.

The treatment of the mild cases, where phosphates continually appear in the urine in nervous, dyspeptic subjects, consists in such alteration of the diet as will correct the disturbed digestive process, together with attention to health laws which provide for a sufficient amount of open-air exercise and mental rest. The total intake of food must be regulated to normal requirements, excess of vegetables being especially curtailed, whilst animal food and liquids may be freely permitted. Insomnia must be

relieved by any of the simple hypnotics, and overwork of the brain and worry avoided when possible.

The best routine drug treatment consists in full doses of the Dilute Nitro-Hydrochloric Acid with small doses of Strychnine and Glycerin of Pepsin administered immediately after or along with the food.

The treatment of the true type of phosphaturia is unsatisfactory, and sometimes the condition ends fatally. The cases in which it is associated with saccharine diabetes are especially rebellious to treatment. The diet is to be planned on the recognised lines and excess of food cut off; should sugar be also present with the phosphates, a diabetic diet will be clearly indicated. The measures suitable for the treatment of the milder forms of the disease are indicated, as mental rest, outdoor life, hypnotics, &c., and when the total amount of urine voided is greatly increased, Codeine or Morphia in small amount should be administered as in diabetes, and tonics like Acid. Nit.-Hyd. Dil. with Strychnine should be given. Hagge recommends Urotropine.

PHTHISIS.

One-seventh of all the deaths throughout the world is due to tuberculosis, and in 13 out of every 14 of these the lungs are affected. It is at once obvious that the prevention and treatment of tuberculosis of the pulmonary organs become the most important problem in practical medicine.

Preventive Measures.—The first advance made in the prophylaxis and therapeutics of phthisis was inaugurated by Henry MacCormac, of Belfast, before the middle of the last century and prior to the original labours in the same direction of Brehmer. MacCormac maintained that phthisis was in eve y single instance preventable by the individual breathing a pure atmosphere, and in his classic work on the "Nature, Treatment and Prevention of Pulmonary Consumption," published in 1855, he laid down clearly the lines which are now universally accepted as the basis of the open-air treatment of tuberculosis. His words may be taken to-day as an epitome of the sanatorium method of treating pulmonary phthisis, which, however, did not come into general practice till nearly half a century later. As a preventive he insisted upon the constant formula to be used by the rich and poor—viz., to sleep with their windows largely open and to spend as much time as possible in the open air. For those already tuberculous he insisted that there should be a ceaseless, unlimited supply day and night, winter and summer, of pure air in the apartment of the sufferer, his rule being that the chamber atmosphere must be as pure and untainted as the open air in which the patient should spend as much time as his strength, the weather, the season and his means will permit. He also emphasised the importance of a liberal supply of highly nutritious food.

The prevention of phthisis has been advanced since the discovery of the causal bacillus, but no measures can be rationally employed in this direction unless guided by the knowledge obtained by recent experimental research. The fundamental fact must be recognised that the bacillus of tubercle can be conveyed from the cow to man and from man to man.

Cobbett in his classic work "On the Causes of Tuberculosis" (1917) maintains that when the bovine bacillus attacks man *it does not in the course of the disease in any one individual become changed into the bacillus of human type.* But if we accept the theory that pulmonary phthisis in the adult is often the result of an intestinal infection in infancy the evidences of stability of type derived from laboratory researches are not conclusive, and the atypical forms found in lupus are regarded by some as evidence of unity of type. The writer, however, accepts Nathan Raw's view and regards surgical tuberculosis as always of bovine origin, whilst phthisis is almost always caused by the human bacillus. When the bovine bacillus in gland or joint disease invades the blood-stream an acute tuberculosis supervenes in which the lungs will suffer. This, however, does not minimise the importance of the general law. Especially is this distinction of value since it gives the key-note to treatment. All surgical cases (bovine bacillus) must be treated by the tuberculin prepared from the human bacillus, and phthisis must be treated by the bovine tuberculin, as the two types are antagonistic. Without further dwelling upon the nature of the difference between human and bovine tuberculosis it must be recognised that the bacillus is ubiquitous, certainly in cities and probably also in rural districts, and that it is constantly finding its way in minute quantities into the human circulation by various channels.

Under ordinary circumstances the defensive mechanism of the human body is quite sufficient to deal with these stragglers, but once this natural resistance has become broken down by illness of any kind, by the constant breathing of impure air, starvation or even by local trauma, the bacillus is enabled to increase and multiply itself.

The natural resistance, or, in other words, the defensive mechanism, being weak in many individuals owing to hereditary or congenital causes, these succumb to phthisis or other form of tuberculosis when their companions, submitted to the same environment, remain healthy. Hence the necessity of open-air life and good feeding as a preventive in all individuals whose family history shows numerous examples of tuberculosis.

Probably no person is immune to the bacillus, whether this be of the human or bovine variety, if the organisms gain admission to the body in such numbers as cannot be effectually dealt with by the natural defensive mechanism. The question of infection therefore resolves itself practically into that of the *dosage* of the living virus.* In order to rationally carry out a successful preventive treatment it is necessary to recognise the channels by which the bacillus finds its way into the human organism.

The intestinal surface is the most important of these channels, as the writer has endeavoured to prove in the Cavendish Lecture (*British Medical Journal*, July 11, 1908). Space does not permit of a repetition of the experimental results obtained by the conjoint research carried out by Professor Symmers and himself; suffice it to say that by introducing

* This sentence stands as printed in the former edition of the present work, and its importance is most clearly insisted upon by Cobbet, who has recently demonstrated its truth experimentally.

large doses of living bacilli into the stomach of guinea-pigs by the œsophageal tube the micro-organisms were found to have penetrated the intact intestinal surface and a few hours afterwards were demonstrated in the lung tissue of the animal. Solid carbon particles, when administered in a similar manner alone or mixed with tubercle bacilli, were likewise found in the lung tissue, having passed through the large-meshed reticulum of the mesenteric glands (without discolouring these organs), to be filtered out of the blood by the fine pulmonary capillaries. These results demonstrate the possibility of the production of pulmonary phthisis through the gastro-intestinal surface without any intestinal or abdominal lesion, as erroneously denied by Koch, especially if we leave out the question of the type of bacillus.

Calmette has demonstrated that when the bacilli are introduced into the stomach of the guinea-pig the cervical lymphatic glands become also involved, thus showing that the theory of the tonsillar route does not always hold true.

When the universally recognised prevalence of tuberculosis in cattle is kept in mind, the bearing of the above facts on prophylaxis becomes obvious. Milk from tuberculous cows, rich in the presence of the infective bacilli, especially when the udder is involved in the disease, supplies the ideal conditions for charging the human organism with large doses of the specific micro-organism, and it must be accepted as proven that the invasion by this route may eventuate in a primary acute general tuberculosis in which the lung suffers with the lymphatic glands of the entire body, though there may be no intestinal ulcers found after death.

Milk, therefore, as an article of food, should be obtained from cows which have been demonstrated to be free from tubercle by testing with tuberculin injections, otherwise it should be sterilised by a heat sufficient to destroy the bacilli. It is the firm conviction of the writer that when uncooked milk becomes recognised (as it should be) to be more dangerous than raw pork then human tuberculosis will become a comparatively rare disease. One more pathological consideration bearing upon the prevention of phthisis and abdominal tuberculosis must be kept in mind by the physician who tries to guard his patients against tubercular invasion:

Von Behring maintained that the phthisis of adults was due to the tardy evolution of intestinal tuberculosis contracted during the early years of life from infected milk, and Vansteenberghe and Grysez claim to have proved experimentally that the tubercle bacillus when injected into the stomach of the very young guinea-pig is filtered out after entering the lacteals by the fine reticulum of the mesenteric glands, which acts at this stage of the animal's existence as an effective barrier to the further entrance of the micro-organisms, and the results of Calmette and Guerin's experiments on young goats prove the same; no involvement of the lungs occurred till after the abdominal glands had caseated. These facts demonstrate the importance of sterilising all milk employed in infant feeding as well as the milk used as food in childhood and adult life. Under Lymphadenitis the experience of the writer is detailed in which upon a

large experimental scale he has conclusively satisfied himself that scrofula may be stamped out by this means.

The important question of infection from breathing the air contaminated by the dried, dust-laden sputum from phthisical patients remains to be considered. Whether the bacilli directly gain an entrance into the air cells in this manner (as denied by Calmette and his disciples), or whether they reach the lung after being swallowed with the saliva and enter the pulmonary substance through the lacteals, is probably only a problem of academic interest. Whilst it would be unwarrantable to conclude in either case that phthisis cannot be produced in this manner it is obvious that the risk, the important question of dosage being considered, is much less than in the case of the ingestion of uncooked tuberculous milk. Hence, whilst ordinary wisdom would suggest the advisability of destroying all sputum as it is expectorated, and of avoiding close intercourse of the phthisical with the healthy, these precautions should never be permitted to interfere with a rigorous surveillance of the milk supply.

The physician should recognise the fact that in the case of even advanced tuberculosis in cattle the animals often present none of the ordinary signs invariably present in phthisical patients. The condition of the animal may appear to be normal, and even a large amount of adipose tissue may be obviously present with a shining coat and a capacity for the production of a large amount of apparently healthy milk, though the internal organs and the mammary glands may be studded with tubercles and the milk laden with bacilli.

The regular inspection of dairies, the scrutiny of the meat supply, the enforcement of the State regulations regarding workshops and factories where unhealthy occupations are carried on, the destruction of ill-lighted, badly ventilated, and imperfectly sewered tenements, and the erection of healthy houses for the poor and artisan classes have already materially reduced the mortality of this dread disease. A strictly regulated municipal control of the milk supplied to city residents would go a great way towards stamping out the different forms of tuberculosis.

Therapeutic Measures.—Once the diagnosis of tubercle of the lungs was established in former years the physician approached the problem of treatment with a sense of therapeutic powerlessness. In recent years the fact has been so frequently demonstrated of various forms of localised tuberculosis showing a marked tendency towards spontaneous recovery that the treatment of phthisis in its early stage is now approached in a totally different spirit, with the result that numerous lives are saved which in former years would have been allowed to glide into a fatal ending. Yet it cannot be said that any new drug or new system of treatment is answerable for this improved state of matters if we except vaccine therapy, which is occasionally resorted to. The advance consists mainly in the tardy recognition of the value of MacCormac's method of preventing and treating phthisis by living in the pure open air day and night, together with a better appreciation of the value of sunlight, and a clearer knowledge of dietetics and of the laws of health.

As summed up by Cornet, "the present-day treatment of phthisis is essentially nothing more than a heightened hygiene of the body and mind." No single element in the cure, neither air, nor food, nor hydrotherapy, nor medicine, affords any guarantee of success, this result being only obtainable by the satisfaction of all the physiological and hygienic demands of the human organism from the gravest to the least significant.

The condition of a patient detected in the first stage of phthisis should lead to a close scrutiny of his environment, habits, occupations, food, &c.

Clothing.—As a rule the amount of clothing worn by phthisical patients in this country is too abundant; they usually select heavy garments, and wear too many of them owing to the insane craze of the dread of draughts. The result is that even moderate exercise is followed by copious perspiration which soon saturates the clothing, and after rest the clammy moisture induces a feeling of chilliness which drives them indoors to ill-ventilated and warmed rooms.

Thin woollen garments of open texture should be worn next the skin in summer; these should be replaced in winter by thicker ones of the same material, which should be frequently changed. In severe winters a perforated chamois vest may be worn outside a light merino under-shirt. The absorption of perspiration is thereby provided for, and it is decidedly better to guard against moderate extremes of temperature by suitable overclothing which can be readily put on or off as requirements demand than by heavy layers of under-garments which always keep the body surrounded by a layer of moist atmosphere. There is not the same difficulty regarding foot-wear; the feet and legs should always be protected by thick-soled boots and woollen stockings in both summer and winter. Whilst outer wraps are essential when reclining in the open air or when driving or motoring, these should always be discarded in walking.

Oral Asepsis.—The condition of the mouth should be looked to, the teeth should be constantly cleansed, and the oral cavity kept in as aseptic a condition as possible. It is very remarkable how often numerous carious teeth are found present, and too often the physician considers it as not worth while to submit a phthisical patient to a radical dental operation, since he is already suffering from what is very likely to prove a fatal disease. In every case in its early stage all suppurating stumps and hollow caverns should be extracted; certainly life may be prolonged by this means in patients who have passed beyond the early stage.

In children the air-way should be explored, and in all suspected cases adenoids and diseased tonsils should be removed.

Breathing Exercises.—In association with the condition of the mouth, throat, and nose there arises a subject which has very rarely received the attention that its importance demands, and it is one which in the opinion of the writer is of really vital moment. In auscultating the chest as part of the routine examination in many diseased conditions the observant physician cannot fail to notice how seldom he meets with an individual who is capable of taking a full and deep inspiration even after allowing for the inhibitory nervousness associated with the unusual sensation of a

medical examination. One is sometimes almost driven to the conclusion that such individuals have never in their lives flushed out their air cells properly unless involuntarily during some rare violent mechanical exercise. In many instances, therefore, the very first step to be taken in the therapeutics of an early phthisis is the education of the respiratory muscles, as without such instruction the patient will derive the minimum of benefit from any form of open-air treatment, just as he will experience the maximum of danger when living in an atmosphere containing a deficient proportion of oxygen. This important subject should also never be neglected in the preventive treatment of pulmonary tuberculosis; freeing the upper respiratory tract from nasal and pharyngeal obstruction is not sufficient; deep respiratory exercises should be constantly insisted upon. Singing lessons under a teacher who thoroughly understands the mechanism of breathing is often of far more vital importance than drugging.

Dietetics.—The next consideration is that of food. As already laid down in the treatment of dyspepsia and other allied conditions, the fallacy of writing out a routine cut-and-dried diet table has been insisted upon. In the treatment of phthisis this fashionable error is especially to be avoided. Whilst it will be always necessary to carefully supervise the diet, the individual tastes of the patient should be most scrupulously considered, and, unless predilection be shown for worthless or unsuitable articles of diet which take the place of nutritious food, he should be permitted within generous limits to feed according to his fancy provided he takes sufficient nutriment to fully meet the demands of his organism.

Food as a rule is of far more importance than drugs, and practically there need be no limit set to its amount. As much as the patient can be tempted to swallow may be administered. A well-mixed or varied diet is the best for a consumptive patient in the early stages. It should be carefully cooked, and served in the most tempting fashion, and a good cook is often of more importance than a therapeutist. Fats should, when possible, form an important item in the daily food, and abundance of milk, eggs, and butter is generally within the reach of all, and they do not demand in their preparation much scientific knowledge of cookery. When the temperature is elevated and the digestive organs weakened, the patient may have to rely entirely upon a milk diet, and experience has proved that this of itself is a most valuable dietary in all stages of phthisis. Some patients can take cream. To live upon milk, 4 pints at least in the 24 hours will be required to meet the demands made upon the system; but, as the great aim in dealing with phthisical patients is to administer more than is required to meet the waste, and to so improve the nutrition as to considerably add to the body weight, a larger quantity will be necessary, and in some of the sanatoria more than double this amount is given.

From what has been stated under the head of prevention the necessity of seeing that the milk is free from tubercle bacilli cannot be exaggerated. It is not enough to see that the udder of the animal supplying the milk is free from disease; the tuberculin test should be employed. If we regard

the human and bovine bacillus as antagonists, theoretically the milk of a tuberculous cow might within certain narrow limits be advantageous to a phthisical patient who is suffering from the human bacillus, but here the vital question of dosage is the important factor. It is a sad reflection to think that the milk of a tuberculous cow has been supplied to the extent of several pints per day to a patient in the early curable stage of phthisis when this milk itself has been deeply contaminated by the specific bacillus, which consequently was given in such large doses as to render the escape from a general tuberculosis impossible, yet the writer has known this to occur in at least three instances. If carefully sterilised, the patient should be unable to detect any difference in the milk.

Buttermilk made in the process in which the entire milk of the cow is churned for the production of butter (not buttermilk made when only the cream of milk is churned) makes an invaluable article of diet. When taken 48 hours after churning, it is fairly acid, and is often appreciated and swallowed in large quantities by patients who cannot tolerate fresh milk.

Milk warm from the cow is believed to be more digestible than the cold liquid. A little good rum added is a great improvement. Jaccoud advised phthisical patients to repair twice a day to the cowhouse to drink the milk warm from the milking pails, and to inhale the moist sedative atmosphere of the place for some time, so as to have laryngeal and bronchial irritation soothed. Most patients could not tolerate such a tepid draught.

The milk of the mare, ass, goat, and sheep may be used, and the first two kinds of milk are easily digested. The Koumiss made from the fermented milk of the mare is a highly prized Russian remedy for phthisis.

As described in another part of the present volume a palatable and highly nutritious beverage may be prepared by mixing 1 part of slightly acid buttermilk and 1 part of water with 8 parts of cow's milk, putting the mixture into a loosely corked gallon jar, leaving it in a *warm*, but not hot, place, where it may be frequently and briskly shaken, and in 36 to 48 hours it is ready for use as a pleasant, sharp-tasted, thick liquid, which slightly effervesces. Some little skill and experience are required in producing a uniform result, and the patient should not give it up if the first and second results are unsatisfactory. After the first batch of this artificial koumiss has been successfully prepared the use of buttermilk may be entirely dispensed with, as an equal bulk of the koumiss liquid can be used instead in the preparation of each subsequent quantity. Where a phthisical subject takes to this home-brewed koumiss, as a rule all difficulty in feeding is overcome; but the article commonly known as buttermilk in England will not make koumiss. Whatever advantages are procurable from the presence in the stomach and intestines of the lactic-acid-producing organisms are obtained by the use of this home-made liquid in a much higher state of activity than is possible by the use of the innumerable preparations placed on the market, many of which are useless.

The milk may be peptonised when the digestive organs are weak, but as a rule it cannot be tolerated in large amount when so treated. Ren-

netted milk is much preferable, and cream can be used along with it to great advantage.

A *raw-meat* dietary is recommended by Richet, and in some Continental sanatoria this system is carried out under the name of Zomo-therapy. The uncooked muscle fibre is held to possess a distinct immunising or protective power which disappears on cooking; in other words, large doses of raw meat in some way increase the defensive mechanism of the body. The juice may be expressed from fresh meat by a press, and may be swallowed from a ruby-coloured drinking vessel by fastidious patients. The meat is passed through a mincing machine, scraped with a knife, pounded in a mortar, or rubbed through a sieve, or rolled into pellets and covered with chocolate.

Fish, poultry, game, raw or cooked eggs, and oysters in abundance, and, in fact, every food which is considered easy of digestion and highly nutritious, may be allowed without stint, always provided that farinaceous, fatty, and fat-forming stuffs are allowed a good place. Weber objects to potatoes and all foods which contain potash salts, which, he argues, encourage the growth of the tubercle bacilli.

Four staple meals in the day is the best division of time for the phthisical patient when his digestive organs are in good condition, and the meals should be served up and consumed when possible in the open air. Some patients do best on three meals, and others who cannot take solid food or raw meat can get along on the milk or koumiss swallowed every two hours.

Débove's *sur alimentation* method consists, as its name implies, of "overfeeding"; he recommends that this should be commenced by forced feeding, the food in a liquid form as milk, strong soups or broth, dried raw muscle fibre mixed with milk, raw eggs, &c., being introduced into the stomach by a soft rubber œsophageal tube. It is claimed for this forced feeding plan that the food is retained when everything swallowed in the ordinary way is constantly rejected by the patient. Soon the tube can be dispensed with and the equivalent of 3 lbs. of meat can be swallowed daily without inconvenience. Beef tea is of little value in any form in the treatment of phthisis, and is better replaced by broths or by strong clear soup in all cases. Many phthisical patients may be advantageously sent to a good farmhouse in the country or near to the sea, where their diet consists of poultry, fresh milk in abundance, butter, cream and fresh new-laid eggs consumed in the raw or lightly boiled state, the meals being all partaken of in the open air, which usually powerfully increases the appetite of the city dweller.

As a rule it may be said that alcoholic stimulants are not advisable in the early stages, except where experiment proves that they increase appetite and assist digestion. They should always be administered along with the food, and any good, sound, light wine may be permitted; but the best form for the administration of alcohol is a little good brandy or whiskey largely diluted with fresh cow's milk. Claret, Burgundy, hock, stout and beer should be avoided; these liquids often set up acid fermen-

tation when mixed food is being administered in large quantities, and Champagne should be reserved for very occasional use when the stomach becomes irritable.

Whiskey may be allowed in the later stages of the disease in fair quantity, and if mixed with the patient's milk any reasonable amount may be allowed without danger of doing harm. By giving it in this way cough may be eased, diarrhœa checked, sleep produced, fever diminished and waste retarded. It is obvious that in the class of case referred to a fatal issue is most likely to be the outcome of the disease, and therefore the moral objection to creating an alcohol habit is not serious.

Cod-Liver Oil still holds a place in the treatment of phthisis, though not so frequently employed as formerly. Its use will be referred to later on under the head of Drugs, though the substance must be regarded in the light of a food. It is best given in combination with Malt Extract.

Open-Air Treatment.—This has already been referred to in discussing the prophylaxis of the disease, and it must be accepted as the most potent factor in the treatment of the established affection, though not mentioned first on the list. The poorer class of patient, who must needs work at his daily toil during the earlier stages of the disease, should be induced to spend every available moment in the open air, and never, when possible, even to take his meals under cover. His occupation should be changed for one which gives him the maximum of fresh air and sunshine when this can be accomplished, and when it is impossible he must have the freest possible ventilation in his workshop.

His sitting and sleeping apartment must be constantly flushed with fresh air, and he must be taught that the danger of "draughts" whilst he lies warmly clad in bed is a fanciful one. Legislation has placed the advantages of sanatorium treatment within the reach of the poor, and indirectly enormous benefits will arise from this, since it will inculcate habits of open-air living amongst a class of the community which dreads pure air and ventilation as deadly dangers.

The ordinary routine open-air life of the sanatorium should be enforced from the start with those who can give themselves entirely up to treatment. In the daytime the patient should spend every moment in the open air regardless of cough, pyrexia or other complication. When unable to take exercise he should be upon a couch in the most open type of shelter, whether the sun is shining or a drizzling rain is falling or the atmosphere is fog-laden, winter and summer alike, provided suitable protection by warm clothing and wraps is afforded. By the use of the rotatory shelter he avoids the direct effects of the wind and rain, and when this is not available a temporary screen may be utilised for the same purpose. Soon the patient becomes able to sleep entirely out of doors in his shelter, and after a short time he refuses to spend his night in any other way, though he may find occasionally some snow on his coverlet in the mornings.

It is, however, a constant difficulty to get patients to carry out this radical change in their mode of living at home, and the practice of the writer is to insist upon all cases going for a time to a well-regulated

sanatorium in order to get acclimatised and thoroughly introduced to the routine of open-air life, which they afterwards carry out enthusiastically upon their return to the homestead. One of the first effects noticeable by this treatment is the great stimulus to the appetite and the improvement in the digestive power, which soon shows itself by a marked increase in weight; cough, sweating and pyrexia diminish, though often little change may be noticeable in the physical signs in the lung.

Rest and Regulated Exercises.—The effects of these valuable therapeutic agents and the indications for their employment will be discussed when dealing with the treatment of pyrexia in a subsequent page.

Climatic Treatment.—Since the establishment of the various open-air sanatoria in different parts of Great Britain, climatic treatment may be said to have been relegated to a lower place on the list of therapeutic agents. This is not to be wondered at, because there are good grounds for believing that often better results can be obtained by means of the superior equipment and the scientific knowledge which guides the routine of these establishments than can be procured in foreign climates where the patient is permitted to eat and drink, live and sleep under sanitary conditions often much less satisfactory than those which prevail in his own home where the disease has been contracted. Even in our own climate the locality in which the sanatorium is situated is believed to be a much less important matter than the nature of the supervision, feeding and routine maintained within it. A dry sandy is, however, preferable to a moist clay soil, and exposure to east and north winds is not desirable.

In the earlier editions of the present volume issued before sanatoria were established, the writer, in discussing the relative value of the various climates in the treatment of phthisis, laid down the following law—that there being no region on the globe free from tuberculosis, no climate could be regarded as possessing a specific action on the growth of the bacillus, and that the climate which afforded the greatest facilities for spending the largest amount of the patient's time in the open air was the one from which the best results were to be expected.

Though bright sunshine and the so-called "sun-bath" are desiderata which can only be enjoyed for a brief portion of the total year at home, nevertheless their absence is fully compensated for by the greater home comforts and the avoidance of the fatigue and dangers which a long journey entails upon patients in a pyretic condition.

Home sanatorium treatment has almost completely removed the highly reprehensible practice of sending patients away in the advanced stages of the disease to perish in a foreign land, far from friends and removed from the comforts of home life.

A long journey when the patient is suffering from a continuously elevated temperature is a decidedly dangerous procedure even in the early stages of phthisis.

It cannot, however, be denied that there are more suitable climates than that of Great Britain for the treatment of phthisis, but the drawbacks

as regards travelling and sanitation must always be considered, as already mentioned.

Sea Voyage.—A long journey in a good sailing-vessel was considered to be the ideal climatic treatment, and doubtless it would remain so but for the fact that steam as a motive power has almost rendered the sailing-ship obsolete. It is seldom possible to arrange that the patient can spend his nights on board ship otherwise than in a small confined space, which it may be impossible to ventilate properly. Thus the unrivalled benefits obtainable on deck during good weather by day are vitiated during the sleeping hours, and the noiseless, dust-free atmosphere of a good sailing-ship is now replaced by an environment in which the ceaseless throbbing of powerful machinery and occasional clouds of coal-dust are frequently perceptibly blended with the characteristic odours peculiar to modern marine propulsion.

It is, moreover, worse than cruelty to consign a phthisical patient to a long voyage when previous experience of a marked tendency to seasickness causes him to dread the trip.

Sea-Coast Resorts.—These are often most advantageous, and by careful selection a bracing or a sedative atmosphere of great purity and equability suitable to the individual wants of the patient may be provided. At home, Bournemouth, Ventnor, Torquay, Rothesay, Nairn, Rostrevor and Glengariff are much appreciated. Of these, Torquay affords a moist sedative atmosphere well suited to those cases exhibiting marked bronchial irritability, and it may, like Rostrevor, be selected as a winter resort. The sanatorium in the latter resort, situated on an elevation sheltered by high surrounding hills, is one of the most favoured spots in the British Isles, being cool in the summer and equally warm in winter and free from sand-storms. The dry sandy soil of Bournemouth, which is sheltered from the prevailing winds, and the advantages of its surrounding plantation of pines make it a valuable substitute for the more tempting climates farther afield.

Arcachon and Biarritz are excellent autumn resorts which can be vacated as winter sets in, when the patient may with advantage move on to any of the sheltered sites on the Riviera; Taormenia, Algiers, Mentone and San Remo are probably the best resorts for winter in the Mediterranean, the first-mentioned being the most sheltered and freest from the dry biting mistral wind. Madeira and the Canaries are easily reached, and by some patients are much prized as havens of winter rest, the former being especially valuable for its moist sedative atmosphere when extensive bronchial irritability is present, which is often aggravated by the more bracing climates.

In California, Los Angeles is an ideal winter resort, and the writer has often been able to save the lives of patients whose means have been limited by sending them out in a vessel plying to Mexican ports, from which they can reach the orange groves of California, where open-air work is easily procurable.

High Altitudes.—The treatment of phthisis by residence in regions

situated at great elevation above the sea-level is one of the many modern adaptations of the open-air method. Such resorts are to be found in various parts of the globe, as Denver and Colorado Springs in the Rocky Mountains, Bloemfontein and Pretoria in South Africa, Davos Platz and Saint Moritz in Switzerland, where the altitude ranges between 4,000 and 6,000 feet.

The extraordinary purity of the air and the low barometric pressure tend, with other considerations, to produce a most beneficial effect upon the lung tissue, which is the seat of disease, as well as to produce hypertrophy, and even vesicular emphysema and expansion of the chest, as believed by Williams.

Davos Platz is the most desirable of these mountain resorts, with its splendid sanatoria and the excellent hygienic arrangements of its modern hostels and pensions. The stillness of the cool air, its great purity, rarefaction and dryness, the absence of fogs and the prevalence of ozone and warm sunshine, renders Davos a favourite resort of the victims of phthisis. Even in the depth of winter the patient can safely sit or lie out in the still pure atmosphere in bright sunshine, when the thermometer is below freezing-point, and at night he can sleep with windows widely open in safety.

The appetite increases, the lungs expand, night sweats and fever subside, hæmorrhage is less likely to occur, and many patients return without any symptoms of the disease, having also left their physical signs behind them. The rarefaction of the air is, of course, a most important factor in producing these good results. Professor Lindsay lays great stress upon the inadvisability of sending patients to Davos who are not capable of supporting and responding to the highly stimulating climatic conditions prevailing there. Where sedative measures are indicated, low-level climates should be selected.

By the majority of authorities, the following classes of cases should not be sent to high-level resorts:—Patients with serious cardiac or valvular lesions, much bronchitis or emphysema; where the symptoms are acute or the fever high; where there is laryngeal or intestinal ulceration; where the disease is so far advanced as to prevent exercise. Also the old and very young had better remain in low-level regions. Those of very excitable temperaments, in whom insomnia is marked, and those suffering from albuminuria, should not try the high altitude unless they have had previous experience of it.

September is the best period for reaching Davos, and it is often expedient that the ascent should not be abrupt. After the expiration of six months the patient may safely move towards the sea-level, to return to Davos again in the early winter, if necessary; he may spend his summer with great advantage in the Engadine, or in some of the districts above the Lake of Geneva.

Camping out in the Peruvian Andes, in Santa Fé de Bogota (Granada), amongst the Blue Mountains in New South Wales, as well as in various parts of the Rockies, Transvaal and Orange River Colony, may be resorted

to by male patients whose strength and vigour are but slightly impaired by the early inroads of the disease.

Inland Climates.—The value of each must be estimated by the above-mentioned law regarding the amount of daily time which the climatic conditions permit of comfortable outdoor life in the particular district. To these should be added the great advantages which sometimes can be obtained by living in the midst of plantations of different coniferæ where the air is purified and saturated with aromatic, resinous or terebinthinate products exercising a most beneficial action upon the diseased bronchial surface. Many such spots are available in the Austrian Tyrol and Black Forest. The dry warm climates where the clear pure air is flooded with sunshine and where the rainfall is so slight as to interfere little if at all with outdoor life are most beneficial, and when the patient can travel, Egypt about Assouan and Luxor is highly prized as a winter resort. Such privileged invalids whose means will permit them to spend the winter in the vicinity of the Libyan or Nubian deserts can on the approach of summer have the benefits of a long Mediterranean cruise amongst the islands of the Greek Archipelago or a summer residence in any of the cooler resorts on its northern shore.

Drug Treatment.—It may be safely affirmed that no antiseptic can be safely administered by the mouth in such quantites as will exercise a lethal action upon the bacillus in the tissues of the body, and it is scarcely necessary to emphasise the fact that drug treatment must take a very subordinate place in the routine treatment of phthisis. But when this has been said a plea must be put in against the abandonment of many useful agents, since the open-air treatment has obtained such a firm position in the minds of the profession and of the laity. Unfortunately in many sanatoria the idea seems to prevail that to resort to any form of drug administration is to belittle the virtue of the open-air method of treatment.

To mention the innumerable local methods of reaching the diseased pulmonary tissue by the routine means of inhalations, sprays, &c., must be to condemn them. It is idle to imagine that the bacillus can be destroyed in this way. But it must be conceded in some cases that where the benefits of a pure atmosphere are not obtainable, sterilisation of the air breathed by the phthisical patient must prove beneficial, especially in early cases, and in some advanced cases where there is extensive bronchial mischief and mixed infection. The old form of oro-nasal respirator containing a space for cotton-wool or a sponge saturated with alcoholic solutions of Menthol, Creosote, Phenol, &c., is now seldom employed. One objection to its use is that it interferes with the full inflation of the lungs with air. Coghill's fluid consists of Creosote 1, Phenol 2, Ethereal Tincture of Iodine 2, Rectified Spirit 3. The Brompton formula is Creosote 1, Spirit of Menthol (20 per cent.) 1, Spirit of Chloroform 1.

The solutions of these and other volatile antiseptics in oily liquids for use by the atomiser or nebuliser are much preferable to aqueous or spirituous solutions. They are of very decided utility in laryngeal phthisis

(see p. 492). Continuous inhalation of Chloride of Ammonium, Eucalyptus Oil, Chlorine, Formalin, Ozone, and a host of volatile substances has been extolled from time to time.

Somewhat allied to the preceding methods of combating the bacilli in the lung by the administration of volatile antiseptics is the plan of intratracheal injection. This has been already described under Laryngeal Tuberculosis. This method must not, however, be confounded with that of inhalations, sprays, &c., the intention being that the intratracheal injection after its slow absorption from the bronchial and tracheal mucosa will enter the blood and exercise its beneficial action in this fluid.

Tuberculin.—P.T.R. Tuberculin (bovine type) is the vaccine to be selected for injection; it is, however, now only used by a few and at most sanatoria its use has been abandoned. Incipient cases of apical phthisis without fever are perhaps the only suitable examples for this method of treatment. The initial dose should not exceed what corresponds to $\frac{1}{2500}$ mgm. of the dried substance.

Cod-Liver Oil has long maintained a high reputation in all forms of chronic tuberculosis, but by common consent it is (though still prized) to be regarded as possessing no specific action. Its great value depends upon its being an easily assimilated form of food which by supplying fat enables the patient to resist the emaciating actions of the toxins of the bacillus. It moreover assists the assimilation of other foods which would not be absorbed except in its presence, as the increase in body weight is often more than the amount of oil consumed would account for. It is best administered in combination with Malt Extract soon after meals, but its use should be suspended during pyrexia.

The excellent and sometimes surprising results obtained by abdominal inunction in mesenteric gland disease have been mentioned on p. 569.

Creosote.— Of the host of antiseptic drugs employed from time to time in the treatment of phthisis none have stood the test of experience so firmly as pure beechwood creosote. Guttmann found that the tubercle bacillus grows but feebly in a 1 in 4,000 culture with creosote, and he calculated by giving 15 mins. daily the blood would be so charged with the drug that the growth of the bacillus would be inhibited. Clinicians have constantly observed how the temperature falls, sweating ceases, cough lessens, sputum diminishes, and the appetite improves during a course of the drug. All these effects are, however, probably due not to any bactericidal action, but to the drug neutralising the evil effects of the tubercle toxins on the different organs. It has been frequently noticed that though weight increases and nearly every symptom improves, the number of bacilli in the sputum may remain undiminished, but ultimately by the cessation of fever and the increase of appetite the protective mechanism of the body is strengthened.

The antiseptic action of creosote is more remarkable in the living body than *in vitro:* this may be seen in its sterilising power over the urinary secretion, but such effects can only be obtained by full dosage—10 to 15 mins. daily. The drug is best given in capsule form 3 mins. 3 to 5 times

a day, and some physicians recommend up to 60 mins. as the daily dosage of pure beechwood creosote, which is rich in guaiacol. Pinewood creosote contains a large amount of Creosol and is not so suitable for internal administration.

Creosote may be given by the mouth, alone in capsular form or in combination with cod-liver oil; it has been injected hypodermically when mixed with oil or vaseline. It is very advantageously administered by the rectum; 20 to 30 mins. mixed with 1 oz. cod-liver oil and the yolk of one egg, ½ oz. whiskey and 4 oz. water may be injected once or twice daily. 1 in 10 of oil may be freely rubbed into the skin, and inhalations or sprays may be employed at the same time, the latter methods exercising a marked sedative action on the tracheal and bronchial surfaces. All the above-mentioned routes may be employed in a single case—a plan advocated by Bourget under the title of the " intensive method," by which as much as 1 fluid drachm of the drug may be daily introduced into the blood.

Modifications of the creosote treatment are carried out, the chief of which is the administration by the mouth and hypodermically of Guaiacol, by many regarded as the active principle of the drug. It is given in the same doses as creosote, the routine being a 5-min. capsule 3 or 4 times a day. A favourite Continental method is to inject a mixture of Guaiacol and Iodoform in sterilised Olive Oil and Vaseline, each c.c. of which is made to contain 1 cg. of iodoform and 5 cgs. of guaiacol, 1 to 3 c.c. being injected into the supraspinous fossa. Such a dose rapidly reduces fever temperature, but like the application of the pure drug to the skin for the same purpose it is not free from danger, as serious collapse has followed the smearing over of a patch of skin not larger than the palm of the hand with guaiacol, when oiled silk has been used to cover the surface. Durant's guaiacol injection resembles the iodoform emulsion, but contains free Iodine 1, 10 of iodide of potassium mixed with 5 of guaiacol and 100 of olive oil.

Duotal or Guaiacol Carbonate is a white crystalline powder without taste; it may be given in 5 to 8 gr. cachets or capsules. Guaiacol Benzoate (Benzosol) and the Camphorate—Guaiacamphol—are similar compounds given in 10-gr. tablets. The Cinnamate of Guaiacol (Stryacol) has its warm advocates; the drug is given in cachets of 10 to 15 grs. Thiocol (Potassium-guaiacol-sulphonate) is a favourite remedy in 15-gr. cachets. Quite a long list of other guaiacol compounds and derivatives are also in use, none of which, however, appear to possess any marked advantages over the pure drug.

A favourite modification of the creosote treatment is the administration of Creosotal (Creosote Carbonate), which is a syrupy and almost odourless liquid, which may be given in ½ to 1 dr. doses. The Valerianate (Eosote) is also vaunted; it is an oily liquid best administered in 5-min. capsules.

The Cinnamic Acid compounds have not maintained their reputation. They have been found to powerfully stimulate leucocytosis, and are believed to greatly aid the defensive mechanism of the body in phthisis. Hetol is the cinnamate of sodium, and is administered in 5-gr. doses in

cachets. It has also been employed, dissolved in normal saline solution, as an intravenous injection, and glowing reports have been furnished of this method, which, however, is obviously not free from danger. Equally satisfactory results are obtainable by the injection hypodermically of the 1 in 10 glycerin solution, which may also be administered in drachm doses by the mouth. Landerer commences with a dose of $\frac{1}{65}$ gr. of hetol by the veins, and increases the amount in subsequent injections to $\frac{1}{4}$ gr., claiming a cure in 85 per cent. of cases.

Cinnamic or Cinnamylic Acid, whose dose by the mouth should not exceed $\frac{1}{4}$ gr. and by the veins $\frac{1}{20}$ gr., is now entirely replaced by its sodium salt—hetol. Cinnamal—the aldehyde from oil of cinnamon—is given in 1-min. capsules, and the allied Coumarin salts and Martindale's Tylmarin are also in use, but probably Oil of Cinnamon in 5-min. capsules, or dissolved in cod-liver oil, will achieve all that is claimed for any of these derivatives.

Oil of Cloves and Oil of Eucalyptus and Camphor have been employed extensively, and appear to act in the same manner as the cinnamon oil and its compounds. Menthol and Oleum Menthæ Pip. are now usually restricted to the cure of laryngeal phthisis by local application or by the method of intratracheal injection. Nearly every known volatile antiseptic oil has been tried and has enjoyed some brief reputation in phthisis.

The volatile sulphur oils contained in the onion, garlic and leek are of unquestionable benefit in relieving cough and altering the sputum. The Allyl sulphide given off by the pulmonary surface has marked antiseptic action, acting like the H_2S which is eliminated after the administration of Sulphur. McDuffie's testimony with that of Minchin and others gives Garlic a very high place as a germicidal in phthisis and all forms of tuberculosis. The blood should be saturated with drachm doses of the juice by the mouth, inunction by the skin as by poultices, applying it between the skin of the feet and the stockings, eating it in soups, inhaling its vapour in hot water. All these methods may be employed simultaneously.

Ichthyol, owing to its containing sulphur, has been also freely administered in capsules containing 30 mins., and Witherle advocated the saturation of the blood with sulphur by administering $\frac{1}{2}$-gr. doses of Calcium Sulphide every hour. Sulphites and Hyposulphites have been recommended upon similar principles.

Compounds of Nucleinic Acid derived from yeast—Nucleins—have been extolled in phthisis upon the same considerations which have made hetol popular—viz., that they stimulate leucocytosis and exert a bactericidal action in the blood and tissues. 15 grs. nuclein (Nucleol) may be given by the mouth, or 15 mins. of the 5 per cent. solution of the acid may be injected hypodermically.

The powerful compounds of Arsenic and Mercury have been extensively employed, upon the theory of destroying the bacillus in the blood and tissues. There is no doubt that small doses of Arsenic, as pointed out by Brunton, are beneficial in the early stages of phthisis, probably by their power in rapidly breaking up the diseased epithelial products in the

alveoli, but there is no evidence to justify the assumption that in safe doses the drug has any action on the bacilli. Hence the employment of the Cacodylates and the more toxic new arsenical preparations as Soamin, Arsamin, or Atoxyl are unjustifiable.

Mercury has been reinstalled as an antituberculous agent, and were it not for the serious objections which maintain against the drug after its long use it would be a good routine. The writer believes that mercury is not borne by the phthisical patient in the same manner as by the syphilitic, in which latter case the metal seems to form a harmless compound with the toxins of the spirochetes. B. L. Wright maintains that excellent results are obtainable by deep muscular injections of $\frac{1}{15}$ gr. Succinimide of Mercury into the buttock region every second day till symptoms of mild salivation appear, after which the dose is lessened and longer intervals between the injections permitted. The treatment extends with occasional breaks over a year.

Iodine and Iodoform have already been referred to incidentally in connection with injections of Guaiacol; there is no evidence that any bactericidal action can be produced in this manner. The writer has seen phthisis *supervene* under enormous dosage by Iodides in Tufnell's treatment of aneurism, and also sometimes in tertiary syphilis where the drugs had been employed in very large doses.

The drenching of the patient with large doses of Tannin, Verbascum Thapsus, and the host of inert vegetable substances gave way to the routine administration of coal tar products, such as Methylene Blue, which in their turn have proved useless.

The Hypophosphites still enjoy a considerable amount of popularity; probably the various compound syrups owe any virtue which they possess to the calcium salt contained in them which increases the coagulability of the blood and still is believed by some to favour calcareous degeneration in caseated tuberculous products.

Electricity.—This agent has been pressed into the service in numerous ways; thus the X rays have been utilised in the diagnosis of phthisis in its earliest stage, and some also attribute a curative power to them when applied over small localised apical deposits. The rays certainly have a marked influence for good in the various forms of cutaneous tuberculosis.

The high-frequency current has been extolled as an antituberculous agent in phthisis, and is employed by those who believe that it powerfully excites phagocytosis, weakens the virulence of the toxins, promotes oxidation and hastens elimination.

Surgical Treatment.—This has been tried, and the results of *pneumonectomy* or removal of a portion of lung injured by tubercle have been almost invariably disastrous. *Pneumonotomy* or incision of the lung with the knife or thermo-cautery in order to evacuate cavities and establish drainage has so frequently been followed by fatal results that the operation has passed into discredit and should seldom if ever be attempted.

As recovery after a spontaneous pneumothorax in phthisis has several times been observed, various attempts have been made to put the diseased

lung at complete rest by producing pneumothorax. Thus Forlanini opens the pleural cavity and injects into it without injuring the lung a quantity of compressed nitrogen gas till complete collapse is effected, several injections being usually required. When skilfully performed there is but little risk, and the reports are more favourable than after other surgical procedures.

Multiple rib resection and *Chondrotomy* of the first and second ribs have been several times performed with the view of mobilising the upper portion of the thoracic wall in apical phthisis and permitting the contraction of cavities by slow cicatrisation.

The injection of antiseptics through a fine needle inserted into the seat of the lesion in the lung has been recommended and practised, but the method has been abandoned.

Symptomatic Treatment.—Though the open-air, overfeeding, tuberculin, creosote and other methods mentioned should constitute the main routine treatment of pulmonary tuberculosis, various symptoms usually arise demanding the discriminating skill and experience of the physician.

Cough is the most common of these symptomatic phenomena, and often its unscientific treatment leads to disastrous results. The cough necessary to bring up the purulent or muco-purulent secretion should never be interfered with. The practice of drenching phthisical patients with nauseating expectorants like tartar emetic, squill, hippo, senega, &c., is most reprehensible, especially when there is no general bronchitis present. These drugs cannot alter the contents of the suppurating pulmonary cavities, but they have the power of arresting the digestive function and of destroying the appetite.

Still more serious is the mistake of administering respiratory sedatives like morphia and opiates when there is profuse secretion, as it is astonishing how small is the dose of these sufficient to stop the necessary cough and produce a fatal asphyxiation during the later stage of the disease. It is, however, otherwise in the very early stage of phthisis before softening has set in, when the patient may be harassed by a *dry* incessant hacking cough which keeps the lungs in a state of unrest, and tends to produce a degree of pyrexia and prevents sleep. Here Morphia or Heroin is clearly indicated in small and repeated doses sufficient to slightly influence the respiratory or coughing centre, and the following combination will be found to be a valuable one:

℞. *Liquor. Morphinæ Bimecon.* ℥j.
Potassii Bicarbonatis ʒvj.
Aquæ Laurocerasi ℥ij.
Aquæ Destillatæ ad ʒviij. *Misce.*

Ft. mist. Cpt. ℥j. *cum* ʒss. *succi Limonis quartis horis.*

Heroin Hydrochloride may advantageously be employed when there is a moderate amount of secretion and a cough much beyond what is necessary to clear the bronchial tubes, as it may be given in doses ($\frac{1}{25}$ gr.)

sufficient to soothe the cough centre without rendering the secretion more adhesive.

Laryngeal cough may often be relieved by the 1 in 100 Carbolic spray or by a 5 per cent. solution of Menthol in Liquid Paraffin employed by the nebuliser. In some cases inhalations of Creosote, Friar's Balsam or Conium may be advantageously employed. Cough which resists all drugs sometimes yields speedily on the establishment of the open-air treatment.

Dyspnœa also generally is cut short by resort to the open-air method, and its presence is a clear indication for the suspension of morphia or other narcotic. Rarely will oxygen inhalation be required: when due to an accumulation of pus in the tubes from the overflow of a large cavity, an occasional emetic may be required, and Ammonium Carbonate is the safest of these. By the administration of teaspoonful doses of Sal Volatile in an ounce of water to which a tablespoonful of fresh lemon juice has been added, as recommended in former editions of this work, the bronchial tubes may be relieved and the cardiac depression combated in the advanced stages of phthisis. Partial asphyxia may be relieved promptly in some cases by $\frac{1}{100}$-gr. dose of Picrotoxin, which acts by stimulating the respiratory centre.

Hæmoptysis should be promptly met by the various methods described in the article under this heading. The former plans of drugging with tannin, ergot and the mineral astringents should never be resorted to, the only reliable procedure being to saturate the blood with Calcium Salts.

Insomnia is often due to incessant coughing, and when this symptom is caused by unnecessary stimulation of the respiratory or cough centre, in the absence of abundant secretion, one dose of Morphia, Codeine, Heroin or Dionin may be safely administered at bed-time. Simple insomnia may be met by 20-gr. doses of Trional.

Pain is often due to localised pleurisy or to pleurodynia induced by incessant coughing; in the absence of free secretion it may be relieved by Morphia. Local applications are usually sufficient, and Chloroform Liniment on lint under oiled silk is a reliable routine. Belladonna Liniment should never be employed in this manner owing to the danger of absorption, since phthisical patients are very susceptible to the action of atropine. A small cantharides blister, which was the former routine treatment of localised tuberculous lesions in the chest, may be often employed with advantage. In thin subjects this acts like Bier's method and relieves underlying congestion; moreover, after absorption minute quantities of cantharidin appear to possess some specific action, as maintained by Liebreich, who injected the drug with the view of causing exudation of serum from the capillaries in the vicinity of the tubercles.

Severe thoracic pain in phthisis can always be markedly relieved by strapping the chest with adhesive rubber plaster.

Pyrexia.—The treatment of this symptom has undergone many changes, as its causation has become better understood. Speaking generally, the most reliable of all agents is *absolute rest* of the body as the patient lies in the horizontal position in the open air. The fever is the result of auto-

inoculation with the toxins elaborated by the bacillus, and may be regarded as a phenomenon in most if not all respects identical with the reaction which occurs after a dose of tuberculin. The influx of the toxins is usually due to physical exercise or mental excitement, and Wright has quoted instances where the opsonic index has fallen from over 1 to 0·12 after moderate exercise.

Sometimes the increased flow of lymph through the infected areas in the lung may be accounted for by the persistent coughing which floods the blood with the tuberculous toxin, and hence the importance of minimising all unnecessary cough, especially in pyrexial cases. By absolute rest of body and mind the auto-inoculations are stopped and the case is brought back to the condition of purely localised infection, and Wright maintains that this desideratum is hastened by the administration of Calcium Salts to increase the coagulability of the blood.

It must, however, be remembered that the rest treatment of pyrexia must not be overdone, and as soon as the temperature has been found to remain permanently normal, graduated exercises should be cautiously commenced. M. S. Paterson has demonstrated the importance of these as a curative method in order to induce such a degree of auto-inoculation as will not raise the temperature or lower the opsonic index. When graduated exercises or moderate manual labour is commenced it becomes, therefore, absolutely necessary to determine frequently the rectal temperature, and when this is found to rise above 100° the patient must be placed in bed again.

Wright also considers that as soon as the antibacterial pressure in the blood has been satisfactorily adjusted by prolonged rest graduated exercises should be commenced, the blood-pressure controlled and the coagulability of the circulating fluid reduced by Citrates so as to irrigate in a methodical manner all the foci of infection with a lymph rich in antibacterial substances.

This scientific treatment of pyrexia aims at the removal of the exciting cause, and should take the place of the empiric methods of reducing fever by the administration of such agents as the coal-tar products—antipyrine, &c. The thermic centres in tuberculosis are in a condition of most unstable equilibrium, and though the pyrexia can be easily reduced by antipyretic drugs the effect of these speedily passes off, and is liable to be accompanied by great sweating and prostration and to be followed by a greater rise in the temperature. Quinine is not open to the same objections, but it often fails entirely to reduce fever heat, though it is a valuable antipyretic drug in the case of children.

The most objectionable and dangerous of all methods of reducing the pyrexia of phthisis is that of applying Guaiacol to the skin under oiled silk, as serious collapse is liable to supervene.

Cold sponging or even the tepid bath may be resorted to when the degee of fever is high and remains refractory to absolute rest. When the pyrexia is due to gastric or intestinal disturbance a saline purge and a return to a milk diet are clearly indicated.

Heim's Pill is a routine remedy for the control of moderate and persistent fever in phthisis; it contains ½ gr. Digitalis, ¼ gr. Ipecac., ¼ gr. Opium and 1 gr. Quinine. Niemeyer's Pill has been long used for the same purpose; it contains ½ gr. Digitalis, ¼ gr. Opium and 1 gr. Quinine.

Strychnine is valuable in the markedly fluctuating temperature which is due to a toneless state of the thermic centres.

Night-Sweats.—This symptom seldom requires special treatment; the full establishment of the open-air treatment usually effectually meets the condition provided that the bed-clothing be not excessive. In refractory cases the best routine treatment is the following old-fashioned pill:

℞. *Ext. Belladonnæ Vir.* *gr.* ⅙.
Zinci Oxidi *gr.* iiss.
Ext. Hyoscyami *gr.* ij. *Misce.*

Fiat pilula. *Mitte* xij. *tales.* *Sumat unamam hora somni.*

Atropine or Belladonna is the most reliable of all drugs for the control of profuse sweating, but after the full dose (1/100 gr. atropine) the dryness of the throat, cardiac excitement and occasional visual disturbances are serious barriers to its usefulness, and sometimes it increases the cough by drying up the sputum. Hyoscine acts in a similar manner, and may be employed when an hypnotic effect is also desired.

Agaricine is free from these objectionable qualities; the dose of this is ⅛ to ¼ gr., and may be given every four hours in rebellious cases. Muscarine acts in the same manner, but it is a body of varying composition, and should not be relied on. Strychnine in small and repeated doses (1/32 gr.) is often useful, especially in those cases where the temperature keeps fluctuating during the sweating.

Picrotoxin (1/100 gr.) checks sweating without in any way diminishing the bronchial secretion, by stimulating the respiratory mechanism, as pointed out by Cushny.

Camphoric Acid in doses of 10 to 20 grs. is a favourite anhydrotic with some physicians when given before bed-time.

Dover's Powder in minute doses (1 gr.) is sometimes efficacious, but often it aggravates the condition. When given in the form of Heim's Pill, in which it is combined with Quinine, it proves useful both in steadying the temperature and reducing the sweating, and Niemeyer's Pill acts in the same manner. Quinine by itself may be tried in larger doses when other measures fail; sometimes the combination of this drug in full doses with the Hypophosphites is efficacious, though Yeo recommends the ordinary mixed hypophosphites as the most reliable routine.

Sulphonal in 5-gr. doses often proves valuable in reducing sweating, and the amount may be doubled when a slight degree of insomnia is associated with the profuse perspiration. Chloralose and Chloralamide act in the same manner.

Alone or in association with any of the above methods, sponging the skin with diluted Vinegar or Alcohol, or water containing a small amount

of Chloral, or sponging lightly with *hot* water may be tried. Tannoform and other dry astringent powders may be dusted over the skin with advantage, but the internal administration of the vegetable or mineral astringents is useless and usually destroys the appetite and causes obstinate constipation.

The Ice-Bag applied to the abdomen for several hours during the night is advocated by Rossenbach in obstinate cases.

Diarrhœa.—When this is due to temporary disturbance of the functions of the bowel, the remedies detailed under Diarrhœa should be resorted to after the exciting cause has been discovered. The obstinate and persistent diarrhœa caused by extension of the disease to the intestinal surface must be met by the methods of treatment described in the article on Tuberculous Peritonitis.

Vomiting, Anorexia, Anæmia and other complications are to be treated upon general principles. The involvement of the larynx, mediastinal or mesenteric glands and the supervention of pleuritis or pneumothorax and other complications are to be met by the remedies detailed in the special articles dealing with these conditions.

Fibroid Phthisis.—For the treatment of this affection, see under Pneumonia, Chronic.

PIROPLASMOSIS.

This disease, common in India and the tropics, has been known as Kala-Azar, Leishmaniasis, Dum-Dum Fever, Sahib's Disease, Tropical Cachexial Fever, &c.

It is probably conveyed by a bite of some species of bug, tick or other insect. The treatment of Kala-Azar was most unsatisfactory till the introduction of intravenous injections of Tartar Emetic, which may be claimed almost as a specific remedy. As soon as puncture of the enlarged spleen by a fine needle demonstrates the presence of the parasite treatment should be commenced. Rogers regulates the dose by the body weight, 1 c.c. of the 2 per cent. solution per each 10 lbs. of body weight should be the maximum, beginning gradually with half this amount. The injections may be given every other day till the fever disappears. Doses of 1 gr. by the mouth have also proved curative, but are not so reliable.

The complications—cancrum oris, dysenteric symptoms, pneumonia, skin eruptions and epistaxis—are to be treated upon generally recognised principles.

PITYRIASIS.

This name has been applied to quite a number of totally distinct skin affections the main or obvious sign of which is desquamation. The treatment of these will be found under their appropriate headings. Thus *Pityriasis simplex* is now regarded as a dry Seborrhœa, which frequently manifests itself as a pityriasis capitis, though it may attack the face and body, and its treatment will be found under Dandriff and Seborrhœa.

Pityriasis Rubra Pilaris is regarded as lichen pilaris or lichen acuminatus,

and is usually known as Keratosis, under which heading and under Ichthyosis, to which it is closely allied, the treatment will be discussed.

There remain three skin affections to which the term "Pityriasis" is still applied; the treatment of each will be detailed under their appropriate titles in the following articles.

PITYRIASIS ROSEA.

The treatment of this short-lived affection is simple, as it always tends to resolve naturally after a few weeks. Any bland unirritating ointment or weak alkaline lotion may be applied in order to lessen the pruritus or itching which usually accompanies the rash. Those who believe in the parasitic theory of its origin recommend antiseptic applications, and Jamieson states that the affection may be cut short in 7 to 10 days by a daily bath stained deeply with Potassium Permanganate, after which a 5 per cent. ointment of Salicylic Acid should be rubbed in.

PITYRIASIS RUBRA, OR EXFOLIATIVE DERMATITIS.

Constitutional treatment is of little if any value in this formidable affection, which Hebra wrongly regarded as invariably fatal. Arsenic should not be given in the early acute stage, even in those cases known as of "secondary" type where the disease originates in the vicinity of a patch of lichen, psoriasis or eczema. Many dermatologists still recommend small and frequently repeated doses of Tartarised Antimony alone or combined with diaphoretics and diuretics in the early stage.

The best hope of cure lies in local treatment, and this after the patient has been put to bed will do much if conscientiously carried out, the chief indication being to protect the affected part (the entire cutaneous covering of the body) from the irritation produced by contact with the air and variations in temperature. Where the disease is secondary to some other cutaneous affection, the primary lesion must receive attention. Special symptoms will call for endless modifications of detail.

A weak alkaline bath, containing Bran or Starch should be administered for one or two hours daily; where itching is very troublesome a little Carbolic Acid may be added. S. Mackenzie recommended the following baths:—Starch, 1 lb.; or bran, 2 to 6 lbs.; or linseed, 1 lb.; or gelatin, 3 lbs.; or gluten (size), 6 lbs., to 30 gallons of water; or 3 oz. borax, or 8 oz. bicarbonate of soda, to the same amount of water. Most reliance is to be placed in inunctions by an animal or vegetable fat. These should be carried out several times daily by an experienced hospital nurse told off for the purpose. Fresh Lard, deprived of every trace of saline matter, answers the purpose well. About 2 oz. of the simple Liniment of Camphor may be added to each pound of the fat, and in summer Suet may also be added. This may be rubbed in gently and patiently, after the scales have been removed by prolonged immersion in the warm bath, or by very gentle friction with a soft rough cotton towel. A mixture of equal parts of Lanoline and Soft Paraffin may be substituted for the lard. Zinc Ointment, to which 5 per cent. of Liq. Carb. Detergens and the same

amount of Camphorated Oil have been added, is to be then smeared over the limbs, which should be covered with lint or old linen, also well coated over with the ointment, and comfortably bandaged, the body being several times anointed with the lard during the day, whilst the limbs and face need be only dressed morning and night with the ointment.

Strong tarry preparations must, however, be used with great caution, especially in the early stage. Crocker envelops the patient in bandages soaked in a cream consisting of 1¼ oz. Zinc Oxide, 1¾ oz. Calamine, 2½ oz. Lanoline, 10 oz. Olive Oil and 10 oz. Lime Water. Mackenzie preferred watery applications, and he put the patient into clothes made of lint, and kept saturated day and night with a lotion consisting of 8 oz. Glycerin of Subacetate of Lead, 8 oz. pure Glycerin, and water to 1 gallon. Cod-Liver Oil and Olive or Almond Oils may be also used. Some cases have been successfully treated by causing the patient to live in a warm bath for many days or even weeks at a time.

The nutrition of the body should be maintained by a generous diet, and Cod-Liver Oil may be given after each meal in the later stages of the disease.

PITYRIASIS VERSICOLOR, OR TINEA VERSICOLOR.

The clothing should be light and the under-garments loosely fitting; linen or silk is preferable to wool, and frequent changes are necessary.

Where the eruption does not yield to absolute cleanliness with soap and water followed by a daily bath of tepid water deeply stained with Potassium Permanganate, the following elegant lotion may be applied:

℞. *Hydrarg. Perchloridi* *gr.* x.
Ammonii Chloridi *gr.* xv.
Spiritus Lavandulæ ℥vj.
Misturæ Amygdalæ *ad* ℥x. *Misce.*

Fiat solutio. Signa.—"*To be freely sponged over the discoloured spots every night.*"

Any antiseptic ointment as Diluted Citrine, weak White Precipitate or Salicylic Acid speedily destroys the parasite (*Microsporon furfur*).

Carbolic Lotion or a strong Carbolic Soap will remove it. In phthisical patients the affection is common, and is sometimes entirely removed by the application of Iodine which is used for purposes of counter-irritation, or by Eucalyptus or Creosote Ointments applied with other objects in view.

Sulphurous Acid Solution (1 in 6), Sulphites (Hyposulphites of Soda, 1 in 20), are speedy and cleanly applications.

PLACENTA PRÆVIA.

The practitioner should never forget, in deciding what is to be the treatment in a given case—first, that a woman with placenta prævia is in danger as long as she is undelivered; secondly, that the best results are

got by totally disregarding the interests of the child; thirdly, that it is *loss of blood* that kills most of the fatal cases, and that even a small further loss in a patient already bled white may prove fatal; fourthly, that the fatal cases that do not die of loss of blood die of *sepsis*. The trump card in placenta prævia, which should always be played when in the slightest doubt, is—*turn, bring down a foot and let the patient deliver herself*.

The operation of *turning* can always be performed when the os is sufficiently dilated to admit two fingers, and it is seldom, indeed, that this condition is not fulfilled when the symptoms of placenta prævia have made their appearance. Should the practitioner be unfortunate enough to meet with a case where it is not, he should tightly plug the vagina with iodoform gauze or cotton-wool pledgets wrung out of lysol solution (drachm to the pint), and wait for four hours, when the plug should be removed, and the os will usually be found to have dilated sufficiently. If not, the plug should be reapplied for a further period of four hours. When the os will admit two fingers only, *bipolar version* must be done, since forcible dilatation of the os is bad practice, and is almost certain to result in tearing the placental site and so giving rise to a form of hæmorrhage which is exceedingly difficult to check.

In carrying out bipolar version the patient should be under chloroform, unless urgent necessity to stop the hæmorrhage or the absence of any reliable assistant puts it out of the question. The patient should lie on her back, with the hips at the edge of the bed. The physician's hands and the patient's vulva must be carefully sterilised—the hands by scrubbing with soap, rinsing with 70 per cent. methylated spirit and immersing for 2 to 5 minutes in 1 in 2,000 Perchloride or Biniodide; the vulva by the removal of redundant hair, washing with cotton-wool mops soaked in soap and water and sponging with mops dripping from lysol solution (1 drachm to 1 pint). Boiled india-rubber gloves may be worn, and *must* be worn if the hands are rough, chapped or abraded, or have been recently in contact with pus or fæces; they should be long enough to reach half-way up the forearm. The whole hand is introduced into the vagina and two fingers inserted through the os. If the margin of the placenta can be easily reached in any direction, rupture the membranes at the margin. If it cannot, go through the placental substance.

The head will now be felt resting on the fingers, and it is to be pushed away by them from its position over the internal os, while at the same time the left hand on the abdomen pushes the child's breech in the contrary direction, so as to get its body transverse with its legs and feet towards the os. When the child has been got into this position it is an easy matter to get hold of a knee or a foot, and so to get the foot between the two fingers. It is not easy to bring a foot through the os with two fingers, and the best thing to do is to pass a pair of sterilised vulsellum forceps up beside the two fingers in the os and to seize the foot under their guidance and draw it down. If a hand has been mistaken for a foot, push it up again and go back for a foot. When it has been brought down a strip of gauze or a broad tape wrung out of antiseptic lotion should be tied round

the leg, and left hanging from the vagina. Slight traction on this will at once stop any further bleeding that may occur. The patient is now allowed to come out of the chloroform, and to deliver herself. Delivery usually takes place in from two to six hours.

When the os is sufficiently dilated to admit the whole hand *unipolar version* is performed, the whole hand being passed into the uterus and a foot seized and drawn down. The after-treatment is the same as with bipolar version. It is especially in cases of this kind that the practitioner is tempted to effect forcible delivery by traction on the leg, partly in the interests of the child and partly to save time. The weight of authority is almost entirely against so doing, on account of the danger of lacerating the cervix or even rupturing the uterus. The only justification that can be alleged is the improvement of the chances of life for the child, so that before even thinking of forcible extraction one should be convinced that the child is still alive, and that if born alive it will be likely to survive. To expose an exsanguine mother to the increased risk of a tear through the placental site or through a branch of the uterine artery with the attendant hæmorrhage, for the sake of a premature infant which must have already been weakened by the maternal anæmia, is quite out of the question.

On the other hand, it must be remembered that some laceration of the cervix by the aftercoming head is practically inevitable, even if the case is left to nature, and when the os is already fairly well dilated, the mother has lost little blood and is in good condition, and the child is alive and there is a fair prospect of its survival, I think that it is justifiable to take the extra risk of immediate delivery, provided the practitioner is prepared to control bleeding from the cervix by suturing the rent at once. In the cases where this method is justifiable only a very slight amount of force is required. If much exertion is needed to pull the child through the os, dilatation is not sufficiently advanced for the manœuvre to be performed without the certainty of a deep laceration, and the practitioner should at once desist.

The method of treatment by the *insertion of a plug within the cervix* may next be considered. One form of this treatment, in which a gauze plug is packed into the lower uterine segment and into the cervical canal after a preliminary separation of the placenta around the internal os as high as the finger can reach, cannot be regarded as comparable in point of efficiency to version and bringing down a foot. It may, however, be useful, combined with a vaginal plug, as a temporary measure in those rare cases where hæmorrhage is going on and the os will at once admit one finger.

The method of *plugging with a dilatable bag* has, however, many advocates, and is recommended by them in preference to version. The advantages of this method are that the bleeding is checked as effectually by the bag as by the child's breech, that dilatation is as rapidly and as efficiently carried out, and that finally the presentation is not interfered with and the child escapes the dangers of a pelvic presentation. The disadvantages are more likely to be felt in general practice than in a hospital. The method requires for its performance a certain amount of perishable appar-

atus, which is apt to be found out of order when required at long and uncertain intervals, as is certain to be the case in private practice, where years may elapse without a case of placenta prævia being encountered. Time is required to sterilise the apparatus, and its introduction into the uterus, especially if no assistance is at hand, will take decidedly more time than the performance of podalic or even of bipolar version. And, lastly, it is quite possible for a hurried or inexpert operator to fail in lodging the bag securely within the uterine cavity, and in consequence to fail in stopping, or, what is worse, to succeed in masking the hæmorrhage—objections which must weigh against its use in urgent cases, except in the hands of experts. Either Braun's bag, which is elastic, or, better, Champetier de Ribes', which is not, may be used, and a large size is preferable, so that when the bag is expelled dilatation will be practically complete. The bag is boiled, rolled up tightly and grasped in special introducing forceps. The finger is passed through the os and the membranes ruptured or the placenta bored through. Partial escape of the waters is rather favourable than otherwise.

The bag is then introduced *above* the placenta and the forceps removed. To the india-rubber tube of the bag the nozzle of a Higginson's syringe is then attached, and the bag is pumped full of weak lysol solution, a basin of which should be in readiness. When the bag has been filled the rubber tube is clamped with artery forceps or a piece of tape is tied around it to prevent the fluid from escaping. The finger should be then introduced into the vagina to make sure that the bag is properly in position within the cervix and above the placenta, as, if it has escaped from the cervix and is lying in the vagina, hæmorrhage may go on above it unobserved. The patient is then left alone till the uterus expels the bag; if there is any sign of hæmorrhage, traction is made gently on the rubber tube; indeed, some authorities advise intermittent gentle traction even in the absence of hæmorrhage in order to hasten dilatation. When the bag has been expelled the head follows it into the cervix, and when it has passed through the os, forceps should be put on and delivery completed unless the progress is very rapid.

It may be mentioned that should the practitioner, on his first arrival, find the os fully dilated and the placenta marginal, his best plan of action is to rupture the membranes and complete delivery with forceps.

During the third stage there is a good deal of risk that the placenta will be slow in separating and that there will be bleeding either from a laceration or from the placental site. The placenta should not be waited for more than about five minutes, when the sterilised hand should be introduced and manual removal carried out. In all cases a hot intra-uterine douche of drachm to the pint saline solution should be given with the patient on her back and Pituitrin (1 c.c.) given hypodermically. If bleeding of any consequence continues the cervix should be drawn down with volsella and inspected. If the blood comes from a laceration, it should be sutured with catgut, the whole thickness of the cervix being taken up, and the highest stitch being inserted just *at the apex* of the tear.

If the bleeding is from the placental site, the uterus and cervical canal should be plugged with gauze wrung out of drachm to the pint lysol solution. If the bleeding is severe, the vaginal vault should also be packed wth cotton-wool pledgets wrung out of lysol solution. Plugging may be done for a laceration if proper suturing cannot be carried out for lack of materials or assistance, or through obscuring of the parts by copious hæmorrhage.

The practitioner may find his patient faint and collapsed from loss of blood on his arrival. In such a case the bleeding has usually stopped of itself for the time, and if the collapse is very extreme it is wise to take measures for combating it by saline transfusion, &c., *before* attempting the treatment of the placenta prævia.

A certain amount of support has been accorded to treatment by Cæsarean section, and the tendency of the day is in favour of a more extended use of this method of rapid delivery in any case where delivery *per vias naturales* is likely to be more than usually dangerous to mother or child. This is, of course, a method which is only available for hospital patients and for those who can afford surgical nurses and specialists. It cannot be said to offer a greater chance of safety to the mother than version or plugging with the bag, and is therefore only applicable to cases where the child is alive and viable, the mother is not greatly weakened by hæmorrhage, and attempts at treatment have not already been carried on. It is the best method for the rare cases where the os persistently refuses to dilate.—R. J. J.

PLAGUE.

Prevention is of vital importance. The flea is the medium by which the disease is conveyed to man from infected rats. Hence the importance of exterminating these rodents by trapping, by poisoning, by cats, by asphyxiation with sulphur and other methods. Of all the means of employing poison none is so efficacious and less dangerous to man than the employment of the Danysz virus. It must be remembered that though all the species of rat-fleas do not bite man, the fleas which infest the human subject and many domestic animals will also bite the rat and become infected, thus conveying the pestilence to the human being.

The parasites leave the body of the infected rat and may travel in clothing or merchandise; hence the importance of the disinfection of all baggage coming from infected ports.

In pneumonic plague the infection is direct from one human being to another, and therefore the rigid isolation of all sufferers is of more vital importance than in the bubonic type.

To isolate the shore rats from those arriving in infected ships the system of placing effective shields or guards on all cables should be rigidly carried out, and when possible the vessels should be prevented from coming in close to the landing-stage. It is needless to state that every precaution which sanitary science can suggest for the improvement of hygiene, the establishment of cleanliness and the protection of all food supplies from

being soiled by the excreta of infected vermin must be established in seaports liable to be exposed to the dangers of invasion. The bodies of all captured or poisoned rats should be cremated without delay.

Vaccine therapy as a preventive is of unquestionable utility. Haffkine's Plague Prophylactic consists of a six weeks' culture of the bacillus, killed by heat and preserved by the addition of ½ per cent. phenol. 1 c.c. of the Lister Institute preparation should be injected subcutaneously and may be repeated in about 12 days. Immunity is conferred after 7 days and lasts for many months; this is not, however, complete or absolute, but the proportion of "protected" individuals who afterwards contract plague is a small one, and the mortality amongst them is comparatively trifling. The vaccine is, however, of no value as a *curative* agent once the disease has appeared in an unvaccinated victim, notwithstanding that the saving of life is enormous in times of the pestilence by resorting to early inoculation.

The treatment of the established disease remains at present mainly symptomatic, Yersin's curative serum having to a large extent failed in fulfilling the high expectations aroused upon its introduction. This serum is prepared at the Lister Institute from horses injected intravenously by virulent cultures of the plague bacillus. The dose is 50 c.c. injected into the veins of the patient as soon as the first symptom of plague shows itself, 100 c.c. being at the same time injected subcutaneously and repeated in 12 to 24 hours, 250 c.c. being injected within the first 24 hours. Dixon states that this dosage is much too small, and he injects intravenously up to 130 c.c. until a rigor is produced. Though many observers maintain an attitude of scepticism about the curative value of Yersin's serum, others affirm that when administered in full doses upon the *first day of the disease* the entire clinical aspect improves. As regards the evidence of its curative virtues, there is still a wide divergence of opinion, but perhaps the most significant fact about its value lies in its acknowledged failure as a prophylactic, and its uselessness when resorted to after the first or second day of the established disease. In mild epidemics where the serum has been administered as a routine, the mortality it is claimed has been markedly reduced, but these are obviously the circumstances under which a low mortality is to be expected. The intravenous injection of Tincture of Iodine has been recommended lately, but further corroboration of its virtues are awaited. The symptomatic treatment of plague must therefore be resorted to in every case, whether or not Yersin's or the Yersin-Roux antiplague serum has been injected.

The most constant and formidable of the symptoms of plague is the profound cardiac depression and weakness, and this must be promptly treated by frequently repeated hypodermic injections of Strychnine, and this drug has been considered by some observers to possess a specific influence upon the progress of the disease.

Proceeding upon similar lines, Choksy has obtained excellent results from Suprarenal Gland preparations administered hypodermically and by the mouth alone, or alternating with injections of Strychnine $\frac{1}{33}$ gr.,

Sparteine Sulphate ½ gr., and Atropine $\frac{1}{200}$ gr. Thornton reports most satisfactory results from 30-min. doses of Adrenalin Chloride with 10-min. Weak Tincture of Strophanthus every four hours by the mouth in routine cases and hypodermically in very severe cases.

With the view of destroying the bacillus in the blood, every known antiseptic has been tried, but even those which can be administered safely in large doses, as Quinine, Arsenic and Mercury, have proved useless. Oxygen inhalations give some relief in the fatal pneumonic type of the disease. The local treatment of the buboes should consist in antiseptic or ice poulticing and free incision as soon as suppuration has shown itself. Thorough drainage must be provided, and some authorities recommend excision or curetting when the tumours are few.

The injection of antiseptics into the swollen glands has produced no benefit, but Thornton recommends the injection of Adrenalin Chloride Solution (20 mins.) into the vicinity of the tumours when these are large.

Alcoholic stimulants and feeding by concentrated soups are indicated in most cases. In the hæmorrhagic type of the disease, Calcium Chloride may be administered in order to control the bleeding from the mucous surfaces. *Pestis Minor* or the condition characterised by slight enlargement of the inguinal lymphatic glands without any malaise, which sometimes occurs in individuals before the advent of an epidemic, requires no treatment, and the same remark holds true of the mild type of bubo which is met with at the termination of an outbreak, and which is known as *Pestis ambulans*.

PLEURITIS, Acute Fibrino-serous.

The patient should be at once placed in bed on a hair mattress in a well-ventilated room. The first indication for treatment in all cases is the relief of pain. When this is severe there is nothing so reliable as a dose of Morphia hypodermically, but in the majority of cases the drug by the mouth meets all requirements, or after one hypodermic dose of ½ gr., mouth administration may be employed to keep up the analgesic effect by small and oft-repeated doses. As soon as the severity of the pain is alleviated the narcotic should be suspended, but coughing being an unnecessary phenomenon it may be resorted to again should this symptom become troublesome.

Local measures should be always preferred for the relief of pain when this is not severe and intense, and they should be resorted to in the most severe cases before the action of the narcotic has been allowed to pass off.

A time-honoured routine which still holds a high place in the treatment of the early stage of pleurisy is poulticing the affected side of the thorax with hot linseed. The first cataplasm may advantageously consist of half-crushed linseed and half-powdered mustard, linseed only being employed afterwards till the pain disappears. There is no advantage in persevering with any form of poultice once the presence of fluid effusion has separated the two inflamed layers of the affected pleura. A convenient method of applying a uniform soothing heat to the surface of the chest is

to cover the skin with a thick layer of Antiphlogistine or of the U.S. Cataplasma Kaolini, which consists of kaolin, boric acid, thymol, methyl salicylate, and peppermint oil, made into a paste with heated glycerin. Spongio-piline, or a thick layer of cotton-wool or Gamgee tissue covered with thin mackintosh dressing, acts in the same way. Poulticing is preferable to Turpentine or other forms of stupe or fomentation, which are liable to produce vesication if not skilfully employed. Often an excellent pain-relieving application may be extemporised by causing the patient to lie upon a rubber bottle partially filled with very hot water.

Cold applied in the form of Cold Compresses, Ice-bags, Leiter's Tubes, or Ether Spray may be employed when heat fails, and some authorities maintain that this treatment should always be preferred to hot applications, but the feeling of the patient may be safely trusted in all cases to decide the routine merits of the two plans. Lin. Chloroformi, Lin. Belladonnæ, Lin. Aconiti, &c., are preferred by some physicians; when employed they should be covered with oiled silk, absorption of contained alkaloids being watched for.

Blisters have been employed as a routine for the relief of pain much more commonly in the past than in modern practice. Though their beneficial effect is undoubted, they interfere with the use of other applications or methods which may afterwards be indicated, and they prevent accurate physical exploration of the chest. At a later stage they may advantageously be employed to hasten the absorption of effused fluid, and they should always be resorted to early for the relief of the pain of dry pleurisy.

Leeching, like blistering, was formerly resorted to frequently for the relief of pain, and it may be employed still with advantage in severe cases. The effect can be heightened by the application of a cupping-glass over the bites.

Some physicians adhere to the old routine of dry cupping, but this is often impracticable in patients with thin chest parietes.

Venesection is now seldom resorted to for the relief of pain in acute pleuritis, but in some very severe cases it may be the only means of saving life. In the acute traumatic form of the disease, often complicated with a fractured rib, there should be no hesitation in freely opening a large vein in the forearm and permitting 10 to 20 oz. blood to escape. Cupping over leech bites is generally a futile procedure for the relief of pain and urgent dyspnœa in such cases, and when blood-letting is clearly indicated venesection should always be selected. A brisk saline purge intensifies the action of the operation, and may with advantage be substituted in mild cases.

Strapping the affected side of the thorax at once alleviates the intensity of the stabbing pain and prevents coughing by securing immediate rest to the inflamed opposing layers of the pleural membrane. Stout strips of adhesive rubber plaster should be applied to the skin on the sound side of the chest beyond the sternum, and these must be brought round the affected side whilst the patient makes a forcible expiration, the extremity

of each strip of plaster being fastened on the sound side of the spine so as to fix permanently the inflamed half of the thoracic cavity as in a vice. Not only is the pain usually speedily alleviated by this procedure, but rest to the diseased pleural membrane is so completely effected that the subsequent effusion is often rendered scanty and the duration of the attack shortened. Firm bandaging of the entire thorax is inferior to strapping.

Whilst the above measures are being employed the patient should be placed upon the diet suitable for most acute febrile affections. Milk diluted with a plain effervescing water or liquor calcis meets all requirements; farinaceous foods need not be withheld, and soups or beef essences may also be permitted. Whatever advantages may follow the use of a strictly dry diet in the stage of effusion, none will accrue by adopting this system of treatment in the early inflammatory period of the disease, and the same remark applies to the unscientific routine administration of saline purgatives with the view of preventing effusion.

Drugs which control fever heat and cause free elimination of deleterious products by the skin and kidneys may be employed in moderate doses; one of the best routine combinations is the following, the amount of Morphine being determined by the presence of persistent pain, continuous unrest, or incessant coughing:

℞ *Tinct. Aconiti* ℥j.
Sodii Salicyl. ℥ij.
Spt. Mindereri ℥ij.
Liq. Morphiæ Hyd. ℥j.
Aquæ Camph. ad ℥viij. *Misce.*

Fiat mistura. Cpt. ℥ss. *tertia q. hora.*

Where the fever tends to keep high the amount of Salicylate may be doubled, or a dose of 5 grs. Antipyrine every four or six hours may be given, but no real benefit is to be expected from continuous drugging with the coal-tar antipyretics in full doses. Rarely will the pyrexia call for cold sponging or baths. Quinine is not to be relied upon for the reduction of fever, and some physicians, on the theory of a rheumatic affinity being present in acute pleuritis, recommend the routine of 15-gr. doses of pure Salicylic Acid administered in cachet form.

When effusion has occurred in mild cases, usually the pain and fever have disappeared, and the above-mentioned drugs should be stopped. In severe cases the fever may, however, continue, and their suspension is equally imperative, since no remedy should be administered which exercises any depressant action upon the overburdened heart in extensive effusions.

The treatment of effusion then comes to be the question of vital importance. The tendency of modern practice is to resort to tapping without delay, but this must not be accepted as a routine method for the treatment of all effusions following inflammation of the pleura, as many such when

of moderate extent tend to disappear spontaneously or under the influence of medical agencies, especially in children and young subjects.

The physician should therefore pause before immediately resorting to thoracocentesis, when the amount of fluid is small and there is no undue pressure upon the heart or embarrassment of respiration, till he sees that there is no marked tendency towards absorption, since he possesses agents which undoubtedly exercise a considerable power in hastening the process.

Blistering is the most reliable of these agents, and is often successful in removing sluggish accumulations of fluid when these are of moderate amount. One large cantharidin plaster (4 by 6 inches) may be applied to the thoracic wall and left *in situ* for 8 hours till thorough vesication takes place, or the latter result may be hastened by the application of a warm poultice after a shorter exposure of the skin to the vesicant. A better plan, however, is to employ several small blisters to different parts of the chest wall for a period of three hours each. These flying blisters should be of about the size of a crown-piece, and 3 or 4 of them may be applied at the same time at different spots, though a better plan is to use only one of larger dimensions (3 by 3 inches). This should be placed over the lower part of the affected side near to the diaphragmatic attachment for about 3 hours; on its removal the same blister is next applied higher up for 3 or 4 hours more, after which it should be attached for 6 or 8 hours about the upper level of the fluid.

The effect of this treatment is often so marked that the writer has satisfied himself that the stimulating effect upon absorption cannot be entirely explained by the theory of counter-irritation. The cantharidin of the plaster appears to exercise some specific action over the lymphatic cells, or else to possess a lethal effect upon the cocci or bacilli which are invariably present in the effused fluid. An effect akin to this is often observed when a hypodermic needle has been employed in exploratory puncture and only a small quantity of fluid has been extracted.

Nearly every known counter-irritant or rubefacient application has been employed, but none is so efficacious as Cantharidin; the most frequently used is Strong Tincture of Iodine.

Agents known as Resolvents or Discutients are also employed locally, as weak Tincture of Iodine, Jothion, Lin. Pot. Iod. cum Sapone, Oleate of Mercury, &c. The best results from such drugs may be obtained by applying weak Mercurial Ointment or the Oleate on lint and firmly strapping over it with rubber plaster as already described.

Internal administration of powerful diuretics like Calomel, Squill, Digitalis, Salicylates, Diuretin, &c., is generally useless, and continuous dosage by strong saline purgatives like concentrated solution of Magnesia Sulphate seldom produces any diminution of the effusion, though when this is of large bulk the last-mentioned drug sometimes appears to markedly reduce the amount of fluid if given after a long fast.

The value of a dry diet such as biscuit, old cheese and stale bread has been greatly exaggerated; it has been stated to possess some power in

large effusions, but this is very doubtful, and some physicians report that a purely fluid diet (6 to 8 pints daily) should be administered.

Speaking generally, it should be kept in mind that the drug or diet treatment of an inflammatory effusion is much less satisfactory than is the dissipation of a passive dropsy in serous cavities.

Whilst the above measures—blistering, &c.—may fairly have a trial for a time in the instance of small effusions, there should be no doubt about the imperative necessity of surgical interference in all cases where the pleural cavity on one side contains fluid up to the level of the third rib. If the dulness extends to near the clavicle when the case first comes under the care of the physician, some fluid should be drawn off without any delay. With a dulness extending above the angle of the scapula which has lasted for three or four weeks the same rule applies. Immediate operation is demanded in the presence of marked displacement of organs, though the breathing is not interfered with and the signs on examination fail to show that the sac is greatly distended. In a double pleurisy with each pleural cavity only half filled with fluid there should be no procrastination.

Two dangers confront the physician in all such cases if tapping be deferred—one is the remote liability of sudden syncope, the other is the risk of permitting the compressed lung to become hopelessly bound down by extensive adhesions.

Thoracocentesis should always be preceded by a verification of fluid by means of the hypodermic syringe; when this precaution is undertaken the site of the aspirating puncture becomes a matter of minor importance. Before inserting the hypodermic needle a little sterilised liquid should be left in the syringe, a few drops of which may be injected should the needle become blocked.

The best site for puncture under ordinary circumstances is the lateral region of the thorax in the mid-axillary line in any intercostal space from the fourth to the eighth; a common mistake is to go below the eighth space. Many operators prefer the neighbourhood of the angle of the scapula in the seventh or eighth space. The patient should be in the lying posture on the sound side and partially on his back. Some surgeons recommend the sitting posture, but this is not advisable. The needle or trochar and canula should be pushed smartly into the centre of the intercostal space or close to the upper border of the rib, so as to avoid the intercostal artery. A spray of Ethyl Chloride may be employed to freeze the skin and render the puncture painless. Aspiration should be gently and deliberately performed, only a slow withdrawal of the piston of the syringe being necessary. When Potain's instrument is employed the exhaustion of the air in the bottle should never be complete at the beginning of the tapping. Only about half of a large effusion should be drawn off, and as a rule 1 quart of fluid is enough. If the plan of siphonage by means of a fine Southey's tube be employed the entire fluid may be safely evacuated owing to the slowness with which the fluid is withdrawn.

Should coughing occur the flow must be stopped till this passes off, the needle or canula being left *in situ;* but excessive or continuous coughing,

dyspnœa or pulmonary embarrassment is an indication that some hyperæmia or œdema of the lung is taking place, and the operator should withdraw the canula and trust to nature for the removal of the residual fluid, or repeat the operation after the lapse of several days.

Tapping when carefully performed is seldom accompanied or followed by any untoward event, but very occasionally air has been permitted to enter the pleural sac, which, however, need excite no anxiety when sterilisation of the instrument has been thorough, nor need any emphysematous condition of the tissues in the immediate vicinity of the site of puncture cause alarm. Syncope is only likely to occur when the fluid has been drawn off too rapidly under a complete exhaustion of the cylinder or exhaust bottle; it may be anticipated in weak and nervous patients by a small dose of alcohol. Pneumothorax from puncture of the lung is one of the rarest complications, and if let alone will resolve. A more serious sequela is the appearance of albuminous expectoration the result of pulmonary œdema; this probably never occurs unless when the operator has been too anxious to remove all the fluid at a single tapping.

After the withdrawal of the canula a small pad of Iodoform gauze or a pledget of lint soaked in Friar's Balsam should be placed over the puncture and secured by a strip of adhesive plaster.

When the remaining fluid fails to disappear as already stated a subsequent tapping will be necessary, and this may require repetition. Some authorities recommend, when several tappings fail to prevent reaccumulation, that the pleural cavity should be freely incised as in empyema, and drainage established though the fluid remains free from pus. The appearance of pus in any subsequent tapping is a clear indication for the major operation.

Barr strongly recommends that after the evacuation of the fibrinoserous fluid in acute pleuritis Sterilised Air should be injected. He advocates the employment of siphonage, and after the withdrawal of about half the fluid the air is injected in quantity equal to the removed fluid. The siphonage is then continued till the entire fluid is evacuated, after which 4 c.c. Adrenalin Solution (1 in 1,000) diluted with 8 to 10 c.c. normal saline is injected into the cavity, and in old patients more air is also introduced so as to make the total amount equal to half or three-fourths of the bulk of the fluid removed.

Nitrogen is preferred to air by Vaquez, being very slow of absorption, and he employs this gas alone without injecting adrenalin. It is claimed for these methods that reaccumulation of fluid never occurs, and the dangers of pulmonary œdema and dyspnœa are avoided though the fluid is all drawn off at a single operation.

The operation is simplified by Achard, who allows ordinary air to enter the pleural cavity through the tube used in tapping at intervals during the withdrawal, trusting to the sterilisation of the air by permitting it to flow over the moistened interior of the rubber tubing. He admits almost as much air as removed fluid, and has never met with an instance of sepsis occurring.

Grünbaum and Pitt slowly inject into the pleural cavity 20 c.c. sterilised Liquid Paraffin after the evacuation of the fluid; the paraffin diffuses itself over the surface of the pleura, effectually preventing the formation of adhesions.

The treatment of pleural effusion must not stop with the removal of the fluid. The researches of past years have demonstrated the frequency with which the disease is associated with the presence of the tubercle bacillus in cases which formerly were accepted as of pneumococcal, streptococcal, or other microbic infection. Even if the theory be accepted that in many if not in most cases the supervention of phthisis is to be explained as a secondary event due to the injury of the pleural membrane by some simple inflammatory action, still the indications for further treatment must be regarded as imperative. Open-air life, improved hygiene, and good living must be rigidly enforced as in every case of tuberculosis, and the earliest and fullest expansion of the compressed lung and of the retracted side of the thorax must be expedited by resorting to pulmonary gymnastic or vigorous breathing exercises carried out perseveringly and thoroughly for a long period. The best of these consists in blowing water from one Wolff bottle to another.

The treatment of acute pleuritis ending in empyema will be found detailed under Empyema.

Chronic pleuritis is to be treated upon the same lines as the acute affection, and the probability being that the infection in these cases is of a tuberculous origin, it is necessary to take active steps regarding open-air treatment. The opsonic index should be determined, and in suitable cases tuberculin should be employed and repeated tapping performed as the fluid reaccumulates, or one tapping followed by air and Adrenalin injection should be carried out.

Chronic dry pleuritis is best treated by blistering, and after the relief of pain respiratory gymnastic exercises may advantageously be employed. Iodides in large doses may be given.

The *acute pleuritis of children* runs a more rapid course than that of adults, and it must always be remembered that there is a greater liability of the effusion becoming purulent owing to the greater frequency of the pneumococcal infection. This is very likely to occur in those cases of pleuritis which follow upon pneumonia. Hence the necessity of an early resort to exploratory puncture. When pus is found the aspirator should be employed without delay, and there is a very fair chance that in a child a purulent pleuritic effusion may be successfully treated by tapping once or twice without resorting to the free incision and drainage necessary in the case of adults.

Though the purely fibrino-serous effusions of childhood are prone to be absorbed quickly without thoracocentesis, the same danger of delaying operation as maintains in the case of adults must always be kept in mind. The physician who puts his faith in blistering and drug administration will usually have his patience rewarded by seeing resolution finally set in, but too often this will be at the cost of finding permanent retraction of the

chest wall, caused by the imperfect expansion of the lung through imprisonment by adhesions. Therefore the risks of procrastination in the evacuation of the fluid in every case of serous effusion must be always kept prominently before the attendant's mind, and where there is the slightest doubt about the rapidity of absorption the decision should be made in favour of early tapping, whether the patient be a child or adult.

In the form of pleuritis which attacks patients suffering from Bright's disease the same line of treatment should be pursued, but blisters, if at all employed, should be of very small dimensions, and the effects of the absorbed cantharidin upon the kidneys carefully watched. The risks of full doses of Morphia by the hypodermic syringe must be avoided, pain being more safely relieved by strapping or local anodynes.

The acute pleuritis which sometimes complicates rheumatic fever is best treated by Salicylates in full doses.

PLEURODYNIA.

The treatment of this affection must be carried out on the lines indicated in chronic muscular rheumatism. The relief of pain is the chief indication, but obviously in a condition liable to chronicity, opiates are not to be employed at all, or only to be reserved for the relief of rare and severe exacerbations.

Drug treatment is generally most unsatisfactory save for the alleviation of suffering, the usual routine remedies possessing but slight curative action. Salicylates and their derivatives—Aspirin, Diplosal, Salol, Novaspirin, Glycosal, Salophen, Salacetol, Saloquinine and Benzosalin—are much vaunted. The best of these is Aspirin, owing to its slow absorption and more continuous action. The powdered drug may be given in cachet form; if administered in tablets, these must be broken up by the teeth before being swallowed, and 30 to 40 grs. may be safely administered in divided doses during the day. Antipyrine and Phenacetin are more speedy, but much more evanescent in their action. Perhaps the most lasting results are obtainable by full doses of Iodide of Sodium (10 to 15 grs.) *ter die* in association with 5 to 10 grs. Guaiacum Resin in cachets or lozenges the iodide being swallowed in solution after meals.

Anæmic patients often derive much benefit from Iron and Arsenic combined with large doses of Quinine.

Local measures for the relief of pain are always indicated. During acute exacerbations due to a concurrent neuritis which results from the fibrositis having involved the sheath of the sensory nerves, the best procedure is to secure as complete rest as possible by strapping the side. This is also efficacious in those cases where an element of true neuralgia exists.

Blisters are of undoubted value in many cases; their frequent application hastens the removal of the fibroid indurations which are the main pathological change in the white fibrous tissue. Cantharidin should always be preferred to mustard or capsicum preparations, which often tend to excite neuritis. Any of the anodyne plasters may be applied when the cuticle is perfectly restored after blistering, or the Liniments of

Chloroform, Aconite or Belladonna or undiluted Methyl Salicylate may be selected, these agents being applied on lint and covered with oiled silk. Menthol, Chloral or Camphor in oil or as ointments are favourite applications.

Much good may be obtained by systematic hydropathy and a change to a warm, but not hot, dry and stimulating inland climate. Flannel underclothing to prevent sudden changes of temperature is essential, but the constant error of wearing heavy garments and of over-clothing should be guarded against.

Massage is valuable in the treatment of all forms of fibrositis. This is less easily carried out in pleurodynia than in lumbago or where the limb muscles are involved, but nevertheless careful and persevering stroking and effleurage movements and gentle tapping or tapotement should be employed assiduously for about 15 to 20 minutes at a time. Mechanical Vibration is also most useful, and can be employed with advantage, as kneading of the intercostal muscles is impracticable. Electricity may be freely resorted to; the Faradic current gives best results, but the static and high-frequency currents are also useful; these may be employed in conjunction with douching, Brine baths and other hydropathic agents.

Aqua- and Acu-puncture have been extolled, and even the cautery has been successfully pressed into the service. For immediate temporary relief the Ethyl spray may be resorted to.

PLUMBISM.

Acute poisoning by the soluble salts of lead will be referred to under Poisoning.

Chronic poisoning by lead is known as Plumbism or Saturnism, occurring in painters, plumbers, glaziers, and pottery operatives, and sometimes amongst the general community through contamination of the water supplied by leaden conduit pipes.

Prophylaxis.—The most effective preventive of chronic lead poisoning lies in absolute cleanliness. The condition usually arises from the introduction of lead salts in minute quantities into the stomach by the operative eating his food without careful washing of his hands, and it is a well-recognised fact that cleanly workmen very seldom suffer from plumbism. As it is also likely that absorption may take place through the skin, those coming into contact with lead should systematically see to the thorough cleansing of the entire skin by a bath in which soap and friction are employed at least once in every week.

The worker should never start his labour until after a morning meal, and a diet of milk and eggs possesses special prophylactic virtues. Where dry dust laden with leaden compounds exists in rooms in which the operative works he should be directed to keep his mouth shut as much as possible, and learn to breathe through his nose whilst working, or else to wear a respirator. He should never eat his meals in his workshop.

Lemonade acidulated with Sulphuric instead of citric or tartaric acid is a commonly used prophylactic. A daily small dose of free Sulphur is,

however, of more value in lozenge or electuary form. This latter plan also will insure against constipation, which must be carefully avoided, and if the sulphur fails to cause slight purging a morning dose of Magnesium Sulphate should be instituted.

Cider drinking is answerable for a proportion of cases of lead-poisoning owing to contamination of the beverage by passing through lead pipes, and this and the water supply should be investigated upon the first appearance of suspicious symptoms.

Once a worker has become affected with well-marked symptoms and relieved by appropriate treatment, he should be advised to change his occupation as a preventive of future attacks, since the process of eliminating the poison is a very long and tedious one, and he is almost certain to return to his work before a complete cure is effected.

Curative Treatment.—This consists in the administration of Iodide of Sodium or Potassium in full doses with the view of dissolving out the lead salts accumulated in the muscles and other tissues. The soluble lead compound so formed enters the circulation, and is mainly eliminated by the mucous membrane of the bowel, and in order to effect its removal from the body Sulphate of Magnesium should be conjointly employed in order to form the insoluble sulphate of lead, which is speedily swept out by the purgative action of the saline, otherwise, as pointed out by Oliver, the patient may be repoisoned by lead which has become dissolved out of his own tissues.

Sulphur baths and the drinking of large quantities of natural sulphur water are also highly recommended. Stephens extols ¼-gr. doses of Permanganate of Calcium in pills.

The symptoms of chronic lead poisoning will require special treatment. Colic is the most urgent of these; it is usually associated with obstinate constipation. A large enema of tepid water should be slowly administered in order to thoroughly wash out the colon, or a pint of warmed Olive Oil may be injected when the fæces are hardened, and, as stated in the article on Colic (p. 163), large doses of oil by the mouth are useful. The enema should be followed immediately by a full dose of Castor Oil or of Epsom Salt. Very severe abdominal pain will call for a full dose of Morphia hypodermically or Opium by the mouth, and it may be found that the opium acts sometimes as a laxative in these cases, and even when combined with Alum it may purge slightly, probably from its action in preventing irregular peristalsis. Belladonna also exerts a specific action upon the muscular nerve supply, and may be advantageously combined with the saline purgative. Poultices applied to the abdominal surface, if very warm and of large bulk, usually afford considerable relief.

Paralysis caused by lead poisoning should be treated locally by Electricity conjointly with constitutional measures as Iodides and Sulphate of Magnesia for the elimination of the metal. The Faradic current gives the best results, and the Schnee 4-cell bath may conveniently be employed, as only the forearms and feet need be immersed, and by this means the interrupted, galvanic and sinusoidal currents may be used from time to

time according to the results obtained in each case. But the entire hydro-electric bath is a more valuable means of promoting elimination of the poison.

Massage should be assiduously employed to the "drop-wrist" muscles, and care should be taken by suitable splints to minimise the overaction of the unopposed flexors.

The parenchymatous injection of Strychnine, though on theoretical considerations condemned by some authorities, is of undoubted value in restoring the tone of the paralysed muscles. The best results are obtained by injecting 1 min. of the official solution, diluted with 10 mins. of water at 4 or 5 places deeply into the muscle substance.

Brain symptoms as intense headache and convulsions should be relieved by small doses of Antipyrine combined with Bromides in full amount. Albuminuria should be treated on the lines indicated in the cirrhotic type of Bright's disease and arterio-sclerosis.

PNEUMONIA.

The patient should be put to bed at the earliest moment in a large and thoroughly ventilated room. A real advance in the treatment of the disease during late years has been the wider acceptance of the necessity of a supply of pure air, as the danger of draughts and chills has become recognised as a bogey. The windows of the sleeping apartment should be kept as widely open as in the treatment of a case of phthisis by the open-air method. By this means the degree of toxæmia may be minimised within certain limits, and it is somewhat surprising to observe that whilst some authorities extol Oxygen inhalations for this purpose, they overlook the importance of the freest possible supply of pure air. In the pneumonia of children this fresh air method of treatment has been abused by some physicians, who insist upon the patient being continuously kept in a draught of cold air.

The bed-clothing should be light, and there is no objection to a moderate degree of warmth from an open fireplace, which aids ventilation. By causing the patient's bed to be surrounded at the distance of a few feet by screens covered with coarse muslin, doors, windows and ventilators may be left constantly open. The crowding of the sick-room by the patient's relatives should be strictly forbidden, and it is a good rule when the apartment is small to prohibit a third person from being constantly present.

By limiting the amount of bed-clothing, cold sponging may be rendered unnecessary save when the degree of fever is high. Constant rinsing of the mouth by a weak Permanganate solution is a wise procedure, by which further toxæmia from swallowing the infected sputum is prevented.

The diet should be such as is indicated in most febrile conditions, small quantities of liquid nourishment being administered at short intervals. Milk answers all requirements, but this should not be poured in as is often done in amounts beyond the patient's assimilative powers. Rarely should the limit of 3 or 4 pints of milk daily be exceeded. There is a

temptation to overfeed, owing to the anticipation of weakness of the heart supervening at a later stage, but as this cardiac asthenia is mainly due to toxæmia it may be precipitated by large amounts of food. There is also a special reason why milk in unlimited quantity should be avoided, since its richness in lime salts increases the coagulability of the blood, which is generally at a high point in the disease. In some cases where calcium salts are indicated milk may be pressed, but as a rule it will be wiser to restrict its administration to 2 pints daily, and give small quantities of clear soup or chicken jelly at intervals, and to dilute the milk with effervescing potash or soda water or with barley water. Ice and pure water may be permitted in moderate amount to allay thirst. Lemon-juice is indicated theoretically as tending to minimise the coagulability of the blood; when it is added to the dietary the milk may be administered in the form of whey. Alcohol should never be employed as a routine, but kept in reserve for the treatment of later symptoms.

Blood-letting, formerly employed as a routine with the view of lessening the amount of toxins in the body, is now not resorted to unless in the presence of certain serious symptoms which will be dealt with later on.

Drug Treatment.—The less heroic this is the better, but the practice of absolutely abstaining from the administration of drugs in pneumonia is a weak practice, usually having its basis in ignorance or scepticism of the scientific action of many remedial agents, and it is quite as reprehensible as was the polypharmacy and wholesale drugging of former years.

Toxæmia may be diminished within certain restricted limits by the judicious administration in the early stages of an occasional saline purgative following a moderate dose of Calomel. By the employment of mild diuretics and diaphoretics elimination of injurious products can be assisted through the kidneys and skin, and the pyrexia may be sensibly reduced without risk of harm being done. Though such agents are probably useless in severe cases showing a high degree of pyrexia or toxæmia (these may be accepted in pneumonia as synonyms), nevertheless in other cases they may be able to turn the scale in favour of recovery. The following combination therefore may be employed usually with advantage:

℞. *Spt. Æther. Nitrosi* ℥j.
Liq. Ammon. Acet. ʒij.
Potassii Acetatis ʒij.
Aquæ Camphoræ ad ℥viij. *Misce.*

Ft. mistura. Cpt. coch. mag. quartis horis.

Some physicians recommend Aconite in small doses in the early stage; it certainly acts promptly on the skin and kidneys, reducing the fever heat and the pulse-rate, but in a disease so likely to exhibit symptoms of cardiac asthenia and fall in blood-pressure this drug should be restricted to the early stage of the disease in sthenic individuals, and the same remark applies to Tartarated Antimony formerly employed as part of the routine in every case of pneumonia.

Quinine in moderate or full doses is another routine method of treatment recommended in the early stage and applicable in the later phases of the disease. Whilst the previously mentioned diuretics and diaphoretics rather aid than embarrass the expectoration, which is always adhesive in character, quinine tends on the other hand to render the expulsion of bronchial mucus more difficult, and therefore its routine administration may do more harm than good.

Nearly every drug possessing antiseptic properties has been tried, but Salicylic Acid, Calomel, Chloroform inhalations, Phenol, Creosote, Guaiacol, Arsamin, Protargol, and a host of others have proved valueless.

Siebert gives hypodermic doses of 12 c.c. of a 1 in 5 oily solution of Camphor (this corresponds to the B.P. Liniment of Camphor), and he states that the drug destroys the pneumococcus, a fact which he has demonstrated by experiments on rabbits. The camphor also undoubtedly acts as a powerful stimulant to the heart.

Pneumococcine or Di-Iodide of Terpine has been vaunted as a specific destroyer of the pneumococcus when administered hypodermically in 30-min. doses, but no convincing data are as yet forthcoming.

Ethyl Hydrocupreine, known as Optochin, a quinine derivative, has been introduced by Morgenroth, and Sir A. Wright has demonstrated its germicidal power in the pneumonia of mice, though as yet its specific action in human pneumonia lacks confirmation. Chesney maintains if given in one initial dose of 6 grs. and 2 grs. every 3 hours during the first 3 days a mortality of only 5 per cent. results.

Symptomatic Treatment.—Pain will be the first symptom calling for relief; as this is due usually to the accompanying pleuritis, the remedies detailed in the article on Pleuritis will be indicated.

A large hot Linseed poultice may be applied every three or four hours. It is best to redden the skin well at the start by Mustard, and to keep up the effect afterwards by plain linseed. The poultices should be spread upon flannel, and should extend from the spine to the sternum on the affected side.

Where poulticing fails to relieve the pain in the chest, a dose of Morphia may be given hypodermically, but though this pain is probably owing to some pleuritis which is constantly present in pneumonia, the same freedom in the use of anodynes is not admissible, owing to the danger of interfering with the expectoration and its evacuation. With care, however, pain at this stage can generally be entirely relieved by opiates. Mitchell Bruce has drawn attention to the necessity of morphine for the relief of pain in pneumonia, and has shown that it often is of the greatest use and may save life. But it may be safely affirmed that opiates in any form should *never* be employed in the late stages of the disease.

Hot fomentations are less satisfactory than cataplasmata, since the heat in the latter is more uniform. A rubber bottle partially filled with hot water so that it may fit in closely to the convexity of the chest often answers all purposes. As in the treatment of pleuritis, Cold Compresses, Ice and Leiter's tubes have been employed; they should only be applied

when hot poulticing fails, though the practice of applying a large ice-bag to the thorax in order to produce an antipyretic as well as an analgesic effect may be tried.

In mild cases any of the local anodyne applications mentioned under Pleuritis may be effectual.

Leeching may be employed in sthenic patients for the relief of local pain, and cupping over the bites may be resorted to, though, as a rule, when blood-letting is indicated for the relief of severe pain and distress, it is better to open a vein.

Pyrexia.—This may be taken as a measure of the degree of toxæmia present in the early stages of the disease, and when the temperature rises to 104° or upwards, measures should be employed to reduce it. Antipyrine and other antipyretics of the same class, including Salicylates, will effectually depress abnormal temperatures, but their effect is so transient and liable to be followed by collapse or other untoward results that their administration appears to increase the mortality of the disease, and their use in pneumonia as a routine should be abandoned. Quinine is less objectionable, but as already remarked it often fails, and sometimes seriously embarrasses the respiration by drying up the sputum.

Cold sponging is always safe, and should be assiduously practised when the temperature reaches 103° or upwards. The cold or tepid bath is more reliable, but owing to the difficulty of employing it systematically it is better to resort to "Cradling." This is carried out by placing a large surgical cradle over the naked or gauze-covered body of the patient; from the interior a number of ice-bags or pails filled with crushed ice are suspended, and the whole covered in loosely by a large thin linen sheet extending from the neck to the foot of the bed. This plan is very suitable for children, but any approach to hyperpyrexia is best met by the prompt use of the cold pack, over which cold water may be affused freely till the temperature falls. The cold douche should be reserved for those grave cases of hyperpyrexia in which cyanosis is threatening from retained bronchial secretion or from collapse of the lobules in broncho-pneumonia.

Digitalis is recommended by Continental physicians, who quote statistics in which the mortality has been reduced to about 2 per cent. When it is remembered that the dose for antipyretic purposes consists of the daily administration of 60 to 180 grs. of the dried digitalis leaf, it is not to be wondered at that the treatment is rarely employed in this country, notwithstanding the strong statements made that the drug exercises a specific action in neutralising the toxins of the disease.

The vaunted antipyretic action of digitalis in pneumonia is not to be confounded with its cardiac tonic properties. Thus Fraenkel, who extols its efficacy, states that it should never be given in cases where cardiac weakness is present; his daily dose corresponds to 1 oz. B.P. tincture, and Jurgensen gives 15 grs. of the leaf at one dose to infants under a year old, and 77 grs. to adults. The writer confesses that he has never possessed the courage to prescribe digitalis in this manner, and therefore cannot speak of its efficacy.

The action of digitalis as a cardiac tonic in pneumonia is most disappointing. Whether this result be due to the high temperature or to the depressing action of the toxins on the cardiac muscle or nerve apparatus remains to be proven by the pharmacologist. Nevertheless in full cardiac tonic doses it can do no harm, and may be combined with any drug prescribed for the relief of other symptoms. Maragliano states that when a preparation of digitalis is mixed *in vitro* with a virulent culture of the pneumococcus the resulting combination is quite innocuous.

As a rule it may be said that little good is to be expected from the mere routine reduction of the fever heat in pneumonia unless when hyperpyretic temperatures are reached, and then the excellent results of the cold bath are attributable to its influence upon the heart and eliminatory organs. It is usually only necessary to keep the patient in the bath or pack till the rectal temperature falls to about 100°, as the reduction of temperature proceeds after his removal to bed.

Dyspnœa and Cardiac Failure.—These symptoms must be considered together, as the first evidence of cardiac weakness may show itself by blocking of the right heart causing urgent respiratory embarrassment. When this occurs the best procedure is at once to open a vein, and when the pulse is full and bounding 15 to 20 oz. blood may be permitted to flow out. As the engorgement of the ventricle has been relieved by venesection, remedies intended to strengthen the action of the muscular fibre should be administered.

Alcohol should not be withheld under these circumstances, and though still much difference of opinion maintains regarding its value as a routine agent in pneumonia, nevertheless it cannot safely be denied that in emergencies like the one under consideration this drug may be the means of saving life. It is wise, therefore, to reserve alcohol during the first three or four days of the disease till the first symptoms of cardiac failure threaten, and as soon as increased frequency with reduced tension of the pulse is apparent Whiskey or Brandy should be commenced in divided doses amounting to 5 or 6 oz. daily. Those habituated to its use may be permitted to take half the above amount from the start, but when in them urgent cardiac weakness supervenes, a daily quantity of 10 oz. may sometimes be necessary.

The action of alcohol as a food in pneumonia need not be considered as in the case of typhoid or other protracted continuous fever where a long demand is made upon metabolism. The confusion of these different actions accounts to a large extent for the conflicting opinions upon the value of the drug in pneumonia. In this latter disease the effects of alcohol as a cardiac *stimulant* should only be kept in mind, and it should never be depended upon alone as an agent for strengthening or increasing the tone of the cardiac muscle, a cardiac tonic being always necessary to supplement its action. In the presence of profound toxæmia or a full bounding pulse, alcohol in full doses is worse than useless, since it only increases the poisoning of the nerve centres, respiratory and cardiac.

The writer is satisfied by prolonged observation and clinical study that

the alcohol which has been produced by the pot-still process and permitted to mature for a period of at least 4 or 5 years is better for medicinal use than the patent-still product, and that, therefore, a blended spirit, whether whiskey or brandy, into which the latter form of alcohol largely enters should be avoided. The stimulant should be given mixed with milk, and as already implied in the statement regarding dosage, a tablespoonful should be given every 3 hours, and in severe cases every 2 or every 1½ hours. Considering that the period of free stimulation does not usually commence till the third or fourth day, these doses will only need to be kept up for 3 to 5 days.

Strychnine should always be resorted to in combination with the alcohol treatment. The divergence of the views regarding the value of this drug may be easily accounted for by the fact that some physicians who invariably give it by the mouth seldom observe any marked cardiac tonic effects, whilst those who resort to hypodermic medication in full doses are satisfied about its strengthening the power of the ventricular contractions. It is difficult to explain this difference in the action of strychnine, but the writer has long been convinced of the truth of the above observation. The drug is, moreover, commonly given in doses which are useless; the tablets for hypodermic injection usually supplied vary from $\frac{1}{200}$ to $\frac{1}{50}$ gr.; less than $\frac{1}{20}$ gr. should not be relied upon, and often in emergencies $\frac{1}{10}$ gr. may be necessary.

Digitalis, as already remarked, is a most disappointing drug in the treatment of cardiac failure in pneumonia. It may, however, be injected along with the strychnine; the B.P. tincture in 15-min. doses may be given by the mouth, whilst the strychnine is administered hypodermically. Notwithstanding the writer's scepticism regarding the value of digitalis in pneumonia, he always administers it as a routine in every case when the pulse is failing in tension and becoming more frequent, though he never depends upon it. It is almost impossible to conceive that it can do harm, and the best routine is to commence with a combination like the following in which the dose of nux vomica is so moderate that it does not prevent resort to $\frac{1}{15}$ or $\frac{1}{10}$ gr. strychnine hypodermically as soon as the symptoms of failing heart power become unequivocal; when the nux vomica or strychnine is given by the mouth the effect of the fuller hypodermic dose is more certain.

℞. *Tr. Nucis Vomicæ* ℥ij.
Tr. Digitalis ℥iss.
Spt. Ammon. Arom. ℥j.
Aquæ Chlorof. ad ℥vj. *Misce.*

Ft. mistura. Cpt. ℥ss. *ex aqua quarta q. hora, p.p.a.*

As in the case of the administration of alcohol, strychnine medication should not be commenced during the first few days unless specially indicated, some authorities holding that the premature resort to strychnine is liable to induce a condition of cardiac irritability, but the writer has never

witnessed such result. $\frac{1}{15}$ gr. in severe cardiac weakness may be injected three times a day, but when these large and frequently repeated doses are necessary the mouth administration of nux vomica should be stopped. The above mixture may, however, be continued, the night and morning doses being substituted by a $\frac{1}{15}$ gr. dose by the needle.

Sal Volatile is a reliable cardiac stimulant and may be given in 1-dr. doses freely diluted instead of or in combination with the alcohol.

Sparteine, Caffeine, Cactina pillets, Strophanthus, and other cardiac tonics have been from time to time employed, but they possess no advantage over the remedies already mentioned.

Normal saline solution has been frequently administered with advantage by the bowel, hypodermically or by the veins. 20 to 80 oz. may be given by any route. It is obviously contra-indicated when there is great distension of the right heart from blocking of the circulation in the lungs. But even in this case it may save life if certain precautions are taken. The benefits obtainable from serum injection are not immediately due to any tonic action upon the cardiac muscle; the serum dilutes the blood appreciably, and thus diminishes the amount of toxins going to the poisoned heart and nerve centres. The rational use of this agent will therefore be found in its power of washing the blood, and in cases where severe or profound toxæmia dominates the clinical picture it is the only remedy to be depended upon. By opening a vein 20 to 25 oz. blood should be withdrawn and twice as much serum injected either into the open vessel or by the hypodermic method. In this way a large enough quantity of the toxins may be removed from the body to turn the scale in favour of recovery. The heart is immediately relieved by the diminution of the amount of poison circulating through its own vessels, and the elimination of the toxins is further increased by the powerful stimulation given to the skin and kidneys to throw out the superfluous serum injected. When large amounts of the saline are injected without bleeding having been previously performed, much toxin may be simultaneously removed by smart purging with Magnesium Sulphate two or three times a day.

In those cases of *dyspnœa* often associated with cyanosis where the embarrassment of the breathing may be mainly due to the obliteration of the large amount of lung substance by the process of consolidation, even before the heart begins to fail, Oxygen inhalations are most beneficial. The somewhat puerile objection to the use of oxygen—that it cannot reach the blood through the blocked air cells of the solid lung—may be dismissed: a large amount of the gas will be absorbed by the blood circulating through the unaffected pulmonary tissue. A free supply of oxygen is also a powerful factor in neutralising the toxins and in stimulating the heart. The gas should therefore be used early and not kept in reserve till too late. It is inadvisable to employ it by a mask or inhaler; it may be permitted to escape slowly from the cylinder through a rubber tube of moderate calibre held several inches from the patient's mouth, and when so administered there is no necessity for heating the gas by passing it through a bottle of warmed water.

Cough should seldom be interfered with; it can be quickly silenced by the administration of narcotics which lull the respiratory or cough centre —a practice fraught with disaster in the later stages of the affection, though occasionally justified at the onset of the disease when the cough is dry and painful, the result of the local pleural irritation. The routine practice of drenching pneumonic patients with large doses of the nauseating expectorants is most objectionable. The presence of an abnormally adhesive or tough secretion in the bronchial tubes is best met by 5 to 10 gr. doses of Iodide of Sodium combined with 30-min. doses of Sal Volatile well diluted with water. When opiates must be administered for the relief of painful cough, Strychnine should at the same time be injected to stimulate the respiratory centre.

Much has been written of late years about the advisability of giving Citrates to decalcify the blood in order to limit or prevent the spread of the consolidation in the affected lung, and enormous doses of Iodides are recommended to increase the fluidity of the circulating fluid, but the practice cannot be said to have proved of use. Brunton recommended Calcium Chloride as a powerful cardiac stimulant and tonic when the heart power is failing, notwithstanding the hyperfibrinous state of the blood.

Delirium.—This may, like high temperature and other symptoms, be regarded as a measure of the toxæmia present, and it should be met when the temperature is high by the use of the cold pack and ice to the head, saline solution hypodermically, and saline purgatives in sthenic cases. Alcohol may be tried often with benefit, but its effects must be watched and the drug stopped if the delirium does not speedily yield.

Insomnia is often associated with the previous symptom, and in some cases it may be the cause of the delirium. Smart counter-irritation at the nape of the neck is often useful. When sleeplessness resists the ordinary antitoxic remedies already mentioned, the serious question of the selection of an hypnotic arises. This is often best met by the administration of a full dose of Whiskey at bed-hour; a small wineglassful (2 oz.) may be given provided the general toxæmia is not severely marked, but insomnia accompanied by a low muttering delirium is liable to pass into coma if alcohol in large doses is pushed. The best all-round hypnotic is a full teaspoonful of Paraldehyde administered along with ½ to 1 oz. whiskey diluted with water. Trional is also comparatively safe, but sulphonal and chloral should be avoided. Morphia, though recommended highly by several authorities, should be reserved for cases where alcohol and the simple narcotics fail, and even then it should be avoided in the late stage of the disease, as undoubtedly lives have been sacrificed to the injudicious use of the hypodermic syringe.

Coma is usually a terminal symptom, but nevertheless sometimes if the pulse is not too low in tension and very quick the letting of blood followed by the injection of 3 or 4 pints or normal saline by the veins or skin may save life. Counter-irritation to the extremities, and when *meningitis* is present lumbar puncture, should be employed.

Abdominal distension in some cases becomes a prominent symptom

from the onset, and seriously embarrasses the heart's action. The best treatment will consist in flushing out the entire colon by large enemata of normal saline solution followed by a small dose of Castor Oil and one full hypodermic ($\frac{1}{10}$ gr.) Strychnine. A large sinapism over the transverse colon may also be applied, but the ordinary carminatives are useless, as they never reach the paralysed bowel unless when given by the rectum. The use of the long tube in these cases only aggravates matters; the best procedure is to get up as much fluid as possible by the ordinary enema apparatus, pausing at times to inject a few drs. of Oil of Turpentine mixed with Tincture of Asafœtida by placing the terminal tube of the apparatus in the mixture without withdrawing the nozzle from the anus.

Vaccine Therapy has failed, and probably there is no hope for it in a disease of such short duration and complex causation as pneumonia. Nevertheless some physicians believe they get good results by injecting a stock polyvalent vaccine as soon as the case comes under observation, following this up afterwards by using 20 million of the killed autogenous cocci obtained by lung puncture or from the sputum.

Serum Therapy, on the other hand, holds out some prospect of a successful method of treatment. The first fact to realise in this connection is the mixed nature of the infection in severe cases. Four different types of pneumococci are now identified: types 1 and 2 supply the majority of cases. By immunising horses with the first type a serum has been obtained and utilised in the Rockfeller Institute by Cole which reduced the mortality from 30 to 6 per cent.

The treatment of complications as empyema, ulcerative endocarditis, joint suppuration, &c., is to be carried out on general principles, and here vaccine treatment should always be resorted to when possible, autogenous pneumococci being injected.

After the crisis has occurred and the temperature has fallen and the immediate danger seems to have passed, the greatest care should be exercised, as the heart may still require assistance. Stimulants should be continued for a little time in gradually diminished amounts, but all antipyretic or depressing remedies must be carefully avoided, and the horizontal position maintained during convalescence. The most liberal diet is to be kept up, and the following tonic, or anything possessing similar action, may be safely administered. Fellows' and Easton's Syrups are valuable.

℞ *Liquor. Strychninæ* ʒiss.
Acid. Nitro-hydrochlor. Dil. ʒiv.
Quininæ Sulphatis ʒss.
Infusi Calumbæ ad ʒviij. *Misce.*

Fiat mistura. Capiat cochleare magnum ex paululo aquæ ter in die ante cibos.

The treatment of the acute pneumonia occurring during influenza will be carried out on the above lines as mentioned in the article on Influenza. As there can hardly be a question about the contagiousness of this type of

pneumonia apart entirely from the infectiousness of the influenza rigid isolation is imperative. Nothing has been said above regarding the necessity of disinfecting the sputum and isolating the patient in ordinary pneumonia, as the disease cannot be regarded as infectious in the ordinary sense. In some epidemics of pneumonia the disease is highly infectious, and at the commencement of an outbreak this type cannot be distinguished clinically from the purely pneumococcal form: it is always wise to take precautions, and common cleanliness demands that the sputum in all cases should be passed directly into a vessel containing some disinfecting liquid.

PNEUMONIA (Broncho-Pneumonia).

This affection, most frequently seen in children, is known by a variety of titles as Catarrhal Pneumonia, Lobular Pneumonia, Vesicular Pneumonia, &c. From the pathological standpoint it is really Capillary Bronchitis, and its treatment is to be carried out on the lines detailed in the article on Bronchitis, Capillary, on p. 108. These run in the main parallel with those of acute croupous pneumonia, but owing to the frequency with which collapse of the pulmonary vesicles occurs the closest attention must be given to the nature of the sputum, and agents which possess the power of rendering it less adhesive should be administered. Expectorants like Ammonia, Squill, Senega, Iodides, Ipecac. and Antim. Tart. are indicated, and Opiates in all forms should be discarded or used with extreme caution. The respiratory movements must be assisted as regards the expulsion of the mucus by emetics, friction to the thoracic walls, hypodermic administration of Strychnine, cold and hot affusion, and even in some cases artificial respiration may be necessary. The temperature of the sick-room should be kept about 60° to 65° F. and the air should be moistened with a spray of steam.

Oxygen inhalations are very frequently indicated, and it is a mistake to wait till a high degree of cyanosis supervenes before resorting to the gas. Whilst the usual routine employed in acute pneumonia in addition to that necessary in the treatment of acute bronchitis is clearly indicated, sight must not be lost of the primary conditions to which the pulmonary affection is secondary, and as these are often measles and whooping-cough or influenza a tonic or stimulating dietary with alcohol and strong soups is necessary. In infants alcohol will often save life in this affection, and the best form for administration of the drug will be found in wine-whey made by adding a glass of sherry to a pint of boiling milk and allowing the curd to settle. (See also under Measles and Pertussis.)

The after-treatment of broncho-pneumonia should be conducted upon the principles now recognised as the routine in pulmonary tuberculosis—open-air life as in a sanatorium, with improved hygiene and forced feeding if necessary.

PNEUMONIA, Chronic.

In the majority of cases this is but a type of Fibroid Phthisis, though some examples may be seen where the affection arises from a prolongation

of an attack of catarrhal or broncho-pneumonia, or even in rare cases the cirrhosis may directly supervene upon an attack of true croupous pneumonia in which resolution has been long delayed.

In all cases, whether there be reason or not for the suspicion of tuberculosis, the lines of treatment are clear. The cirrhotic process is beyond the reach of drugs, and the management of the case resolves itself into the treatment of symptoms and the maintenance of the highest ideal of hygiene as in the open-air life and forced feeding methods indicated in phthisis. The patient may advantageously be sent to a properly conducted sanatorium for six weeks to learn the routine of living there, after which he should, when his means permit of it, be sent to a bracing seaside spot where he can live almost entirely in a pure atmosphere with a large degree of sunshine.

The first aim in every case should be to prevent the cirrhosed lung becoming infected secondarily by the tubercle bacillus omnipresent in the air of cities and where individuals are crowded together in unhealthy workshops and factories.

The main indication for symptomatic treatment is afforded by the degree of cough and the nature of the expectoration. The promiscuous administration of sedatives to stop cough or of nauseating expectorants to bring up the sputum more easily is to be discountenanced. Seldom if ever will narcotics be indicated for the relief of unnecessary coughing, and the best drug for liquefying the sputum is Iodide of Sodium in 5 to 10 gr. doses, prescribed with Ammonia. The iodide is likewise employed by those who believe that it exerts some specific absorbent action upon the pathological fibrous tissue, and it is trebly indicated where the cirrhotic process has originated in syphilis. The most important point regarding the management of cough and expectoration is the appreciation of the fact that the cirrhotic change tends in all cases to eventuate in bronchiectasis. The sputum retained in the dilated tubes soon becomes foul from decomposition, and the main treatment of every case of pulmonary cirrhosis due to whatever cause becomes the treatment of the resulting bronchiectasis. Hence the value of volatile antiseptics internally and by inhalation. The best of these are Creosote and Oil of Eucalyptus by the mouth, and the vapour from heated Tar or Oil of Turpentine. (See article on Bronchiectasis.)

In those rarer cases where pneumonia becomes chronic, and eventuates in suppuration or gangrene of the pulmonary substance, the proper treatment will be found in the articles on Lung Abscess and Lung Gangrene.

PNEUMONIA, Deglutition or Aspiration.

This type corresponds pretty closely with broncho-pneumonia mentioned in a preceding article, but as implied by its name the condition arises from the aspiration of infective organisms which are drawn into the bronchi from the mouth usually during a paralysed state of the tongue and larynx or in the violent inspiratory efforts made during drowning.

The treatment should be mainly *preventive*. In all paralytic conditions

attention should be scrupulously given to oral sepsis, and the position of the patient's head and neck should be such as will permit easy removal of all secretions accumulating in the mouth. In submersion cases, death not rarely follows long after rescue from the admission of infective organisms in the impure water aspirated, hence the importance of inversion of the body before resorting to artificial respiration in the case of an individual who has been submerged in sewer-contaminated water such as always exists in the neighbourhood of crowded wharfs, &c. After the free establishment of normal respiration it is a good routine in each case to administer an emetic so as to pump out all the bronchial mucus in the patient's chest, and Oxygen inhalations may always be resorted to in such cases.

The after-treatment consists in the meeting of all symptoms—fever, pain, dyspnœa, &c.—upon the lines laid down for the treatment of pneumonia and broncho-pneumonia.

PNEUMONIA, Hypostatic.

This is the name given to the final stage or splenisation process which follows hypostatic congestion of the bases of the lungs of bedridden subjects, the treatment of which has already been detailed on p. 516.

PNEUMONOKONIOSIS.

This unwieldy title is given to the chronic pneumonic process induced by the inhalation of air laden with particles of dust of various kinds, and therefore includes the *Anthracosis* of coal-miners, the *Siderosis* of metal-grinders, and the *Chalicosis* or *Silicosis* of stone-cutters.

Anthracosis with its black expectoration seldom leads to serious injury of the pulmonary substance, but the inhalation of particles of metal and silicious matter eventually terminates in a chronic inflammatory process in which localised pneumonia, bronchitis, emphysema and bronchiectasis play their separate parts, generally to be followed by a tuberculous invasion of the affected pulmonary tissues.

Preventive treatment consists in the use of respirators and the freest ventilation of the air in the mine or workshop in which the unhealthy occupation is carried on, and the occasional spraying of the air by jets of atomised water to lay the dust.

Once the symptoms of bronchial irritation with the characteristic sputum manifest themselves, the patient should be compelled to change his occupation. The after-treatment will be that suitable for the most prominent symptoms—bronchitic, emphysematous or bronchiectatic—which dominate the clinical picture.

Aspergillosis is a condition closely allied to the above, in which a chronic pneumonic process is set up by the inhalation of the spores of *Aspergillus fumigatus* existing in various kinds of grain. It is met with in pigeon-feeders, and in hair-sorters who use rye-flour in their work.

The treatment is to immediately stop the possibility of the further entrance of the fungus by a change of occupation, and to administer the

agents already detailed as indicated for the relief of the localised pneumonia, bronchitis and emphysema present.

As for the somewhat similar condition of *Actinomycosis* of the lung caused by the entrance of the ray fungus, Iodides have proved of undoubted value when given for long periods in full doses; these should be administered also in aspergillosis, alone or in combination with moderate doses of Arsenic. Recently deep muscular injections of 5 c.c. of Sterilised Milk have been recommended, and Vaccine treatment has been employed, 25 million fragments of the fungus being injected.

PNEUMOTHORAX.

In the majority of cases of this condition there should be little done to interfere with the natural process of resolution, as the opening in the pulmonary pleura tends spontaneously to close and the air to be absorbed.

When pneumothorax occurs in apparently healthy individuals, usually after some severe muscular effort, the shock may be so great as to require free stimulation by a dose of Alcohol or Sal Volatile; pain and distress likewise may call for a full hypodermic of Morphia, and should any distension of the right heart occur and the ventricular action become feeble, Strychnine hypodermically may be clearly indicated. With a full bounding action of the ventricle accompanied by much dyspnœa the usual advice to apply leeches should be discarded and a vein should be promptly opened.

Dyspnœa and cyanosis or asphyxia are, however, most frequently the result of mechanical pressure of the distended pleural sac (with air under increased pressure) causing great displacement of the heart. The best procedure in this condition is to thrust between the ribs a fine trochar and canula, or the hollow needle of the aspirator, and permit the escape of the imprisoned air, but *aspiration* should not be employed. After air ceases to escape spontaneously the affected side may be firmly strapped, but resort to this procedure without previous tapping can only aggravate the patient's distress, and sometimes, even after tapping, the pressure of the air still escaping through a valvular rent in the pleura will necessitate the removal of the plaster or bandage.

When the mildness of the symptoms permit, undoubtedly the best line of treatment is to place the patient at absolute rest in bed, and refrain from tapping in order to encourage or hasten the sealing up of the puncture in the pulmonary pleura, after which the air will become slowly absorbed and the collapsed lung expand again.

Some fluid nearly always accumulates in the pleura, and for the reason just stated this had also better be left alone for a considerable time; after the spontaneous closure of the pleural wound it may, like the air, become absorbed, but if after the expiration of a few weeks the fluid remain and there is displacement of organs, aspiration should be performed. Frequent aspiration is to be avoided; when a considerable quantity of fluid continues to reaccumulate it is best to freely incise the thorax and provide for the

drainage as in empyema, and this should be done at once when the fluid is purulent.

In traumatic cases where the wound in the pleura can be located Macewen advises the resection of a rib and pressure over the abdomen and chest to bring the two layers of the pleura in contact, when they will then be held in position by capillary attraction as soon as the lung expands.

Pneumothorax occurring during the late stages of phthisis is very liable to be immediately followed by purulent accumulation, and when the condition of the patient permits the cavity should be opened and drained.

POISONING.

After the accidental swallowing of any strong poison life may sometimes be saved by the patient *immediately* drinking a great draught of water or milk to dilute the poison and retard its absorption, whilst measures are being taken for evacuating the contents of the stomach. At the earliest possible moment the stomach should be emptied. This may be accomplished by emetics or by the stomach-pump, or by tickling the fauces when these agents are not at hand. In poisoning by the strong mineral acids and all corrosive substances the stomach-pump is contra-indicated, but in the case of mild corrosives like carbolic acid this may be used cautiously if a soft tube be employed. Indeed, the soft india-rubber tube of the stomach-pump can scarcely do any harm except in the most destructive instances of poisoning by concentrated sulphuric or nitric acid, and the pump should always be fitted with such a tube in at least two sizes. When at hand the pump, or a soft rubber tube with funnel attached, should be preferred to every other means of emptying the stomach, and except in the limited number of cases just mentioned, it may be used even when there is room for considerable doubt in the diagnosis of poisoning in patients found in insensible or comatose conditions. The coroner's court will justly censure the practitioner who has been in attendance upon a patient picked up in an insensible condition if the evidence afterwards produced proves that a narcotic poison had been swallowed, though when seen by the physician no such evidence had been forthcoming and the symptoms pointed to head injury, uræmia, or apoplexy. The cautious use of the pump with the rubber tube or the siphon apparatus, when scientifically carried out, can in no way injure the patient's chances of recovery should the case ultimately turn out not to be one of poisoning; and as every minute's delay may be serious for the patient, and as there is thus short time for counsel and debate, he should be prepared to act accordingly and make his error upon the safe side. The first time of using the stomach-pump or lavage tube is sure to be a bungling affair if the operator feels timorous or hurried.

The tongue being depressed by the left index-finger as the patient is seated in a chair, with the head well steadied by an assistant, and the gag in position, the tube is to be pushed steadily and rapidly through the mouth, pharynx and œsophagus till the stomach is reached. Though it is more difficult to pass the soft rubber tube, the confidence in its perfect harm-

lessness will be of great importance to the novice. He should not be deterred by the sound which may be produced by air passing through the tube as its extremity glides past the epiglottis; this ceases as the rubber is passed home into the stomach. An intelligent patient can assist the operator by a voluntary effort at swallowing, and he should not be rushed unless in cases of desperate emergency. During the pumping, by reversing the action of the levers, a little water may from time to time be sent into the stomach to clear the tube of any solid obstruction, and before withdrawing it finally, tepid water, well coloured with Permanganate solution, should be injected into the organ, and this should be pumped out again, the operation being continued till the washings return clear. The antidote may be mixed with the water, and in many instances a quantity of this should be left in the stomach. In pumping opium or alcohol cases, after the washings return clear and free from odour the stomach may be partially filled with strong infusion of tea or coffee.

All these manœuvres can be equally achieved by using the soft rubber tube with its attached funnel, such as is employed in ordinary lavage of the stomach.

As it is now known that most of the alkaloids are eliminated by the mucous membrane of the stomach, in poisoning by these substances the washing out of the organ repeatedly during treatment is necessary. If the patient remains conscious he may be able to wash the stomach out himself by drinking copiously of tepid water. The writer has frequently pumped and washed out the stomach of young infants by using an ordinary soft rubber catheter attached to the nozzle of a metal or glass syringe.

The best routine emetic, and one which the physician should carry in his emergency case, is 30 grs. Sulphate of Zinc. This may be given dissolved in half a tumblerful of tepid water; the mistake is often made of diluting the emetic too much, as this retards its action somewhat. 10 grs. Sulphate of Copper comes next in value, and may be administered when dissolved in a tumblerful of water.

Apomorphine when injected hypodermically in doses of $\frac{1}{10}$ gr. is also a most valuable drug, and possesses the advantage over all other emetics in being available when the power of swallowing is lost and the patient is insensible. A larger dose should *never* be given by the skin, though $\frac{1}{2}$ gr. and even 1 gr. has been given by the mouth without depressing the heart.

Mustard is nearly always at hand, and is a most efficacious emetic. By giving a large dessert-spoonful in a pint of tepid water soon after the poison has been swallowed the absorption of the latter is instantly retarded, and the emesis will bring up the greater portion of the poison along with the mustard.

Antimony, Ipecacuanha, Squill, Carbonate of Ammonia, Alum, &c., are too slow in their action to be depended on, but the physician must employ whatever agent he can lay his hands upon in the emergency. Sometimes a copious draught of water in which vegetables have been boiled may be within reach, and by adding butter or grease of any kind

to this a highly nauseating and effective emetic combination can be prepared in a few seconds.

Jona has demonstrated that if a full dose (½ oz.) of Adrenalin Solution, 1 in 1,000 in dilution, be promptly administered after a lethal dose of strychnine, the blanching of the gastric mucosa will present a reliable barrier against absorption for a considerable period, and this gains valuable time in the treatment of such swiftly acting poisons as the cyanides and powerful alkaloids. Perhaps an equally efficacious method is to administer promptly a draught of water containing 5 to 10 grs. Permanganate of Potassium which will rapidly oxidise all alkaloids.

The antidote suitable for each poison will be mentioned in the following paragraphs mainly reprinted from the last edition of the author's work on Materia Medica.

In the case of a poison of unknown nature a general antidote has been recommended consisting of equal quantities of Calcined Magnesia, Powdered Wood Charcoal and Hydrous Peroxide of Iron—1½ oz. of this mixture may be given in a tumbler of water every 30 minutes till three doses be taken.

It is often necessary for the after-investigation of poisoning cases that the stomach contents should be preserved for analysis in a clean vessel which should be sealed up by the physician himself, and this procedure is also necessary in fatal cases after opening the body.

Acetanilid or Antifebrin.

The stomach-tube or an emetic of Carbonate of Ammonia should be used, followed by Strychnine, $\frac{1}{15}$ gr. hypodermically, and external warmth. Where cyanosis is marked, inhalations of Oxygen may be given, and free stimulation with Alcohol.

Acid, Carbolic—see under Carbolic Acid.

Acids, Mineral.

The stomach-tube should *not* be used. Alkalies—Lime, Soap, Chalk, Potash, Soda or Magnesia—moderately diluted with water may be freely given. In the absence of these, plaster off a wall (softened by hot water), oils (Almond or Olive), and small doses of Morphine hypodermically should be administered; all food should be given by the rectum. At a later stage, when the danger of perforation has passed off, bland mucilaginous foods, like barley water, linseed tea and white of eggs may be freely given.

Acid, Oxalic—see under Oxalic Acid.

Acid, Prussic (or Hydrocyanic).

The stomach, if possible, should be emptied by the tube or by a rapid emetic (½ dr. Sulphate of Zinc); hypodermic injections of Atropine ($\frac{1}{60}$ gr.); 2 mins. of the 1 in 100 Solution of Atropine may be given and repeated in 30 minutes if necessary. Ammonia or Whiskey, inhalation of Oxygen, Ammonia or Chlorine, cold and hot affusions alternately and *artificial respiration* are the best agents to resort to.

Freshly precipitated Oxide of Iron, followed by a solution of Carbonate of Potassium, is to some extent a chemical antidote, but *free stimulation* after the evacuation of the stomach must be alone relied upon.

Kobert's method of treatment consists in the hypodermic injection at various points of a 3 per cent. Peroxide of Hydrogen every few minutes, and lavage

of the stomach with a 15 per cent. solution in order to change the prussic acid into oxamide in the blood and stomach.

Aconite and Hellebore and Veratrine.

The stomach-tube or emetics should be used; $\frac{1}{10}$ gr. Apomorphine hypodermically, or a tablespoonful of mustard in warm water, or $\frac{1}{2}$ to 1 dr. Sulphate of Zinc should be given as soon as possible. Stimulants—Whiskey and Ammonia hypodermically, with 20 to 30 mins. of *Tincture of Digitalis*, or 2 mins. Liquor Atropine should be then administered. Strychnine may be given ($\frac{1}{30}$ gr.) by mouth, rectum or hypodermically.

The patient should be kept on his back with his head lowered, and in a state of absolute rest, and sinapisms applied to the heart and extremities; and dry heat, friction, and artificial respiration kept up unceasingly with occasional inhalations of Nitrite of Amyl.

When the patient is seen in time, Permanganate of Potassium (5 to 10 grs.) in solution should be given immediately.

Alcohol.

The stomach-tube should be used, and the stomach afterwards filled through it with strong coffee, to which a little Ammonia should be added; or a hypodermic injection of 10 mins. Apomorphine Solution may be given in the absence of the pump or siphon; sinapisms, cold affusion, Nitrite of Amyl inhalation, or Electricity may be tried, and in *desperate* cases where respiratory paralysis is threatening life boiling water may be used to cause immediate vesication of the skin over the soles of the feet. The hypodermic injection of $\frac{1}{30}$ gr. Strychnine is of unquestionable value, and Mindererus Spirit in 2-oz. doses may be given if power of swallowing is retained. Warmth to the surface is essential. (See also p. 21.)

Ammonia and Alkalies.

The stomach-tube should *not* be used. Weak acids (Acetic preferable) may be given, largely diluted, and followed by draughts of Almond or Olive Oil or of melted butter and demulcent drinks.

Tracheotomy may be required for the œdema of the glottis, and Morphine hypodermically for the shock.

Aniline.

The stomach-tube should be used and free washing out of the organ accomplished, after which artificial respiration and Oxygen inhalations and Strychnine injected hypodermically ($\frac{1}{30}$ gr.). 10 to 15 oz. blood may be extracted from a vein, after which 30 oz. Normal Saline should be injected.

Antimony (Tartar Emetic).

The stomach-tube or emetics are not generally required, as vomiting sets in soon. Tannin, strong tea or coffee, or any astringent tincture or infusion containing tannin, may be freely given, followed up by the hypodermic or rectal administration of Alcohol, to which small doses of Digitalis or Strychnine may be added. White of egg, barley water, or linseed tea may be given freely, and the patient kept in the prone position.

Butter of Antimony.—The treatment of poisoning by this preparation of Antimony should be the same as for Mineral Acids—viz., Magnesia, Soap Suds, Chalk, Potash or Soda, followed by Oil and Milk.

Antipyrine.

After the use of the stomach-tube, free stimulation by Alcohol, followed by hypodermics of Strychnine ($\frac{1}{30}$ gr.). External warmth and Oxygen inhalations where there is much cyanosis.

Arsenic.

The stomach-tube or emetics or 10 mins. of Apomorphine injection should be employed even when vomiting has already taken place. Freshly prepared moist Peroxide of Iron (prepared by adding Soda or Ammonia to the Liquor or to the Tincture of Iron, and filtering rapidly through muslin or cambric) may be given in tablespoonful doses frequently. Dialysed Iron in ounce doses, diluted, or, in the absence of these, Magnesia freely, or Animal Charcoal, Olive Oil or Lime Water must be freely given; demulcent drinks and stimulants by mouth or rectum are also indicated. Large doses of Castor Oil are essential to clear out the intestinal tract and to prevent further absorption.

The following method of using the iron antidote is convenient: 3 oz. of the strong Liq. Ferri Perchloridi is poured into a pint measure, which is filled up with water; 1 oz. of Calcined Magnesia is then mixed with another pint of water; both solutions or mixtures are then to be thoroughly shaken together, and a dose of 1 tablespoonful should be given every 5 to 10 minutes.

Atropine and Belladonna.

The stomach-tube or emetics, and afterwards the following are to be given: Tannin, very strong Coffee or Tea, Charcoal, Morphine ($\frac{1}{2}$ gr.) by subcutaneous injection or Laudanum by the mouth or Pilocarpine ($\frac{1}{3}$ gr.) subcutaneously, followed by purgatives.

The poison being excreted by the kidneys, the bladder should be emptied by the catheter to prevent reabsorption. Eserine in small doses has been advocated as an antagonist, but pilocarpine is better. Free stimulation by Alcohol, hot and cold douching alternately should be carried out; counter-irritation and artificial respiration may be necessary. When the patient is seen immediately after swallowing the alkaloid, Permanganate of Potassium 5 grs. when at hand in solution should be instantly swallowed before using the pump or tube.

Barium Salts.

After the use of the stomach-tube or emetics 1 oz. doses of Glauber's or Epsom Salt should be given dissolved in a tumblerful of water. As barium kills by paralysing the heart muscle, Strychnine hypodermically and Alcohol by the mouth should be given.

White of eggs in milk may be freely administered, and warmth with friction applied to the skin.

Camphor.

Stomach-tube or emetics, and copious draughts of water, with brisk Saline cathartics and general counter-irritation, or cold and hot douches alternately, afford the best means of dealing with this poison. Alcoholic stimulation may be necessary. Where the drug has been swallowed in an undissolved condition warm milk may be freely used as a lavage fluid to dissolve the solid particles adhering to the mucous membrane.

Cannabis Indica.

The stomach-tube or emetics, especially Apomorphine hypodermically (10 mins. of B.P. injection), are to be given, and the symptoms treated as they present themselves. It will generally be found necessary to both purge and stimulate.

Cantharides.

Stomach-tube or emetics, mucilaginous drinks, or, in their absence, Oils, Chalk, a little Opium by the mouth and a Morphine suppository by the rectum should be used.

Carbolic Acid.

A stomach-tube of soft rubber should be used, after which the organ should be thoroughly washed out with Soluble Sulphates as Epsom or Glauber's Salt in

moderately strong solution. Schobert gives Saccharated Solution of Lime if the poison is still in the stomach, and follows it up with sulphates after emesis. Give oils, egg albumin and warm mucilaginous drinks, with any soluble sulphate and finally, freely stimulate, counter-irritate, and inject $\frac{1}{60}$ gr. of Atropine. Though there is no reliable antidote, the writer—in a case where half a cupful of the strong acid was taken in a fit of drunkenness—after the contents of the stomach were evacuated, washed that organ out repeatedly with pure Glycerin, using ½ gallon of it, the Glycerin dissolving the excess of acid out of the swollen mucous membrane, and the patient made a good recovery. He has since satisfied himself that this is the best treatment whenever the strong acid has been swallowed; it does not interfere with the administration of soluble sulphates. The shock may be combated by Alcohol in full doses by the rectum, and external warmth applied by hot bottles and warmed blankets.

Iodine is said to be a true antidote, and 1 oz. Iodised Starch may be added to the water used for lavage.

Carbon Dioxide (Carbonic Acid).

The treatment of this form of poisoning and of Acetylene gas should be conducted upon the same lines as for the following poison.

Carbon Monoxide (Carbonic Oxide).

Water-gas and coal-gas owe their poisonous properties to the amount of this agent in their composition. Artificial respiration must be kept up after the removal of the patient from the poisoned atmosphere, and this must be continued for hours when necessary. Inhalation of Oxygen is to be used at the same time freely, and if the heart shows signs of failure Strychnine may be given and Faradisation of the phrenic nerve and rhythmic traction of the tongue should be resorted to. When the patient's case appears desperate, venesection should be resorted to, and after the removal of 20 to 30 oz. blood as much Normal Saline should be injected into the vein or twice as much hypodermically, and warmth should be applied to the surface of the body.

Chloral Hydrate.

The stomach-tube or emetics, especially 10-min. injection of Apomorphine Solution, should be used, and these must be followed by injections of Strychnine ($\frac{1}{60}$ gr.) or of Atropine ($\frac{1}{120}$ gr.), Caffeine (5 grs.), or free stimulation with Ammonia, Whiskey or Ether, and Sinapisms. Electricity and artificial respiration; inhalation of Amyl Nitrite may be tried. The patient should be roused and prevented from sleeping, and as death may occur from the diminution of the body heat *external warmth is essential*, and a pint of strong, *warm* coffee injected into the rectum. Dougall pointed out that Potash is an antidote to chloral, ½ dr. completely decomposing 80 grs. of chloral. He recommends drachm doses of B.P. Liquor Potassæ, largely diluted, every hour for several doses.

Chlorine.

When this gas has been inhaled the treatment will consist in inhalation of Ammonia or Sulphuretted Hydrogen. If the poison has been swallowed it should be neutralised by large quantities of Albumin and mucilaginous drinks.

The routine in Chlorine manufactories is resort to very hot drinks of strong tea, coffee, or milk; as a *preventive* the Hyposulphite of Soda mask.

Chloroform.

When symptoms of an alarming interference with the breathing or circulation come on during anæsthesia, the tongue should be drawn forward, and artificial respiration, cold affusion, free ventilation by a current of air, turning over the patient upon his left side or inversion of the body may be tried. The Konig-Maas method of starting respiration is carried out by placing the ball of the thumb of the operator's right open hand upon the patient's chest between the apex-beat region and the sternum and pressing rapidly (120 per minute) the

thoracic wall with considerable force, so as to cause direct pressure upon the cardiac muscle.

In Laborde's method the tongue is forcibly pulled forward and rhythmical traction upon it kept up at the rate of 15 to 20 per minute.

Hypodermically—Whiskey, Ammonia, Strychnine or Digitalis or inhalation of Nitrite of Amyl may be given. Strychnine is unquestionably the best of these, and may be given hypodermically in one dose of 5 to 10 mins. B.P. liquor. Galvanism is doubtful. If the chloroform has been swallowed, use the stomach-tube, or give 10 mins. of Apomorphine Solution, and proceed as if inhaled.

Chronic Chloroform Poisoning (Acidosis, Acid Intoxication, Acetonæmia, Acetonuria) is described under Acidosis.

Cocaine.

After the use of the stomach-tube or emetics fill the stomach with hot strong Coffee and a little Alcohol, and give $\frac{1}{15}$ gr. Strychnine. If the symptoms continue, Chloroform inhalation may be necessary to quiet convulsions, but the best procedure is to administer Oxygen and keep up artificial respiration. Where Permanganate of Potash or Condy's Fluid is at hand, and the patient is immediately seen after poisoning by the alkaloid, this may be oxidised in the stomach by prompt administration.

Colchicum.

Stomach-tube or emetics, mucilaginous drinks, Albumin or strong Tea or Tannin should be given, and these should be followed by a purgative, after which free stimulation with Alcohol may be required, and symptoms met as they arise, heart failure being relieved by Strychnine ($\frac{1}{15}$ gr.) hypodermically, and severe colicky pain by Morphine or large doses of Olive Oil.

Conium.

The stomach-tube or emetics, Tannin, and Castor Oil should be used. Stimulate freely by Ammonia. Hypodermics of Strychnine or Atropine may be tried, and artificial respiration persevered with assiduously till the poison is eliminated.

Copper Salts.

The stomach-tube or emetics must be resorted to if free vomiting has not occurred; yellow Prussiate of Potassium, egg Albumin and Milk, which form insoluble Copper Salts, are to be given; mucilaginous drinks, and wheaten flour or water in which yolks of eggs are suspended, and the free use of Opium to allay irritation are called for.

Corrosive Sublimate—see Mercury.

Creosote.

The same treatment as for Carbolic Acid.

Croton Oil.

The general treatment for irritant poisons may be used—viz., Emetics, or, if in the early stage, the gentle use of the soft rubber stomach-tube, demulcent drinks, soothing enemata and Opium. Free stimulation and the application of a large poultice to the abdomen, and the use of a Morphia Suppository and external warmth to combat shock may be necessary.

Cyanide of Potassium.

Poisoning is to be treated as if Hydrocyanic Acid had been swallowed, and, if seen at once, give Solution of Ferrous Sulphate (30 grs.) and use the alternate hot and cold douche, whilst Atropine is given by hypodermic injection and

Ammonia inhaled by the nostrils. Artificial respiration should be persevered with. Whilst the poison is in the stomach Permanganate of Potassium may be given, or its absorption delayed by a ½ oz. Adrenalin solution (1 in 1,000) till the tube can be introduced.

Digitalis.

The stomach-tube or emetics, especially Sulphate of Zinc (½ dr.), or 10 mins. of Apomorphine solution hypodermically, Tannin or animal Charcoal, free stimulation and the hypodermic injection of $\frac{1}{120}$ gr. Aconitine, and the free use of Opium, are required. Muscarin ($\frac{1}{3}$ gr.) is antagonistic, and Alcohol should be given. The patient should be kept absolutely quiet, and in the horizontal position.

Eserine, or Calabar Bean.

Emetics or the stomach-tube, with Tannin or any Tannin-containing liquid, may be employed, but hypodermic injections of Atropine ($\frac{1}{60}$ gr.) till the pupils widely dilate afford the best chance. Strychnine and Chloral have been recommended. Artificial respiration should be assiduously tried, with friction and warmth externally. If seen immediately give 5-10 grs. Pot. Permang. in solution.

Ether (Inhalation).

Pull forward the tongue, give free current of air, commence artificial respiration, and try the Konig-Maas method, and treat as if Chloroform poisoning.

Formalin.

Ammonia is decidedly antidotal. Formaldehyde is changed into the comparatively harmless urotropine upon the addition of free ammonia. The best method to pursue in poisoning is to give small doses of ammonia largely diluted with water, or 2 oz. Liquor Ammon. Acetatis every ½ hour.

Fungi, or Muscarin.

Emetics or the stomach-tube should be used, and Atropine given hypodermically ($\frac{1}{10}$ gr.), and repeated till the pupils dilate, or Digitalis or Morphine may be given. Free stimulation, sinapisms, and friction may be required.

Gelsemium.

The stomach-tube or emetics are to be used, and Bicarbonate of Potassium and Tannin freely given; warmth, free stimulation with Alcohol, electricity and artificial respiration are to be kept up.

Hypodermics of Atropine or Digitalis are partially antagonistic. The best result will follow 3 mins. of atropine solution, and if signs of heart failure show themselves $\frac{1}{15}$ gr. Strychnine should be given by the needle.

Hyoscyamus.

Same as for Atropine.

Iodine.

Emetics or the *cautious* use of the rubber stomach-tube should be employed, together with the free administration of starch, arrowroot, bread, boiled potatoes or flour, lime water and demulcent drinks.

Sodium Hyposulphite is believed to be preferable to saccharated Lime solution.

Iodoform.

Emetics or the stomach-tube, and large diluted doses of Bicarbonate of Soda, followed by free stimulation and a hot pack. Saline solution injected hypodermically in large doses is recommended by Kocher.

Laburnum.

The stomach-tube, if possible, should be always used, even if vomiting has occurred, as portions of seeds, &c., may remain in the stomach. Free stimulation, and in bad cases injection of Ammonia by a vein, may be resorted to. Counter-irritation, friction and the cold douche are necessary, and a smart purgative should be administered afterwards to clear out the intestinal tract.

Lead Salts.

The stomach-tube, or preferably a large emetic of Sulphate of Zinc, which is also an antidote, should be given, and followed by milk, white of egg, diluted Sulphuric Acid, Epsom or Glauber's Salt, or Phosphate of Sodium, Sulphuretted Hydrogen or Harrogate water. Demulcent drinks, with mild Opiates to allay pain and spasm, may be administered. See also under Plumbism, where chronic lead poisoning by treatment with Iodide of Potassium is described.

Lime.

Carbonic Acid—any Aerated water, as soda-water or lemonade—is very useful, or weak Acetic Acid, Vinegar or Lemon-juice diluted, and followed by Oil or demulcent drinks, may be freely administered. The stomach-pump should not be used.

Lobelia and Tobacco.

Emetics or the stomach-tube should be employed, as should also Tannin, and free stimulation externally by sinapisms, friction, and dry heat; internally or hypodermically Alcohol, Ammonia, and Ether, with Strychnine ($\frac{1}{20}$ gr.) and small doses of Opium should be administered. The patient must be kept strictly in the horizontal position.

Mercury (Corrosive Sublimate).

Emetics or the very cautious use of the stomach-tube will be required. (The tube should not be used except in the very early stages of the poisoning.) Starch, or Gluten (prepared by washing flour in a muslin bag), the uncooked whites of half a dozen eggs, followed by demulcent drinks, milk and oil are to be given by the mouth, and Morphine subcutaneously and Alcohol by the rectum, whilst heat is to be kept to the surface of the body by means of hot-water bottles.

Morphine—see Opium.

Nitro-Benzene.

The stomach-tube should be used, and a stream of warm water passed through it. Alcohol and fats must not be used, the main reliance being placed upon counter-irritation by Mustard, artificial respiration and Galvanism, and measures useful in Prussic Acid poisoning, as Atropine $\frac{1}{50}$ gr. or Strychnine $\frac{1}{15}$ gr. hypodermically.

This substance is wrongly used to flavour sweetmeats as a substitute for Benzaldehyde, which is innocuous, being the essential oil of almonds deprived of prussic acid. Poisoning by Bitter Almond is to be treated as Acid, Prussic, Poisoning.

Nux Vomica—see Strychnine.

Opium, or Morphine.

The stomach-tube, or in its absence emetics (if the patient is capable of swallowing), must be resorted to, or $\frac{1}{10}$ gr. of Apomorphine injected hypodermically. The stomach should be washed out with tepid water, and filled with strong coffee or tea, or any infusion or liquid containing Tannin. Owing to the fact that the mucous membrane of the stomach continues to excrete the poison, it has been advocated that it is of the greatest importance in all severe cases

that the stomach be repeatedly washed out at short intervals during the treatment.

Permanganate of Potash has been demonstrated to be a chemical antidote to morphine, weight for weight, and as it can do no harm it should be given immediately without waiting for vomiting (5 grs. in 5 oz. water). The stomach should be thoroughly washed out with a weaker solution after it has been emptied by the tube, and at a later stage the washing may be repeated to get rid of any of the alkaloid which has been excreted by the gastric mucous membrane.

Caffeine, Atropine or Strychnine hypodermically is to be administered. This latter should be repeated frequently as long as there are dangerous cardiac or respiratory symptoms; $\frac{1}{50}$ gr. may be given every 2 or 3 hours. Flagellations, cold and hot affusions alternately, electricity, extensive sinapisms or very hot water to cause vesication in desperate cases must be employed to rouse the patient, and when once roused he should never be allowed to fall asleep again, but should be kept continually on the move, though every care must be exercised lest this should be carried too far so as to induce exhaustion, as is, unfortunately, often done. Artificial respiration may be required. The dose of Atropine should not exceed $2\frac{1}{2}$ mins. of the liquor, and should not be repeated, as a larger dose only reinforces the action of the morphia.

Oxalic Acid.

The stomach-tube or emetics must be used. Lime (saccharated lime water, putty of lime or chalk) is the best antidote; one good dose of Castor Oil, counter-irritation, free stimulation by Strychnine hypodermically and by Alcohol *per rectum*, and the treatment for gastro-enteric inflammation should be followed.

Phosphorus.

The stomach-tube or emetics will be necessary. Sulphate of Copper, 5 grs. every 15 minutes, is both antidote and emetic, and the stomach afterwards should be freely washed out with a weak solution of this salt. Permanganate of Potassium, 5 grs. in 2 oz. water, will act as an efficient antidote, or Peroxide of Hydrogen may be given if at hand. French Oil of Turpentine or any *old* Oil of Turpentine, purgatives and demulcent drinks containing Magnesia and Albumin should be swallowed. Oils and butter should be avoided.

Pilocarpine.

The stomach-tube or emetics will be required, together with the free administration of Tannin and the hypodermic use of its antagonist—Atropine—in $\frac{1}{50}$ to $\frac{1}{25}$ gr. doses.

Potash, Caustic.

Emetics should be administered; the pump or stomach-tube should not be used. Weak Acids (Vegetable preferred, and largely diluted), as Vinegar or Lemon-juice, Oils and Butter may be freely administered. The after-treatment will consist in rectal feeding, and, after the danger of perforation has passed away, the free use of barley water, linseed tea, and other demulcents.

Potassium Chlorate, and Nitrate.

The stomach-tube or emetics and profuse demulcent drinks and purgatives are indicated, along with hot-blanket baths and the treatment for Acute Bright's Disease, as the immediate danger is in the acute inflammation of the kidneys.

Ptomaines.

In poisoning by the ptomaines contained in decomposing food, if vomiting has not already occurred emetics or the use of the stomach tube or pump should be resorted to, and the organ should be thoroughly washed out with warm weak Permanganate Solution. A brisk saline should be given to clear out the intestines, and the colon should be flushed with normal saline solution,

which may be also required intravenously or hypodermically. The symptoms as they arise are to be treated thus: The heart failure will require Strychnine by the needle, or Digitalis or Atropine; shock will indicate the use of stimulants and external warmth and Alcohol; pain should be relieved by Morphia and Poultices; intestinal Antiseptics are worthless.

Sewer Gas.

After immediate removal to a pure atmosphere artificial respiration should be resorted to. Oxygen inhalation or a small amount of much diluted Chlorine gas may be used. Stimulants are freely to be administered, and the rectal route may be employed when swallowing is lost. Warmth to the surface by hot blankets, water-bottles and friction is essential, and Strychnine hypodermically should the pulse become weak.

Silver Nitrate, or Lunar Caustic.

Large doses of common Salt or Sea Water should be swallowed, and the soft rubber tube of the stomach-pump being passed, the whites of half a dozen eggs should be injected into the stomach after the poison is removed. Yolk of egg, wheaten flour, or milk mixed with water should be freely administered afterwards as demulcents.

Soda, Caustic.

Acids and Oils will be required as for Potash Poisoning.

Stramonium.

Emetics or the stomach-tube, Tannin, free stimulation, and hypodermic use of Morphine are the necessary treatment (same as for Atropine and Belladonna).

Strychnine.

If seen immediately 5 to 10 grs. Permanganate of Potash in solution or some Condy's Fluid should be promptly swallowed to destroy the poison in the stomach, and the stomach-tube or emetics should follow. A ½-oz. dose of Adrenalin solution (1 in 1,000) may be used if at hand to retard absorption while steps are being taken to evacuate the contents of the stomach. The stomach should be well washed out with the permanganate solution should the convulsions permit. Apomorphine 10 mins. B.P. Injection is the best emetic when at hand.

In the after-treatment the writer has found by experience that poisonous doses of *Alcohol* afford the best treatment, given both by mouth and rectum. Artificial respiration may be tried. Chloroform inhalation may be kept up as long as the convulsions are severe, and 1 oz. Bromide of Potash with 1 dr. Chloral may be given by the rectum.

Sulphurets and Sulphuretted Hydrogen.

Inhalation of Oxygen or air containing a small percentage of Chlorine, and the free administration of a very weak solution of Chlorinated Lime or Soda constitute the necessary treatment, with the additional measures mentioned under Sewer Gas.

Sulphuric Acid—see under Acids, Mineral.

Tartar Emetic.

Tannin, Strong Tea, &c. (See Antimony.)

Tobacco.

Emetics or the stomach-tube, Tannin, free stimulation, and hypodermic injection of Strychnine ($\frac{1}{15}$ gr.) are indicated, and the recumbent position must be strictly maintained (as for Lobelia).

Veratrine.

The stomach-tube or emetics must be used, and lavage with Permanganate solution afterwards thoroughly carried out, followed by Alcohol, Opium, &c. (as for Aconite, which see).

Vermin Killers.

The treatment will depend upon the nature of the poison in the compound. Some of these contain Arsenic (Hammond and Simpson's Rat Paste) or Strychnine (Gibson's, Battle's, and Butler's), and some consist of free Phosphorus.

Zinc Salts (chiefly the Chloride, as Burnett's Fluid).

The rubber stomach-tube should be used with caution, or emetics, especially Apomorphine $\frac{1}{10}$ gr.), injected hypodermically. Egg Albumin, Tea, Tannin, Milk, Alkalies or their Carbonates, demulcent drinks and soothing enemata containing a little Laudanum are to be administered.

POLIOMYELITIS, Acute—see under Paralysis, Infantile.

POLYPUS.

Polypi may be removed by various means according to the situation of the growth and the presence or absence of a pedicle.

Nasal mucous polypi may be removed after painting the region about their bases with Cocaine solution. The cold wire snare may be gently coaxed round the pedicle, and the loop tightened so as to cut through the attachment of the tumour. The galvano-cautery snare is preferable, as hæmorrhage is absent and pain is slight. The point of attachment after either method of removal should be well cauterised with the point of the hot wire to prevent the growth sprouting again, or it may be touched gently with Chromic Acid.

Sometimes there is much difficulty in getting the wire round the base or pedicle, in which case the tumour may be firmly grasped by stout forceps and twisted till the base gives way. As they are frequently multiple, several sittings are necessary, and there may be much hæmorrhage, which should be controlled by the cautery; Adrenalin may be necessary.

The medical treatment of nasal polypi is unsatisfactory, but occasionally a soft gelatiniform polypus springing from the turbinated bone may be caused to shrivel up and disintegrate by the continual use of a snuff consisting of finely powdered Tannic Acid. Parker has employed Salicylic Acid with advantage in the same way, and powdered Sulphate of Zinc or Alum is sometimes successful. The spray of strong Alcohol may be used, or various astringent solutions may be applied with a large camel's-hair brush, or the same solutions may be injected by the hypodermic needle into the growth, or, in more dilute solution, they may be used as nasal douches. Glycerin of Carbolic Acid and Solution of Perchloride of Iron may be thus used. Ethylate of Sodium Solution may be efficacious if brushed over soft or even moderately fibrous polypi. Chromic Acid fused upon a roughened probe is the best of all agents for touching small polypi.

Though these methods of dealing with nasal polypi must be considered

as anything but satisfactory in the first instance, especially where the growths are within easy reach of the snare or forceps, nevertheless they are of great value as auxiliaries to the surgical measures.

Firm *fibrous* polypi generally spring from the roof of the naso-pharynx; their removal is attended with severe hæmorrhage and the approach is often difficult, sometimes requiring division of the soft and sometimes of the hard palate, with plugging of the pharynx after a preliminary laryngotomy.

After applying Cocaine to the nose and lip, Baracz makes an incision through the lip immediately to one side of the middle line, and carries it up through the fleshy part of the nose on one side of the septum as far as the nasal bone. If the growth be *very* large, he cuts the nasal bone and turns it aside with the flap of the skin, which, upon being forcibly retracted, permits of the nasal aperture being somewhat enlarged by bone forceps. Upon introducing one finger into the nostril and another behind the soft palate, the polypus can be enucleated by the finger-nail. He states that by this plan of operating, the entire nasal cavity, as far as the base of the skull, can be reached as effectually as in the more formidable operation of Langenbeck. There is little hæmorrhage, and upon bringing the edges of the wound accurately together, only a linear scar remains.

Firm fibro-sarcomatous polypi, when exposed by any of these methods, should be removed by the écraseur or raspatory, and the base should be thoroughly destroyed by the cautery before plugging of the naso-pharynx with gauze.

Uterine polypi may be removed by the ligature, torsion, snare, écraseur, galvano-cautery wire or excision by knife, according to the peculiar conditions maintaining in each case. Small polypi can generally be easily twisted off by grasping the pedicle in a pair of stout ovum forceps. When large, firm polypi grow from the ceiling of the uterus, rough or strong traction upon their pedicles, especially if these are short, may cause a portion of the uterus to become inverted, and this might be included in the écraseur if the surgeon was not upon his guard. The best procedure is to dilate the cervix under strict antiseptic precautions with a series of graduated metal dilators, and apply the wire of the galvano-cautery to the pedicle of the tumour, after which the uterus may be curetted and its cavity firmly packed with sterile gauze.

POLYURIA—see Diabetes Insipidus.

POST-PARTUM HÆMORRHAGE—see under Puerperal Hæmorrhages.

POTT'S CURVATURE—see Caries of Spine.

PREGNANCY, Disorders of.

The troubles which afflict the pregnant woman may be merely an aggravation of some common complaint, they may be caused by the mechanical effects of the uterine enlargement, or, lastly, they may result from a reflex neurosis due to the extraordinary stimulus acting on

the genital tract, or from that interesting and little understood interference with general metabolism—the toxæmia of pregnancy. I propose to consider the treatment of the diseases peculiar to pregnancy, and to review briefly a few of the more common conditions of disease as aggravated by pregnancy.

1. Toxæmia of Pregnancy.—Whatever view of the cause of this condition be taken, the practitioner should be always on the lookout for the symptoms of it, and should be prepared to waste no time in adopting suitable treatment for it, since it is commonly the forerunner of that very dangerous complication, puerperal eclampsia. To obtain timely warning of its onset the practitioner should make a point of examining the urine every 4 weeks up till the end of the sixth month, and every fortnight during the last three months of pregnancy. The first sign of danger is given by the appearance of albumin in the urine, and when this has been detected, a 24 hours' sample of urine should be obtained and the quantity of urea estimated. Should this have fallen much below the normal (20 to 24 grms. per day) treatment should be commenced at once, and the appearance of such symptoms as headache, disturbances of vision, or œdema of the feet and legs give the same signal. Another sign of toxæmia often present is intense itching of the skin generally or of the feet and legs.

The patient should at once be put to bed. Should the symptoms be severe or the urea much diminished her diet should be restricted to milk alone, of which 2 quarts per diem may be given. She should be encouraged to drink plenty of plain water or of Imperial drink (Cream of Tartar 1 dr., the juice of one lemon and sugar to taste, dissolved in a pint of boiling water). A simple diuretic mixture of Pot. Cit. and Liq. Ammon. Acet. may be given if desired, and the bowels should be kept acting by means of saline aperients. It is worth while trying the effect of dried Thyroid gland in 2-3 gr. doses at bed-time, as in some cases it seems to be of considerable benefit. When the symptoms have passed off and the quantity of urea increased, as usually happens after a few days of this treatment, or where symptoms and deficiency of urea have been not very marked at the beginning, more latitude in the way of food may be allowed. Bread and butter or toast, a cup of tea, fresh salad or stewed fruit may be allowed in addition to the milk. Should treatment fail to control the symptoms, daily hot packs may be given to stimulate the skin, and if matters get steadily worse labour should be induced. (See below, under Pernicious Vomiting, and also under Puerperal Convulsions.)

2. Pernicious Vomiting.—The normal "morning sickness" of pregnancy usually passes off in the course of the first 3 months and never threatens the patient's well-being. Where it continues on into later stages of pregnancy, and when it is so severe and so continuous as to prevent the assimilation of sufficient nourishment, it is known as "pernicious vomiting." For this condition three causes are assigned. It may be a pure neurosis, it may be a reflex from genital irritation or it may be toxæmic in origin.

The range of treatment in this complaint is practically endless, and as many cases are undoubtedly neurotic in origin it is at least probable that the good results reported from time to time through the adoption of various methods are due, in great part, to suggestion. This statement is not intended as an adverse criticism of the remedies; indeed, suggestion is an indispensable element in the treatment of all cases of pernicious vomiting in which there is a neurotic element, and the physician must impress his patient with his confidence that he can check the symptom and his ability to conduct the case to a successful issue. It is rather intended to warn the practitioner that he must not despair if his favourite remedy proves unaccountably useless, for the only measure which will put an end to the condition in *every* case is the drastic last resort of emptying the uterus, which should never be attempted until after a consultation has been held.

Where the patient's condition is not very serious, drug treatment should first be tried. A gastric sedative may be given, such as—

℞ *Bismuth. Carb.* *gr.* v.
Sodæ Bicarb. *gr.* x.
Mag. Carb. Pond. *gr.* x. *Misce.*

Fiat pulvis. Signa.—"*One powder stirred up in half a teacupful of warm milk three times a day, half an hour before meals.*"

This has the advantage of acting to a certain extent as a laxative, and in all cases of the kind care should be taken that the bowels are kept well opened. At the same time the diet should be varied to suit the case. Thus some patients do well on fluids, milk, mutton broth, beef juice, &c., while dry, solid food seems to suit better with others. It is usually a good plan to make as complete a change as possible in the dietary. A patient who has been vomiting slops for days, will often, if given encouragement, be able to take and retain a broiled chop and potatoes, or a slice of roast meat; quite lately an obstetrician has been declaring the virtues of roast pork, which has cured all the cases he has met with for some years back! If the patient is moving about it is a good plan to get her to lie down for an hour after each meal, which in itself often checks the vomiting. Should these measures prove unavailing the practitioner has a wide choice of drugs, all of which have been highly recommended. Any of the following may be given:

℞ *Acid. Hydrochlor. Dil.* ʒiv.
Inf. Gentian. Co. ʒviiss. *Misce.*

Ft. mist. *Cpt.* ʒss. *ter in die ex aqua.*

Tr. Nuc. Vom. in 5-min. doses may be given, or Acid. Hydrocyan. Dil. in 2-min. doses. Pepsin and Ingluvin are sometimes useful, or a mixture of several remedies may be administered.

℞. *Acid. Hydrocyan. Dil.* ℥j.
Liq. Morph. Hydrochlor. ℥iiss.
Liq. Bismuthi (*Schacht*) ℥iss.
Vin. Pepsinæ ad ℥iv. *Misce.*
Ft. mistura. Cpt. ℥j. *ter in die ex aq. post cib.*

Oxalate of Cerium in 3 to 8 gr. doses may be given as a powder. Capsules containing 1 or 2 mins. of Carbolic Acid or Creosote, Salol in 2-gr. doses or Menthol may do good.

Cocaine (¼ gr. in solution) given every 2 or 3 hours has been recommended, and Bromide of Potassium, 30 grs., with Chloral Hydrate, 30 grs. dissolved in 9 oz of water, and administered by the rectum has been found very useful. Opium by the rectum is also advised. Tr. Opii (15 to 30 mins.) may be given, combined with Bromide, or a Morphine (¼ gr.) suppository may be administered every 4 or 6 hours.

Cases which resist all these and other remedies are often cured by complete abstention from everything by the mouth, with rectal feeding by nutrient enemata for a day or two. The bowel should be washed out once a day with a copious enema of warm saline solution, and every 4 hours an enema is given of 4 to 6 oz. of peptonised milk, alternating with 4 oz. of unsalted beef tea, part of which may be replaced by one of the numerous preparations of liquid predigested food now on the market. The nutrient enema is best administered through a large rubber catheter with a glass funnel, and should be allowed to run in very slowly so as not to excite the rectum to reflex contraction. After a few days of this treatment the patient usually recovers appetite and is able to take and retain her food.

With a view to eliminating the reflex element in the vomiting, a careful examination should be made of the genital organs and any abnormality should be corrected. Thus a lacerated and inflamed cervix may be swabbed over with Nitrate of Silver (grs. xx. to ℥j.), or if ectropion or erosion is present a Fergusson's speculum may be passed and the silver solution poured in and allowed to remain in contact with the cervix for 10 minutes. A retroverted gravid uterus should be replaced when possible and a pessary inserted, and a careful examination should be made to see whether the size of the uterus corresponds to the reputed duration of gestation, as some cases of vomiting are due to a molar pregnancy. Good results have been recorded from the insertion of a pessary or of a Barnes's bag, even when no malposition of the uterus was to be detected, and a manœuvre which has been successful is the dilatation of the cervix with Hegar's dilators up to 12 or 14. Copeman's treatment, which may also be tried, is to follow up dilatation by inserting a finger within the os and gently separating the membranes from the uterus. It need scarcely be said that the latter two forms of treatment are not very suitable in the early months of pregnancy, when abortion would probably result, and that even in the later months the greatest care must be taken lest the membranes be ruptured.

Cases in which a toxæmic element is marked will probably go on from bad to worse in spite of the trial of any or even of all of these remedies in succession, and it is most important that the practitioner should be on his guard against continuing his therapeutic experiments so far that even the emptying of the uterus will come too late to save the patient. Clinically, when the pulse-rate is 120, the temperature 100° F., when the patient is becoming emaciated and haggard, and when the sight or smell of food or mere movement in the bed is enough to cause vomiting, it is time to end the pregnancy, lest further depletion of her resources should leave the patient so low that even the induction of labour would only hasten death. There is considerable difficulty in judging on this point, and to avoid possible recrimination afterwards the practitioner is strongly advised to call in a consultant before deciding it. Williams of Boston has drawn the attention of the profession to the value of estimating the "ammonia coefficient" of the urine in deciding on the proper treatment. Normally the greater part of the nitrogen eliminated in the urine appears as urea or uric acid, and only about 3 per cent. as ammonia compounds. In severe cases of pernicious vomiting the percentage passed as ammonia rises to 10, 20, and even as high as over 40 per cent., and it is laid down as a rule that when the percentage goes over 10 any unfavourable symptom such as rise of pulse-rate or temperature should be the signal for emptying the uterus. Williams's conclusions have been criticised by other observers, who have pointed out that a high ammonia percentage is to be found in other conditions, and have attributed it to the fact that the patient is starving and so is living on her own proteid, and Williams has himself now admitted that an absolute conclusion cannot be drawn from the ammonia coefficient of the urine taken by itself, but that it must be checked by clinical observation. Stress has been laid also on the condition of "acidosis" which is present in these cases. There is no doubt that an examination of the urine by a competent biochemist is likely to throw light on a doubtful case. If the practitioner wishes to avail himself of this method, he should take a sample of urine in a bottle, sterilised by boiling, shake it up with a few crystals of thymol, and forward it to a chemical laboratory with a statement of the investigation required, unless he is possessed of the necessary chemical apparatus and skill to make the estimation himself.

Induction of Abortion and Labour.—Up to the end of the fourth month the operation may usually be completed at a sitting. The patient's vulva is carefully sterilised, all superfluous hair is removed, the parts washed with soap and water, and douched plentifully with 1 in 4,000 Perchloride, or drachm to the pint Lysol or Creolin solution. The hands are sterilised by scrubbing with soap and water, rinsing in 70 per cent. Methylated Spirit and immersing for 2 to 5 minutes in 1 in 2,000 Perchloride or Biniodide. The patient lies on her back across the bed and the legs are held up by straps or by attendants. The catheter is passed and the bladder emptied. The cervix is then dilated until it will admit the finger, which is passed into the cavity and used to peel off the ovum, while the

other hand on the abdomen grasps the fundus and pushes it down within reach of the intra-uterine finger. When the ovum has been separated it may be removed by ovum forceps. If the operator is skilled in the use of the curette he may use it to separate the ovum, but the finger should be passed into the cavity after the uterus has been cleared out to make sure that no tags of placenta have been left behind. An intra-uterine douche should then be given.

When the cervix is firm and not easily dilatable or where the operator has any doubts of his own asepsis or manual skill, the safest plan is to pack the cervix and lower uterine segment with a narrow strip of gauze sterilised by boiling, and then to pack the upper end of the vagina firmly with gauze or cotton-wool wrung out of an antiseptic lotion. The plug should be removed in from 12 to 24 hours and the ovum will often be found lying in the vagina. If not, the cervix will be dilated and no difficulty will be experienced in completing the removal.

After the fourth month the fœtus is of such a size that the cervix can no longer be dilated sufficiently for its passage without tearing. The requisite dilatation is therefore obtained by inducing labour. For this purpose several methods are employed, and more than one may have to be tried in the same case. The simplest consists in perforating the membranes and allowing the water to drain away, but it is very uncertain, and not to be recommended. A favourite method is that of Krause, in which a sterilised gum elastic bougie is introduced through the cervix and insinuated between the membrane and the uterine wall. If this fails to bring on labour in 24 hours, a second and even a third may be introduced. A very good method which may be combined with the foregoing is to dilate the cervix to a 12 or 14 Hegar, and to pack the lower uterine segment with gauze. The upper end of the vagina may also be packed at the same time. Closely analogous to this method is the introduction of small india-rubber bags, Barnes's fiddle-shaped bag, Tarnier's *provocateur uterin*, Horrocks's bag, or a child's rubber toy balloon, into the lower uterine segment, and the filling of them with antiseptic fluid. When the cervical canal can be dilated to a diameter of an inch, a Champetier de Ribe's bag may be introduced and distended. To this the uterus usually responds in a few hours.

In any case where induction of labour is decided on, I have found it an excellent plan, as suggested by Blair Bell, to give a hypodermic of Pituitrin (1 c.c.) for 3 days in succession before the actual induction is attempted, when labour quickly follows on any of the methods described.

Although delay in the onset of labour may usually be regarded with equanimity, as the measures for its induction just detailed commonly suffice to put a stop to the vomiting, it may sometimes be thought advisable to empty the uterus as soon as possible. This can be done by the method of anterior hysterotomy, often dignified with the name of vaginal Cæsarean Section. A transverse incision is made in front of the cervix, and the bladder peeled up off its anterior surface as high as the

peritoneal reflection. The anterior lip of the cervix is then incised in the middle line as high as may be necessary to permit of the extraction of the fœtus and placenta, after which the incisions in the cervix and vagina are united by catgut sutures. The operation is an easy one up till the sixth month; after that period it is rather more difficult and is attended by considerable hæmorrhage.

3. Pyelitis and Pyelonephritis.—Sometimes in pregnancy as well as during the puerperium the pelvis of one kidney, almost always the right kidney, becomes inflamed. Rigors and high temperature, with pain in the affected organ, usually usher in the attack, and on examining the urine it is found to be acid in reaction, to contain some albumin, and to be cloudy from the presence of pus cells or opalescent from the presence of *Bacillus coli*, the organism responsible for the condition.

The attack usually yields to rest in bed with abundant bland fluids, milk, whey, barley water, and home-made lemonade with a teaspoonful of cream of tartar to the pint. At the same time the patient should be put on the following urinary antiseptic:

℞ *Urotropin.* ʒj.
Pot. Citrat. ʒiv.
Tr. Hyosc. ʒiv.
Aquæ Chlorof. ad ʒvj. *Misce.*

Ft. mistura. Cpt. ʒss. *quartis horis ex aq.*

As a rule, when the urine has been made alkaline by this mixture, the infection dies out and the bacilli disappear. When the condition refuses to yield to medicinal measures, a sample of urine should be taken in a sterilised bottle, and sent to a competent bacteriologist in order that a vaccine may be prepared. The administration of this has usually the desired effect.

4. Incarceration of the Retroflexed Gravid Uterus.—This accident may be due to a pregnant uterus becoming retroflexed in the early months, or to a pregnancy occurring in a uterus already retroflexed. As a rule no symptoms arise until the close of the third month, when the uterus fills the pelvis and in the ordinary course of events should commence to rise out of it. This it often does, even when retroflexion exists, but in some cases it fails to do so owing either to adhesions or to some slight anatomical peculiarity in the particular instance. In the further course of events the patient may abort, she may develop retention of urine with tremendons distension of the bladder, or rarely pregnancy may go on till term, the anterior uterine wall stretching and accommodating the major part of the ovum.

If abortion is threatened, the patient should be at once put to bed and treated as for threatened abortion (*q.v.*). At the same time an effort should be gently made to replace the uterus manually, and if successful a pessary may be inserted and worn for a few weeks. In effecting manual replacement it will be found most convenient to have the patient on her left side

with the left arm behind her back and a hard pillow under the left hip so as to elevate the pelvis and allow the abdominal viscera to fall away from it. Two fingers, carefully sterilised, of the right hand are introduced into the posterior fornix, making gentle pressure on the fundus uteri so as to raise it from Douglas's pouch. This manœuvre is often assisted by seizing the cervix in a volsella and drawing it down towards the vulva with the left hand. When the fundus has been raised, the left hand is placed on the abdomen and an attempt is made to steady and pull forwards the fundus towards the abdominal wall, while the fingers of the right hand in the vagina are now transferred to the anterior surface of the cervix, pushing it backwards. Should the attempt fail at first, it may be repeated next day under chloroform.

If the patient is suffering from retention her bladder will be greatly distended and "incontinence of overflow" may be observed, the urine leaking away drop by drop. The condition should be relieved at once, and it is wise to pass a male catheter to do so, as the urethra is pulled upon and considerably lengthened, so that a female catheter may be too short to enter the bladder. There is sometimes a little difficulty in finding the urethral orifice, which may be drawn in under and even behind the symphysis. After relieving the bladder a gentle attempt may be made to replace the uterus, as described above. According to Herman there is no need to do so, all that is necessary being to put the patient to bed and empty her bladder twice a day, as under this treatment the uterus will speedily rise from the pelvis of its own accord. It is recommended that when adhesions binding down the fundus are diagnosed, the abdomen should be opened, the uterus freed and secured in proper position.

If the retention has been neglected, the prolonged distension of the bladder may cause sloughing of part of its walls, the result being an exfoliative cystitis. This may be treated with urinary antiseptics and washing out the bladder, but the quickest method of relief is to incise the vesico-vaginal septum, remove the slough, and drain the bladder.

Lastly, when the condition persists till term, the thickened posterior wall of the uterus forms an insuperable obstacle to labour, and rupture through the thinned anterior wall of the uterus is very likely to be the result. The indications are either incision of the posterior wall from the vagina or the simpler and more satisfactory operation of Cæsarean section, followed by the freeing of the uterus from its adhesions.

5. Prolapse.—A pregnant woman feels her prolapse worse during the early months, and as a rule less during the later months than if she were not pregnant. A pessary should be put in for the first 4 or 5 months, but great care should be taken to use daily lukewarm douches of salt and water (drachm to the pint) to get rid of discharge. Prolapse of the vaginal walls occurs, but nothing can be done to cure it, though the condition is relieved by rest in bed.

6. Pendulous Abdomen and Uterine Anteversion.—The discomfort arising from this condition may be met by the wearing of a well-fitting abdominal belt. In order to prevent the separation and loss of

tone of the recti muscles, which are the main factors in this complaint, care should be taken after each confinement to examine the patient's abdominal wall at the end of 10 days, and if the muscles are very flabby to persuade her to perform exercises daily for the purpose of strengthening them. While lying on her back in bed with the pillows removed, she should raise her head and shoulders from the bed without the aid of her hands, and should repeat this movement from 5 to 20 times as she gains strength. She should either alternate with or follow this exercise by repeatedly drawing up both knees as far as possible, so as to touch her chest. In this way a surprising effect is soon produced on a flaccid abdominal wall, and the patient's comfort and her figure are both benefited.

7. CONSTIPATION AND HÆMORRHOIDS.—Patients suffer much from both of these complaints, which are frequently associated and aggravate each other. For the constipation regulate the diet, giving fresh and stewed fruit, oatmeal porridge, wheaten bread, plenty of green vegetables and salad when in season. Encourage the patient to swallow plenty of fluids, and to take a walk every day in the open. Medicinally, she may have a saline aperient in the morning, half an hour before breakfast, the dose being gauged to secure one good motion per day. In aggravated cases an excellent plan is to give—

℞. *Aloin.*
Pulv. Ipecac.
Ext. Nuc. Vom. *āā gr.* ½. *Misce.*

Fiat pil. Cpt. j. *ter in die p. cib.*

If this does not control the constipation two may be taken at night instead of one. If it acts too powerfully, leave off the midday pill. When the piles are very troublesome it is recommended to give an electuary:

℞. *Confect. Sennæ*
Confect. Sulph.
Confect. Piper. *āā* ℥j. *Misce.*

Signa.—"*A teaspoonful as required.*"

Locally for the piles the patient should be told to wash the anus with tepid water after each motion and to dry it with a soft rag. If there is much irritation the Gall and Opium Ointment of the B.P. may be prescribed, or—

℞. *Hydrarg. Subchlor.*
Bismuth. Oxychlor.
Pulv. Opii *āā gr.* j.
Lanolin. ℥j. *Misce.*

Ft. ungt.

Either should be supplied in a collapsible tube with an anal nozzle. (See also under Constipation.)

8. Sleeplessness.—An endeavour should be made to relieve this complaint without giving hypnotics. Plenty of open air and a walk in the afternoon or evening will often be all that is necessary. If sleep obstinately refuses to come at night the patient may be encouraged to rest and sleep during the day if she is able to do so. Sometimes a tonic, such as Ferri et Quin. Cit. with a bitter will do much good. When driven to hypnotics as a last resource, avoid morphia, and give Sulphonal (20 to 30 grs.), or Paraldehyde (℥j. in Aqua Chlorof. ℥ij.).

9. Vaginal Discharge.—When a patient complains of a large amount of vaginal discharge, often associated with itching or scalding, an examination should be made. The normal vaginal discharge consists of whitish, curdy or cheesy masses of macerated epithelium; sometimes, on wiping it away, the mucous membrane is seen to be reddened or injected. When this condition causes trouble, a lukewarm vaginal douche of normal saline may be used, and any reddened or injected areas swabbed through a duck-bill speculum with Nitrate of Silver solution (gr. xx. to ℥j.). When the discharge is yellow and purulent, gonorrhœa may be suspected, and every effort should be made to cure the condition on account of the danger to the mother in the puerperium. Douches of sulphocarbolate of zinc (℥j. to Oij.), sulphate of zinc (℥j. to Oij.), or permanganate of potash may be prescribed night and morning. Any reddened and inflamed patches on the vagina or cervix should be swabbed with the Silver Nitrate solution, and if sexual intercourse has been indulged in, it should be interdicted. If such a discharge is present at the time of labour a copious douche of 1 in 5,000 perchloride or drachm to the pint lysol should be given before and after delivery and daily afterwards. Great care should be taken that the infant's eyes are washed clean after birth with boric lotion, and that a 4 gr. to the ounce Silver Nitrate solution is dropped into them.

10. Abdominal Pain.—This is a frequent complaint with pregnant women, and the pain is often referred to the right side of the fundus uteri. The pain is often relieved by measures adapted to remove constipation. When these are ineffectual, rest in bed, with the application of warmth to the affected part for a day or two, usually gives marked relief, and the employment of an abdominal belt afterwards will assist in preventing its return. If rise of temperature and pulse-rate accompany the pain, the physician should be on the lookout for appendicitis, which is fairly common as a complication of pregnancy, and is a very dangerous one, and no time should be lost in obtaining an opinion as to the propriety of removing the inflamed organ.

Other causes of abdominal pain which should be kept in mind are tumours such as fibroids or ovarian cysts (possibly strangulated). (See Ovarian Cyst and Uterine Fibroids.)—R. J. J.

PRESBYOPIA.

This condition depends upon a gradual loss of elasticity in the crystalline lens, increased in older subjects by a loss of power in the ciliary muscle.

Its correction should be effected by the use of the proper convex glasses,

which will enable the patient to read with comfort at about 12 inches, but the strength of lens required will depend upon the nature of the ordinary eye work pursued by the patient. It is a mistake to order strong lenses at first, and as the patient gets older the convexity of his glasses may be increased till he reads with comfort at 9 inches. It may be necessary to correct both eyes for the same distance; many patient prefer to use stronger glasses when working by artificial light. Any hypermetropic astigmatism present should be corrected at the same time by the addition of a cylinder lens.

PRICKLY HEAT—see under Miliaria Rubra.

PROCTITIS.

The cause of the inflammation of the rectum is most frequently found to be an extension of the dysenteric process from the colon, and in the cases of females it is often of gonorrhœal origin.

The first step in the treatment is to remove when possible the exciting cause, and a search should be made for foreign bodies, fissures, polypi, piles, ulcers, stricture or worms.

In the *acute* stage, warm poultices, hot fomentations or hot sitz baths may be tried, after which, or whilst sitting in the bath, the rectum may be irrigated by a stream of warm water. If arrangement is made for the return of the water, the injection can be carried out for considerable periods without dilating the inflamed bowel or exciting spasm in the sphincter. Iced water injections may be thus used, and at a later stage antiseptic solutions, as Boracic Acid, and at later stages still astringent agents may be injected.

Tenesmus, which withstands warm or cold irrigation, must be relieved by enemata of Laudanum and Starch, or by a ½-gr. Morphia suppository. A most reliable local anodyne is the late B.P. Ungt. Conii applied by the finger or by an ointment introducer. The bowels must be kept free by Castor Oil administered by the mouth.

The *chronic* stage of proctitis is best treated by dilatation of the anal sphincter and a thorough brushing of the mucosa by a 5 per cent. solution of Nitrate of Silver or 25 per cent. Argyrol. (See also under Anus, Fissure of, and Pruritus of, where a list of local anal sedatives will be found.)

Ulceration of the rectum is often present in the chronic stages of dysenteric, tuberculous, or syphilitic inflammation, and there is little hope of relieving the accompanying proctitis as long as an open sore remains. The best procedure is to forcibly dilate the sphincter and curette the surface of the ulcer, after which Nitrate of Silver may be applied in strong solution or used as the solid stick. When the ulcer can be easily reached the speediest and most satisfactory method of treatment is excision by the knife. In severe cases healing will not take place till a temporary opening is made in the colon to divert the fæces through an artificial anus. The proctitis and ulceration which is caused by long-impacted scybalæ generally resolve soon after the evacuation of the fæces.

PROGRESSIVE MUSCULAR ATROPHY—see Paralysis.

PROLAPSUS ANI et RECTI—see under Anus.

PROLAPSUS UTERI—see under Uterine Displacements.

PROSTATITIS.

Acute inflammation of the prostate gland is generally the result of gonorrhœal infection or of traumatic causes, as after catheterisation. It is not rare as a sequel to prolonged sexual excesses, especially when the congestion of the prostate has been fanned into activity by jolting exercises as horse or bicycle riding, or driving in springless vehicles over rough roads.

Absolute rest in bed unless when the patient is sitting in a hip or sitz bath is essential, and the lower extremities should be elevated above the level of the trunk by raising the foot of the bedstead. The bowel should be cleared out by a large warm water enema, and towards the end of the operation a stream of very warm or of very cold water may be employed to irrigate the lower end of the rectum. Hot fomentations or poultices applied to the perineum give relief; when these fail ice may be tried, and a large smooth piece inserted occasionally within the sphincter.

Leeches applied to the perineum and bleeding encouraged from the bites by the application of a hot poultice or small cupping-glass are a very reliable means of subduing pain, tenesmus and painful micturition.

A full dose (½ gr.) Morphia as a suppository may be inserted into the rectum or a small Starch and Laudanum enema may be administered. By combining 10 to 15 grs. Ichthyol with the morphia and ½ gr. Ext. Belladonna a very soothing suppository or small medicated pessary may be devised.

Retention of urine commonly results; this should be met by prolonged immersion in the hot hip bath, during which the patient attempts to relieve the bladder without making violent expulsive efforts. If the retention resists this, a smart saline purge may be tried. If it becomes necessary to draw off the urine, a few drops of Cocaine solution having been injected into the urethra and massaged backwards through the compressor urethræ muscle a soft rubber catheter may be gently coaxed through the narrowed prostatic urethra, but when the pain is intense this may not be possible, and a general anæsthetic may be needed, and the instrument should be left *in situ*. Sometimes it will be found necessary to aspirate the bladder above the pubes.

Should an abscess form in the inflamed prostate, the finger being inserted into the rectum, a free and deep incision should be made in the perineum over a bougie or staff introduced through the urethra, and drainage must be provided. Though a prostatic abscess may sometimes spontaneously burst into the rectum it is not now opened from the bowel by the surgeon.

Chronic Prostatitis.—This is often a sequel to the acute attack caused by gonorrhœa, and it is sometimes most rebellious to treatment; it is sometimes due entirely to sexual excesses. The glairy fluid or muco-

purulent secretion which escapes from the meatus, especially during or after defecation, leads the patient to believe that he is suffering from discharge of seminal fluid—so-called "spermatorrhœa"—and as this is usually accompanied by profound mental depression or hypochondriasis moral treatment is also indicated, and will be found discussed under the latter heading.

Sexual excitement must be avoided, and though there is nothing but harm to be got from sending the patient to bed, as thereby his melancholy and introspection will be increased, he must be warned to confine his physical exercises to quiet walking, cycle and horse riding and driving being forbidden. An open-air life or a sea voyage is very beneficial, and alcohol should be strictly avoided. Though some surgeons condemn all local treatment it is generally necessary when a history of gonorrhœa is present to pass a full-sized solid sound in order to dilate the urethra to its fullest extent, after which the application of Nitrate of Silver to the prostatic urethra should be made as described in the articles on Gonorrhœa and Gleet. The acute symptoms which may follow should be treated by rest in bed and the agents suitable for the relief of acute prostatitis.

In very chronic cases nothing is so successful as massage of the prostate through the rectum, which should be repeated at intervals of every 4 or 5 days. When the discharge is indicative of the presence of an abscess in the prostate or of a suppurative condition of the seminal vesicles, the best procedure is to evacuate the pus by a free and deep incision into the perineum, curette the cavity and pack with gauze. Search should be made for the presence of prostatic calculi in all acute or chronic cases, and these should be removed through the incision for abscess. Alexander of New York strongly advocates the removal of the lateral lobe containing the pus, as the abscesses are generally multiple; he operates by the median perineal route.

PROSTATIC ENLARGEMENT.

In the early stages of enlargement of the prostate there is no procedure of so much importance as the effectual emptying of the bladder by natural means. The patient should be instructed to carefully expel every drop of urine without making violent expulsive efforts, and often after the urine has ceased to flow, by a further attempt a few minutes later when the amount of residual urine is small he may succeed in completely evacuating the contents of the organ. He must also be taught that under no circumstances in the daytime should he permit a period of four hours to pass without voluntary emptying of the bladder, and at night micturition should be performed at least once between bed-time and getting up.

Though there have been few departments of surgery in which so satisfactory advances have been made as in the operative treatment of enlarged prostate, still a note of caution is necessary since a percentage of cases reach a standstill in the progress of the enlargement which is compatible with a prolonged life of tolerable comfort without operative interference.

This satisfactory result, in the writer's opinion, is more likely to occur

in those cases of moderately small fibrous prostates which occur at a comparatively early age, say about 50 years, where an inflammatory element enters into the condition. Such cases may be recognised by rectal exploration with the finger and by cystoscopic examination, which will reveal a trifling intravesical protuberance. By careful attention to the emptying of the bladder and by the patient employment of rest and vesical sedatives during acute exacerbations, the secondary changes in the bladder may sometimes be indefinitely postponed, even when catheterisation has been demanded at some time for temporary retention. The following bladder sedative is often of distinct value in controlling the irritability about the vesical neck and prostatic portion of the canal:

℞ *Ext. Saw Palmetto Liq.* ℥iij.
Tinct. Hyoscyami ℥iv.
Syr. Aurantii ℥iv. *Misce.*

Ft. mist. *Cpt.* ℥j. *quater in die ex* ℥ss. *aquæ.*

The combination with Santal known as Sanmetto and Woolley's Elixir are both excellent drugs.

Whilst such palliative measures are recommended by the writer as a mild protest against immediate and indiscriminate resort to prostatectomy, it should be understood that a septic state of the urine should never be permitted to develop. Ammoniacal urine, severe cystitis, hæmorrhage or retention setting in should be a clear indication for radical operation.

The normal bladder should empty itself when moderately full in about 30 seconds after the flow of urine commences; a period of 45 to 60 seconds should be regarded as pathological.

Catheterisation is permissible in those cases in which the instrument is only necessary before retiring to bed: regular "catheter life" should only be recommended in very old and otherwise diseased patients where an operation is strongly contra-indicated, and it is hardly necessary to emphasise the warning that the catheter should never in a case likely to require operation be put into the hands of a patient who cannot be depended upon for the carrying out the most rigid asepsis.

In inoperable cases where a septic condition of the bladder has already occurred, urinary antiseptics as Urotropine or Creosote by the mouth and washing out the diseased organ by saturated Boric Acid solution must be resorted to. Sometimes it may be necessary to drain the bladder by regular catheterisation or by retaining the catheter *in situ*, and when this cannot be borne cystotomy may be necessary for the provision of complete drainage.

In operable cases where the bladder has already become infected the same measures will be necessary to diminish sepsis as far as possible before resorting to the removal of the enlarged prostate.

In the use of the catheter for retention from enlarged prostate some important points must be remembered. A soft rubber instrument with coudé end of size 12 E should always be used when such can be passed

into the bladder; failing this a large gum-elastic coudé should be gently tried: a small or finely pointed instrument should never be employed: in difficult cases before resorting to suprapubic tapping a large and long silver prostatic catheter may be tried, but this should not be placed in the hands of the patient. A. B. Mitchell has proved that suprapubic removal may be safely carried out in acute retention without waiting for temporary relief by the catheter with two provisos: (1) That the urine is sterile, and (2) that there has been no dilatation of the ureters with back pressure on the kidneys. This is indicated by pain in the inguinal region passing upwards along the ureter and a plentiful urine of low specific gravity.

Another important point regarding catheterisation which should be remembered in cases of enlarged prostate where the instrument is employed for the first time in an examination with the view of detecting the amount of residual urine—if the whole of this be removed by the instrument the surgeon should be prepared to inject a quantity of warm Boric solution and leave it in the bladder so as to prevent the collapse which is liable to occur.

The various procedures of a palliative kind such as castration, the use of thermo-cautery puncture, permanent perineal drainage, McGill's suprapubic partial operation, section of the vas, &c., have been all finally abandoned for prostatectomy in every case where the disease is progressing and causing mechanical obstruction to the emptying of the bladder.

Age is no barrier to the operation, which has been often successfully performed on patients beyond 90 years of age.

After as complete a state of bladder asepsis as is possible has been obtained by irrigation, the administration of antiseptic drugs and, when much purulent cystitis has been present, by suprapubic drainage of the bladder, the operation of prostatectomy should be undertaken.

Since the introduction of Freyer's brilliant advance in prostatic surgery whereby enormously enlarged prostates may be removed suprapubically by an operation only extending over a few minutes the perineal route in this country has been neglected. There cannot, however, be any doubt about the superior advantages of the perineal operation in selected cases as practised by Young of Baltimore, who has reduced the mortality of this operation to under 2 per cent.; the reports of the Johns Hopkins Hospital in 1908 show that 91 consecutive perineal prostatectomies were performed without a single death. Freyer's last statistics published in *British Medical Journal* of February 1, 1919, of the suprapubic operation showed in his skilled hands a mortality of 3 per cent. in the last 200 cases. It seems probable that by a careful adaptation of each method to individual cases the mortality of prostatectomy in skilled hands should fall below 1 per cent. when malignant cases are excluded.

The suprapubic method is undoubtedly the best for the removal of all large prostates bulging into the bladder, and the perineal operation for smaller fibroid enlargements which project downwards, and in which the sheath and prostatic capsule are fused together. Malignant enlargements are more completely removed by the lower operation. The drainage is

complete, the urethra is not torn, sexual power is seldom destroyed, and the patient may be permitted to leave his bed for a couch in the open air in 24 or 48 hours after operation. It is, however, agreed on by all authorities that perineal prostatectomy should only be undertaken by the skilled and experienced surgeon, being a difficult and complicated operation.

Freyer's suprapubic operation consists in opening the freshly irrigated bladder above the pubes by a small incision capable of admitting the forefinger; the mucous membrane over the projecting tumour is torn through by the finger-nail or a blunt-pointed scissors so as to admit the entrance of the forefinger between the capsule of the prostate and the sheath formed by the prolongation of the recto-vesical fascia. By inserting a couple of fingers of the other hand into the rectum so as to make the tumour project farther into the bladder the enlarged gland is shelled out *en bloc* or in two pieces, the enucleation being commenced at the sides and terminated close to the pubes as the prostatic urethra is torn across at the junction with the membraneous portion of the tube. The enucleated gland is next delivered by the finger, scoop or forceps through the stretched suprapubic opening and the bladder irrigated by a stream of hot sterile saline solution. A rubber tube of large calibre is then inserted through the skin wound into the bladder opening and connected with a suction apparatus, or the wound is covered up by several thick layers of absorbent cellulose wadding which are to be removed at two-hourly intervals to minimise the excoriation of the skin caused by the urine continually welling up through the tube and trickling over the surface. The tube is removed from the 4th to the 7th day, and some surgeons drain the bladder by a catheter left *in situ* for 14 days to expedite the healing of the wound. The patient in about two to three weeks commences to pass urine by the urethra and the bladder wound is sometimes completely healed in about a month, though a pin-hole opening may remain for a much longer period.

It is needless to say that before tearing through the mucous membrane a careful exploration of the bladder should be made by the finger for the discovery of a calculus or phosphatic débris, which should be extracted before attempting enucleation of the prostate when the suprapubic operation is selected.

In feeble patients, especially if there be renal insufficiency, and in emergency prostatectomies it is preferable to perform the operation at two stages, the bladder being opened and drained through a small suprapubic incision under local anæsthesia; after the patient has regained a further degree of strength and the renal functions have become re-established, a general anæsthetic or spinal anæsthesia being selected, the enucleation can more safely be proceeded with by enlarging the bladder wound. Some surgeons advocate spinal anæsthesia in every case where severe bronchitic or heart trouble increases the risk of chloroform or ether narcosis.

Malignant disease of the prostate is much more common than has been hitherto recognised; once the stony hardness so characteristic of the disease

has been detected there should be no time lost in waiting for further developments. The best operative procedure is the above-mentioned perineal method of removing the diseased gland. In inoperable cases much relief may be obtained by drainage of the bladder through a suprapubic incision and frequent flushing out of the vesical cavity by mild antiseptics. Cases formerly regarded as outside the pale of operation have been successfully dealt with by Young, who removes the entire prostate and seminal vesicles with the portion of the bladder below the ureters, afterwards suturing the membraneous urethra to the remaining part of the bladder wall.

PRURIGO.

Much confusion still exists regarding the recognition and nomenclature of this affection, which, according to Crocker and Comby, starts as a lichen urticatus or a papulose urticaria, but afterwards as the wheals disappear nothing is left but an intense pruritus accompanied by a papular eruption. The severe form of the disease known as Hebra's Prurigo or *Prurigo ferox* is generally fatal, being little influenced by treatment; the common type—*Prurigo mitis*—though seldom capable of permanent cure, can be so alleviated by suitable treatment as to cause little distress. The term *Prurigo senilis* should be confined to cases of phtheiriasis, the treatment of which consists in absolute cleanliness as described in the article on Pediculi.

The treatment of prurigo mitis should include every agent capable of improving the general hygiene and raising the standard of health and the body nutrition. Cod-Liver Oil is decidedly beneficial. A host of internal drugs has been recommended. Amongst these Arsenic, Phosphorus, Iron, Quinine and Thyroid Extract have been advocated; each of these, whilst apparently beneficial in some cases, aggravates the condition in others. Of drugs administered with a view of alleviating the intense itching Cannabis Indica, Antipyrine, Carbolic Acid and Pilocarpine have often proved of considerable value. The writer has often succeeded in the early stages of the disease in subduing the pruritus by short courses of Calcium Chloride in 30-gr. doses.

Local treatment is of more importance than the administration of drugs, and, if carried out with patience and perseverance, the disease may be kept in check in the worst cases, and even in severe cases may be ultimately banished. In children the management and removal of the disease are, for the most part, not so difficult.

Scratching should be avoided as far as this is possible, since the condition is greatly aggravated by the dermatitis caused by the finger-nails. Children should have woollen or cotton gloves tied on at the wrists before going to bed. Variations of temperature should be guarded against.

Warm baths should be given frequently, and these may be made alkaline by adding about half a pound of Bicarbonate of Soda to a large bathful of water, or Soft Soap may be used when the skin is much infiltrated,

the object being to get rid of the increased growth of superficial cutaneous cells which have become dry and dead. After each warm bath, and as much gentle friction as will, without increasing the irritation, cause the removal of the loose layers of the cuticle, the patient's body should be dried, and an *animal* fat should be thoroughly rubbed in. If this be carried out every night for a considerable period, it is sometimes surprising how soon the prurigo will show signs of yielding. Lard, Cod-Liver Oil and Lanoline are the best substances for inunction. The latter is preferable if the patient can get over its disagreeable stickiness. Cod-Liver Oil is valuable, but its disagreeable odour, which increases after it has become mixed up with the dried scales on the surface of the body, is a great barrier to its use, but in the case of children it certainly is the best remedy. Naphthol in the form of an ointment (1 to 20) is recommended by Kaposi; it may be rubbed in after the alkaline bath.

After the skin has been brought into a more healthy condition the animal fats may be replaced by an anointing oil consisting of 19 parts of Olive or Almond Oil and 1 of Oil of Cade, and with this treatment general massage may be advantageously combined.

Whilst the bath and inunction methods are being carried out the patient may be provided with a lotion or ointment for application to any part which is hypersensitive; any of the formulæ in the article following may be employed for this purpose. As a rule opiates should not be employed for the relief of insomnia. This is best treated by prolonged immersion in a warm weakly alkaline bath. Any eczema or dermatitis caused by the trauma of scratching should be treated by weak antiseptic ointments. An occasional sponging over with 1 in 40 Carbolic lotion prevents secondary infection of the skin and relieves itching.

PRURITUS.

Accepting the term "pruritus" as a sensation of continual itching, without the presence of the papules characteristic of prurigo or of any other visible cause, the first step in its treatment will be to remove any blood condition which may be irritating the peripheries of the cutaneous nerves. Diabetes, gout, Bright's disease, jaundice, dyspepsia and other ailments may be the direct cause and will afford the true indications for correct treatment. Local sources of irritation must, however, not be overlooked, and a search should be diligently made for minute fissures or cracks in the skin, scabies, pediculi, ringworm, and the possibility of the pruritus being the result of certain dyestuffs in the clothing next the skin must not be forgotten. In the local varieties of pruritus there is always a local cause to be found if rigid search be made. In other cases the pruritus appears to depend upon a neurosis, and must be met by remedies which will tend to depress or blunt the exalted sensibility of the fine nerve endings in the skin as Bromide of Sodium in large doses, Cannabis Indica, Carbolic Acid (3 grs.), Ichthyol (10 grs.), Antipyrine (10 grs.), Tincture of Gelsemium (10 mins.), Pilocarpine ($\frac{1}{4}$ gr.), Atropine, Digitalis and Ergot.

The following may be found useful:

℞ *Ext. Cannab. Ind.* *gr.* ¼.
Acid. Carbolici *gr.* iss.
Cocain. Hydr. *gr.* ¼.
Ext. Gelsemii *gr.* ¼. *Misce.*

Fiat pil. *Tales* xxiv. *St. unam omni nocte.*

Excellent results have been obtained by Shoemaker in cases characterised by anæmia and debility, from Cod-Liver Oil, in daily doses of 1 to 2 drs., injected into the subcutaneous tissues of the back. At the same time, and in all cases, electricity and massage may be relied upon to improve the general condition and afford comfort. Mild local Faradisation with central galvanism he finds most effective in nervous, prostrated patients.

Warm or tepid baths are always serviceable, one containing from 1 to 2 lbs. Bicarbonate of Soda to 30 gallons water usually affords temporary relief, and if used before a good half-hour's general massage its effects are often very marked at bed-time, inducing sleep. Sulphuret of Potassium has been used, though the writer has generally found it to aggravate matters, owing to the very common traumatic eczema induced by previous scratching. Nearly every one of the numerous sedative baths used in the practice of skin therapeutics affords more or less relief from the sensation of itchiness. The starch bath is a favourite, and after coming out of it the skin may be dusted over with the dry powder, mixed with 4 to 5 per cent. Salicylic Acid.

In many cases the careful employment of a soft hair-brush when in the bath in order to remove dead epithelial scales is followed by relief.

Menthol is one of the most reliable drugs for local use. It may be dissolved in oil or spirit; Saalfeld dissolved ½ dr. in 1½ oz. of pure spirit of wine, and this may be painted over the affected region in the same way as the writer has brushed on the Oleum Menthæ Piperitæ with a camel's-hair brush. The menthol cone may be rubbed on the skin, after moistening the latter with spirit. 2 drs. of Menthol rubbed up with ½ oz. Olive Oil and 1 dr. Chloroform may be made into an ointment with 2½ oz. Lanoline, but in order to influence a large tract of skin a solution of 1 in 50 of olive oil should be employed. The B.P.C. Liniment consisting of Menthol 3, Chloroform 4, Olive Oil to 16, may be brushed over the skin in localised areas.

Cocaine has been extensively employed, but should only be relied upon, even in localised pruritus, as a temporary agent. Porritt uses a cone of cacao butter impregnated with 2 per cent. of cocaine. As this is rubbed over the irritating patch the warmth of the skin melts the butter, which forms a soothing, emollient shield over the irritable nerve endings.

The following is an elegant and valuable formula where the itching is bad at night:

℞ *Cocainæ Purif.* *gr.* iv.
Hydrargyri Ammon. Chloridi *gr.* xv.
Zinci Oxidi ʒj.
Vaselini Albi ʒx. *Misce.*

Fiat Unguentum.

Carbolic Acid is often useful. A 1 in 60 lotion may be sponged over the skin at night, or carbolic oil (1 in 20) may be smeared over the body at bed-time, or any firm ointment may be employed. Lanoline, which alone is an excellent sedative in pruritus senilis, may be combined with the carbolic acid. Creosote is better than carbolic acid, and the following combination is excellent: Creosote (Beechwood) 1 dr., Lanoline 2 oz.

For *Pruritus vulvæ* Machiavelli recommends the following: Carbonate of Sodium 25, Eau de Cologne 75, Glycerin 100, Distilled Water 300, followed in bad cases by compresses soaked in the following: Hydrochloride of Cocaine ¾, Alcohol 100, Distilled Water 300, but the free use of cocaine in the long run always aggravates every form of local pruritus.

Startin's lotion consists of 1½ drs. each of Borax and Carbonate of Ammonia, 1 oz. Glycerin, 3 drs. Dilute Hydrocyanic Acid, and Water to 16 oz. To be diluted with 2 or 4 times as much water before application.

Julien uses the following in pruritus vulvæ:

℞ *Acidi Salicylici* ʒj.
Zinci Oxidi Purif. ʒiij.
Glycerini Amyli ʒiij. *Misce.*

Fiat Unguentum.

Chloretone (1 in 200) is a valuable application, but as pruritus of the vulva is always due either to local causes or to glycosuria or diabetes, a careful search should be made for the causal element.

The writer has found that Ungt. Conii alone or mixed with 10 per cent. Creosote or Carbolic Acid is the best routine. Dry Bismuth Carb. and Oxide are often most soothing and Zinc Oxide may be similarly dusted on.

Pruritus Ani can only be treated after a careful search for and the removal of the exciting cause as described under Anus, Pruritus of, on p. 50.

Tar, Liquor Carbonis Detergens, Calomel, Camphor, White Precipitate, Friar's Balsam, Borax, Chloral, Corrosive Sublimate, Ichthyol, Iodoform, Naphthol, Petroleum, Bismuth, Nitrate of Silver, Sulphur, Salicylic Acid, Alum, Zinc Carbonate, Tannin, Lead Salts, Acetic Acid, &c., are examples of drugs which have been found useful in local and general pruritus, and formulæ might be multiplied to the extent of the present volume. Enough has been given to show the principles upon which relief of the itching may be obtained by the use of local and constitutional agents.

PSOAS ABSCESS.

This may be regarded as practically always of tuberculous origin, the disease starting in the vertebral column. The treatment of the resulting abscess has been already described in the article on Caries of the Spine and the general principles have been discussed under Abscess. For convenience of reference the operative procedures may be here summarised, but it must be remembered that a psoas abscess being devoid of the presence of the ordinary pyogenic organisms in a small percentage of cases it may, under proper rest, open-air and antituberculous treatment, shrivel up or wither without surgical interference. This possibility should never tempt the surgeon to wait till the skin over a pointing abscess becomes involved, as the aim in all procedures must be to prevent the sac of the abscess becoming infected from without by pus-forming microbes.

The abscess should therefore be incised through healthy skin when possible, and after the evacuation of its contents the sac must be thoroughly irrigated by a stream of hot normal saline solution, and all semi-solid caseous products mopped out by sterile gauze, and the cavity filled with a 10 per cent. emulsion of Iodoform in glycerin or a 10 per cent. solution in ether. After permitting the excess of emulsion to escape, the lips of the incision are secured by fine sutures, and the utmost antiseptic precautions taken by the application of suitable absorbent wool dressings or iodoform gauze, no drainage being provided. It is usual in these cases for refilling of the sac to occur, not, however, with pus, but with serum. Repeated aspiration of this fluid through one angle of the wound will succeed in causing complete recovery provided general methods of treatment are applied at the same time.

In any case, Barker's method should be tried before resorting to drainage. It consists in opening the abscess by a small incision at its most dependent part, through which a flushing curette is introduced and the cavity thoroughly scraped out, the débris detached from the walls of the sac being washed away by the continuous stream of warm saline passing through the curette; the walls of the abscess track are further mopped by long strips of gauze and the wound sealed up without a drain. It may sometimes be possible by a free incision to remove loose carious bone, after which the sac may be filled from the bottom by packing it tightly with gauze to stop all hæmorrhage; when this has been accomplished, after waiting for some minutes, the gauze is gently withdrawn, and the walls covered with dry powdered Iodoform before sealing up the wound, or the cavity having been packed with Iodoform gauze, this is left *in situ* to encourage healing by granulation.

Some surgeons advocate and carry out a more radical operation by freely exposing the diseased vertebræ and removing the laminæ and spinous processes.

When secondary infection has already occurred there is no resource but to fall back on drainage, and the surgeon will sometimes be compelled to drain when the cavity continues to refill though no external organisms have been admitted.

A marked advance has been made by Beck's method of dealing with old sinuses and long sinuous tracks, which consists in injecting a paste of Bismuth liquefied by heat (Bismuth Subnitrate 6, Soft Paraffin 1, White Wax 1, and White Vaselin 12). This of the consistence of cream should be forcibly injected into the sac so as to fill up all sinuses and pouches connected with them, and the injections should be continued every second day till healing is accomplished. It must be noticed that this paste is unsuitable for injection into the abscess cavity in the absence of sinuses, when the wound is to be sealed up, as after the use of iodoform emulsion.

The after-treatment of psoas abscess must be conducted upon the generally recognised principles of dealing with every other form of localised tuberculous lesion. In some cases Vaccine treatment has been proved serviceable. When urgent symptoms due to psoas abscess have disappeared it may be advisable to prevent spinal deformity by the introduction of an Albée's Bone Graft. This acts as an internal splint; and when the patient begins to go about, prevents the undoubted tendency to recurrence of signs and symptoms of the caries and abscess.

PSORIASIS.

Of the two methods of treating this obstinate affection—the constitutional and the local—the whole trend of opinion is towards the recognition of the importance of the latter. Though no investigator has succeeded in isolating a specific microbe, the belief in the existence of such is becoming general. However, some authorities still regard psoriasis as evidence of a gouty or scrofulous diathesis, and recommend treatment accordingly, but as a rule such drugging, based as it is upon a wrong hypothesis, only leads to disappointment and mischief. Diet should be such as will be best calculated to maintain a perfect standard of health, and the fancy dietaries insisted upon by some specialists are as useless as they are irksome to the patient. It is nevertheless a good practice to alter the patient's diet periodically, and a few months' course of vegetarianism is often most beneficial in those who eat too much animal food. Several authorities in recent years maintain that excess of proteins is an important factor in the disease, since nitrogen retention is always marked, especially when the eruption is extensive; good results often follow restriction of the intake of nitrogen.

Arsenic is the only drug which has any claim to the possession of a specific action in chronic cases. In acute severe cases it should not be employed. It must be commenced in small doses, say 2 mins. of Fowler's solution, which should be steadily increased till 5, 7, or even 10 mins. are given three or four times a day, diluted with water, immediately after or along with food. The drug may be pushed till the physiological effects are noticed, and after redness or irritation of the conjunctiva the dose may be diminished or suspended for a short time. This treatment may be continued for many weeks, and should not be stopped upon the removal of the eruption. The Asiatic pills, each containing $\frac{1}{15}$ to $\frac{1}{12}$ gr., the Liquor Sodii Arsenatis or the Liquor Arsenici Hydrochlorici in the same doses as

Fowler's solution may be given. $\frac{1}{12}$ gr. of the Arsenate of Iron three or four times a day may be prescribed in the form of pill.

Cacodylates possess no advantage whatever over Fowler's solution, and are open to the objection that they cannot be pushed for long periods; and the newer organic arsenical preparations are more dangerous than the official liquors. When arsenic has been long administered hyperkeratosis of the palms and soles may be induced as evidenced by great warty thickening of the skin in these regions and pigmentation of the affected spots of skin, and sometimes peripheral neuritis results.

The much-vaunted Phosphorus is of little use; it is very doubtful if it has any influence save by its action as a restorative.

Iodides unquestionably possess remarkable powers over the affection in a small percentage of cases, when given in heroic doses (2 to 4 drs. daily), but like the following drug their use is entirely empiric, and we have no means of determining beforehand in any given case that improvement is to be expected.

Thyroid Extract is open to the same objection, and like iodides its action is rapid when it acts at all, but it must be administered in doses which border on the dangerous, and the results are as evanescent as those of iodides. The drug may be combined with arsenic.

Perhaps the best routine for internal administration is a combination of Iodide with Arsenic as the following:

℞ *Sodii Iodidi* ʒij.
Liquor. Arsenicalis ʒiv.
Glycerini Purif. ʒiss.
Aquæ Camphoræ ad ʒviij. *Misce.*

Capiat ʒij. *ter in die ex cyatho vinario aquæ post cibos.*

Each dose of the above will contain $\frac{1}{2}$ dr. of the Iodide, and the total daily allowance will fall short of 100 grs.

Turpentine is recommended by Crocker, who gave it in an emulsion or in capsules till 30 mins. were reached three times a day.

Copaiba, Antimony, Salicylates, Colchicum, Carbolic Acid, Creosote or Tar, Mercury, Sulphur, Alkalies, Cantharides and various diuretics, purgatives and alteratives have been vaunted, but beyond correcting some temporary or accidental complication they cannot lay claim to any specific action. Malcolm Morris has obtained excellent results from Tartar Emetic in the early stage and in acute varieties of the disease where arsenic is contra-indicated, but the drug should only be given for a few weeks at most.

Cod-Liver Oil always does some good in the treatment of the affection in children, and in lean adult subjects it often appears to assist the action of arsenic and other drugs.

Local treatment must be employed assiduously, whether internal medication be resorted to or avoided, and of all the host of drugs applied to the diseased patches none have stood the test of time and experience like the following:

Chrysarobin.—This drug should be employed in every chronic case, whilst in very acute cases it will be well to wait for a few weeks, keeping the patient on slightly nauseating doses of Tartarated Antimony or Salicylates before resorting to vigorous local chrysarobin treatment.

The best routine method of applying the drug is that recommended by Norman Walker and Graham Little, and now usually followed. The patient should have a warm bath in which he lies for half an hour till the skin is thoroughly soaked and the scales softened; by using a hair-brush or coarse piece of flannel on the thickened patches much dead epithelial débris may be removed. After drying the body, an ointment consisting of 1 oz. Chrysarobin in fine powder blended with 15 oz. Vaselin should be rubbed over the entire cutaneous surface, the head and neck only being left alone. It will be observed that this 7 per cent. (or $\frac{1}{2}$ dr. to the ounce) ointment is much stronger than the B.P. preparation, which is only of the strength of 1 in 25 or 4 per cent.

Walker now uses a 5 per cent. ointment, and it will be wise to select this in all individuals with fine or delicate skin; he uses it in the same manner as the stronger preparation—*i.e.*, the ointment is to be well rubbed in over both the healthy skin and the diseased patches, and a layer of lint covered with the unguent should be left in contact with each patch and when practicable fastened by bandaging.

The applications should be made twice daily, and a warm bath taken every morning before the first inunction. The skin becomes rapidly stained, and an erythematous inflammation or dermatitis attacks the general cutaneous surface, being much less marked over the diseased patches, which at first present a white or anæmic appearance. It will often be necessary to apply a stronger preparation to the patches by applying it on the lint after the general rubbing-in of the weaker ointment. In the carrying out of the above plan of attack the patient must take to bed and give himself up entirely to the treatment, owing to the deep staining of the skin and linen by the drug. The face must be carefully protected by a lint or linen mask, and it is a wise precaution for the patient to wear cotton gloves in order to prevent the chrysarobin being transferred by the fingers to the eye. The above treatment will require at least a fortnight, and where the erythema is severe the B.P. Ungt. Zinci or a powder of Calamina and Starch or Fuller's Earth or any bland oil may be applied over the skin, the patches being still treated by the chrysarobin on lint till every trace of the disease disappears on the trunk and limbs.

In chronic cases where the thickened patches are few, large and well circumscribed, the best procedure is to make a hard cerate in the form of a salve-stick consisting or Chrysarobin 3, Wax 2, and Lanolin 5; this may be well rubbed in over each patch, which can then be covered with a layer of Traumaticin or a piece of rubber plaster. A pigment consisting of 1 part of chrysarobin dissolved in 9 parts of Gutta Percha solution is often employed. The writer has sometimes obtained excellent results by painting over, after the scales have been removed, very indolent patches with the powdered chrysarobin reduced to a creamy consistence by rubbing

with a little water in a mortar; after drying, the patch may be covered with collodion, traumaticin or rubber plaster. The drug may also be obtained in the plaster form for application to the skin.

There seems little doubt but that a portion of the chrysarobin rubbed into the skin is absorbed and aids in the removal of other patches of the disease to which the drug has not been directly applied. When any alkali has been used in the bath to soften the scales, before the application of the ointment this should be washed away, otherwise some decomposition occurs in the chrysarobin.

Of the above two methods of local treatment, that in which the entire cutaneous surface (except the face and head) is submitted to the drug is certainly more efficacious and speedier than the plan of confining the application to the diseased patches. The selection of the method is determined by the patient's circumstances—if he can give himself entirely up to a few weeks' treatment in bed, the inunction should be general, but if he must continue in his usual avocation the partial method can only be carried out. Tarry compounds may be tried with advantage in these cases.

The treatment of psoriasis of the scalp is one of great importance but also one of much difficulty. Walker maintains that as long as the eruption is left untreated on the scalp it is certain to again spread over the entire body. Chrysarobin cannot usually be employed owing to its power of staining the hair and causing severe irritation about the eyelids and conjunctiva. It must therefore be treated by other methods, and there is no use in smearing ointments over the thick crusts amongst the hair; these must be first removed by prolonged washing and scrubbing with Borax or with a solution of Soft Soap in spirit, after which an ointment (1 in 20) of Salicylic Acid may be rubbed in twice daily.

Oil of Cade emulsified with a few minims of fluid extract of Quillaia and diluted with an equal bulk of Glycerin of Starch is employed by Graham Little. White Precipitate Ointment to which 15 per cent. Liq. Carbonis is added is another excellent application to the scalp.

A radical method is to shave the scalp and apply Saalfield's ointment (Chrysarobin and Salicylic Acid of each 10 parts, Green Soap and Vaselin of each 25 parts) or a solution of Chrysarobin (1 dr. in 1 oz. of equal parts Chloroform and Glycerin.

As substitutes for the application of Chrysarobin, innumerable compounds have been advocated in the treatment of psoriasis of the body.

Anthrarobin, a powerful deoxidising agent obtained by reducing alizarin, is employed as a 1 in 8 ointment and does not stain.

Pyrogallol (Pyrogallic Acid) is a powerful antiseptic introduced by Jarisch in the form of a 1 in 8 ointment, but it is a dangerous remedy; the writer has seen sloughing follow its application in psoriasis. Lenigallol is quite safe but of little use. Eugallol, another derivative of pyrogallol, is a most valuable drug; it may be brushed over the patches after diluting it with an equal bulk of Acetone. Saligallol is used in the same manner.

Pyrogallol Oxide (Pyraloxin) and Gallacetophenone, 1 in 10 ointments, are also efficacious applications, but it cannot be said that these compounds are able to hold their own with chrysarobin, and the same may be said of Eurobin and Lenirobin, which are acetates of chrysarobin and do not stain.

Various antiseptics have been combined with chrysarobin in the routine treatment of psoriasis carried out as before described; the most frequently employed of these are Salicylic Acid and compounds of Tar. Unna's Compound Chrysarobin Ointment consists of Chrysarobin 5, Salicylic Acid 2, Ichthyol 5, Vaselin 88. Another very valuable formula of Unna's is Chrysarobin 10, Salicylic Acid 5, Birch Tar (Oleum Rusci) 10, Soft Soap 12·5, and Vaselin 12·5. This latter ointment should not be used as a general inunction owing to its strength in chrysarobin and soap, but it may be safely rubbed into isolated patches of the disease. Many dermatologists advocate the addition of Sulphur to the tarry ointments especially for the treatment of the scalp.

Tar Ointment B.P. has been much used formerly, but the Liquor Carbonis is more cleanly and equally efficacious. It may be used as a 1 in 4 ointment with lanoline and vaselin, or brushed in its full strength over the patches and allowed to dry, or used as a 1 in 10 lotion with spirit and water and covered over with oiled silk.

Juniper Tar Oil, Huile de Cade or Oleum Cadinum is a favourite still. It may be mixed with Ungt. Cetacei (1 in 4) or diluted with 2 to 5 times its volume of Olive Oil, or made into an ointment by heating it with its own weight of Yellow Wax. Vidal makes it into a soap with an equal amount of Glycerole of Starch by adding 5 per cent. Green Soap, which should be rubbed into the diseased patches at night and washed off in the morning.

Hutchinson's Ointment combines the majority of the most reliable agents together in one compound:

℞ *Chrysarobini gr.* x.
Liq. Carbonis D. ℥x.
Hydrg. Ammon. gr. x.
Creosoti ℥xx.
Adipis Benz. ʒj. *Misce.*

Oleum Fagi Pyroligneum (Beech Tar) and Oleum Rusci Pyroligneum (Birch Tar) may be employed as substitutes for the official Pix Carbonis Præparata (Coal Tar), from which the B.P. Liquor is prepared, and for the official Pix Liquida (Stockholm Tar) prepared from Scotch Fir.

Whatever ointment or other form of application made from any of the agents mentioned in the above list is employed, it should only be used after prolonged soaking of the skin in a warm bath to remove the accumulation of dead epithelial scales. Their removal may be hastened by the hair-brush with or without the aid of Green Soap, Borax or Sodium Bicarbonate. The patient after brisk rubbing with a towel to dry the

skin should remain rolled up in a thin blanket for several minutes till the cuticle loses its retained moisture, after which the ointment should be well rubbed in.

The chief cause of failure in the treatment is owing to the cessation of the applications before the diseased patches have been entirely eradicated. This is even the case when the more radical method of general inunction by Chrysarobin ointment has been carried out. After the patient begins to go about his usual work he should be directed to inspect his skin every day, and all suspicious spots should be rubbed with the salve-stick of chrysarobin or any of the stronger ointments already mentioned, the treated patch being bandaged or covered over with rubber plaster or traumaticin.

There is no end to the formulæ recommended for the treatment of psoriasis, as every known antiseptic or antiparasitic agent has been vaunted from time to time, and the young physician will be wise who selects any one remedy and adheres to its use till he becomes a thorough master of its action, instead of flying from one preparation to another. By this way alone he will become familiar with the conditions which indicate an increase or diminution of the strength of the preparation which he is employing, as in the treatment of chronic eczema, which is vitiated by the perplexing multiplicity of its unnecessarily complicated formulæ.

There remains one other agent to be mentioned; in former editions of the present work the use of electricity in the forms of the constant, interrupted and static currents was mentioned; now the high-frequency current and the X rays are advocated. The latter but for its dangers would be an ideal treatment for psoriasis of the scalp; at present its use should be confined to very obstinate patches on the body. Radium emanation has also given good results.

PTYALISM.

Salivation in adults is generally due to the administration of mercury, iodides or pilocarpine. In children the various forms of stomatitis are the common causes. In all cases ptyalism or salivation should be regarded solely as a symptom, and the primary cause searched for and removed, after which as a rule the amount of secretion and the secondary changes in the mouth will soon disappear.

In mercurial ptyalism the drug should be temporarily stopped with promptness. In the modern treatment of syphilis salivation is never aimed at; though the surgeon often pushes mercury to the extent of producing a slight sponginess of the gums, he is content to permit the physiological action of the drug to go no farther, and he only allows it to proceed so far in order to satisfy himself that the system has become safely saturated by the metal. As the first symptom of ptyalism may be the precursor of a severe salivation it is necessary to stop the administration at once, and as the condition of the mouth becomes normal the drug may be continued after a few days in smaller doses.

Severe salivation must be promptly dealt with. The best local applica-

tion will be Chlorate of Potash (1 in 40), which should be used as a mouth wash every hour, after first cleansing the buccal cavity with a weak Solution of the Permanganate of Potassium. Before and during a course of mercury the greatest attention should be paid to the state of the gums and teeth in order to prevent ptyalism. This is most carefully attended to at Aix, and is one of the details upon which the success of the treatment there depends.

When in excessive mercurialisation the gums become much swollen and ulceration has occurred, astringents will be required. Alum (1 in 40), Chloride of Zinc (2 grs. to 1 oz.), Tannic Acid (1 in 40), Decoction of Oak Bark, or other vegetable astringents may be used. The overwhelming fœtor may be met by weak solutions of Chlorinated Lime or Soda, or by a mouth wash consisting of Carbolic Lotion (1 in 80) or Iodine (1 of weak tincture in 80), or weak Condy's Fluid. The Glycerin of Borax is a most efficient local application, but it must be used almost continuously.

Internally, the Chlorate of Potassium may be given with advantage, and if combined with a Mineral Acid or Iron preparation containing a free acid, a better effect will be obtained.

Stimulants may be needed in bad cases, and only liquids or pulpy food can be permitted.

Though the amount of the salivary secretion can be checked by the local use or by the administration of Atropine, Belladonna, Hyoscine or Opium, it is most undesirable to proceed upon this routine, since the salivation is an effort on the part of nature to eliminate the poison. But when ptyalism is evidently the result of some local reflex, as an ulcer of the mucosa, such a plan may be sometimes safely resorted to. There is, however, no such objection to astringent applications, which increase the tone of the mucous membrane and prevent breaking down of the gum tissue.

Iodides have sometimes proved useful, but occasionally they have been observed to seriously aggravate the condition, and they should not be resorted to till the mercury has been suspended for several days.

Bromides combined with small doses of Belladonna are suitable in the ptyalism which sometimes is associated with pregnancy.

The ptyalism caused by stomatitis must be met by the use of the agents indicated for the primary disease, as described in the article on Stomatitis and Pyorrhœa.

The opposite condition—Dry-mouth or Xerostomia—is best met by the frequent use of Glycerin; the local use of Pilocarpine may induce marked swelling of the parotid glands.

PUERPERAL CONVULSIONS.

The treatment of eclampsia or puerperal convulsions should whenever possible be begun in the pre-eclamptic stage, and should be directed to the prevention of this very dangerous complication of midwifery. It is seldom that the fits come on without warning in a patient who has been previously in good health, and the practitioner who is on the lookout and

warns his pregnant patients to be on the lookout for the symptoms of toxæmia of pregnancy—headache, disturbance of vision and œdema—especially if he makes a point of periodically examining their urine, will have no reason to consider his precautions a waste of energy if he is able to avert by suitable treatment an attack of this justly dreaded affection—threatening to the life of mother and child alike. The treatment of this pre-eclamptic condition is dealt with under Pregnancy, Disorders of—Toxæmia of Pregnancy. It may be summed up here as strict confinement to bed, milk diet and saline purges. When the toxæmic symptoms are very prominent, or when the treatment indicated fails to relieve them, I have seen excellent results after complete starvation for a few days, the patient being kept in bed, her bowels induced to act freely, and copious draughts of water given. After a few days of this regimen the urine often clears up and milk diet may be again begun.

Before actual convulsions have set in it is not uncommon to see prodromal symptoms, which are a warning of imminent danger. The most common of these are—violent headache, sudden loss of sight, pain in the epigastrium, often so severe as to lead to suspicion of a ruptured viscus or some similar abdominal catastrophe. When such symptoms are noted in a pregnant woman, a sample of the urine should be obtained at once, and if albumin be found present, as is usually the case, energetic measures should be taken without delay. These measures should have for their object the rapid elimination of the toxins which are causing the symptoms and are soon to cause even more serious ones. The patient should be put to bed, and warmth to the skin by blankets and hot-water bottles applied. It is probably a mistake to induce profuse sweating, as elimination of the toxins is not effected through the skin, and excessive loss of fluid in this way will only tend to increase their concentration in the blood. At the same time there is a pretty general consent that external cold tends to increase the incidence of eclampsia, and it would therefore seem rational to apply external warmth with a view of preventing it. If the symptoms are severe it is wise to wash out the stomach either with the tube and plenty of warm water, or if that is not available by giving an emetic such as mustard and water in quantity, or by giving large draughts of water and tickling the fauces. When the stomach has been washed out, a purgative should be administered, and it does not matter much what purgative so long as it is sure to be effectual. Croton Oil (2 mins. rubbed up in a pat of butter) has a considerable vogue, but if that is not at hand an ounce of Castor Oil, with a few drops of brandy to disguise the flavour, or ½ ounce of Epsom Salt dissolved in lemonade may be given. If the stomach-tube has been used, the purgative may be poured down before it is withdrawn and allowed to remain in the stomach. Having thus attended to the upper end of the intestinal tract, the lower end of it is next attacked, and repeated enemata of water, in which a drachm to the pint of Sod. Bicarb. has been dissolved, are administered. The usual result is to bring away a considerable quantity of scybala, and the lavage should be continued until a free action of the bowel is obtained. If the symptoms are acute it is

advisable to leave ½ dr. of Chloral in solution in the rectum. Before tucking up the patient after these energetic procedures, a linseed poultice may be applied over her loins for the purpose of encouraging the kidneys to act. Food, including milk, should be interdicted, but she may be encouraged to drink freely of plain water, or home-made lemonade with a teaspoonful of cream of tartar to the pint. If the symptoms subside under this treatment, and the urine increases in quantity with diminution in the amount of albumin, the patient may be put on milk diet and treated as for Toxæmia of Pregnancy (*q.v.*). If labour comes on, it usually terminates rapidly, but if the second stage is slow the forceps may be applied as soon as the os is dilated. If the symptoms grow worse in spite of treatment, the onset of convulsions may be regarded as inevitable, and treatment as for convulsions may be commenced without delay.

If convulsions have already occurred when the practitioner first sees the case, he should carry out the measures just advised—*stomach lavage* with the administration of a purgative, preferably Croton Oil as the most potent, *rectal lavage*, and the application of external warmth. It is questionable whether Chloral *per rectum* should be given. The alternative is a hypodermic of Morphine (½ gr.), which has the advantage of being quicker and more certain in its action. It is fairly certain that the morphine, especially if it be followed up by ¼-gr. doses every 2 hours up to 2 grs., as many authorities recommend, will kill the child, but this is not a valid objection, as in most cases of severe eclampsia the child is stillborn no matter what treatment is adopted. A more serious objection is that the morphine is not eliminated in the disabled condition of the kidneys, and may produce poisonous effects, slowing the respirations and conducing to cyanosis and coma. These symptoms may have to be met by artificial respiration and the administration of oxygen, so that I think the practitioner who has not the resources of a hospital behind him will be well advised not to increase the total dose of morphine above 1½ grs. in the 24 hours unless he has skilled assistance at hand. With this limitation he may safely employ it. The next question that faces him is how to deal with the fits as they arise. Practically the only thing that can be done is to treat each fit as an epileptic fit, have a piece of stick or a spoon wrapped around with linen to place between the teeth as the fit comes on in order to prevent the patient biting her tongue, see that all clothes are loose at the neck, and take care that she cannot injure herself in the clonic contractions. Chloroform has been recommended, but it may, I think, be unhesitatingly condemned, unless as administered between the fits for some procedure, such as passing the stomach-tube. The post-mortem in fatal cases shows a condition of the liver identical with that found in acid intoxication, and a precisely similar condition is found in cases of delayed chloroform-poisoning. Full chloroform anæsthesia is therefore inadmissible on account of the danger of producing or assisting in a degeneration of the liver which will lead directly to a fatal result. The partial chloroform anæsthesia often recommended, which consists in clapping on the mask at the beginning of a paroxysm, is useless for the

reason that the initial stage of the fit consists of a tonic spasm in which the respiratory muscles share, so that the chloroform vapour is not inspired, and therefore cannot be absorbed until the fit is already half over. It is therefore practically without effect in limiting the duration of the seizure. I may say that I have witnessed the onset of repeated convulsions in a patient who was anæsthetised with chloroform for the performance of an operation, so that even full surgical anæsthesia is not always capable of inhibiting them.

The methods recommended by Stroganoff have been so successful over a long series of cases that I add his own summary of his procedure:

1. Avoidance of all external irritation. Room to be kept quiet and dark; all examination limited to what is absolutely necessary. All manipulations, catheterisation, rectal injections, hypodermics, etc., to be carried out under slight chloroform anæsthesia (15 to 30 mins.).

2. Control of fits by morphine and chloral hydrate, given as follows:

1st hour: Morphine ($\frac{1}{4}$ gr.) hypodermic.
2nd hour: Chloral Hydrate (30 grs.) by mouth or rectum.
3rd hour: Morphine ($\frac{1}{4}$ gr.) hypodermic.
7th hour: Chloral (30 grs.).
13th hour: Chloral (25 grs.).
21st hour: Chloral (25 grs.).

3. Labour is assisted, but not forced.

4. Watching and stimulating the vital processes.

(1) *Respiration.*—Posture; cleansing of nose and throat; pure warm air; oxygen after fits.

(2) *Heart.*—Milk and saline infusion *per os* and *rectum;* digitalis for weak pulse.

(3) *Kidneys and Skin.*—Warmth and saline infusions.

Another point which the practitioner will consider is the propriety of *inducing labour* or of *rapidly emptying the uterus.* Although it is true that eclampsia occurs in quite as severe a form intra- or post-partum as ante-partum, I think that the experience of most obstetricians is that when fits occur before labour they usually cease as soon as it is completed, and that, *prima facie,* the evidence would be in favour of the emptying of the uterus at once. In deciding this point we must recollect that labour comes on in nearly every case of eclampsia of its own accord, and that it usually progresses rapidly, so that a wait of a very few hours is certain in most cases to put us in possession of any therapeutic advantage that the completion of labour confers. We have to consider further the risks that are run in an accouchement forcé—laceration of the cervix with great probability of sepsis, to which eclamptic patients fall an easy prey, and in any case a considerable amount of shock. The interests of the patient will best, in my opinion, be consulted by confining interference to the application of forceps when the os is fully dilated if delivery is slow.

I have come to this conclusion after an experience which includes all the methods of rapidly emptying the uterus, such as Cæsarean section,

accouchement forcé, and the use of Bossi's dilator. I am now satisfied that if the modern methods of elimination are faithfully carried out the patient's chance of recovery is quite as good undelivered as delivered, and there is nothing to be gained by taking the risk unavoidable in an attempt to deliver before labour has set in.

It is at least possible that the improvement sometimes following artificial delivery or other operative procedures is partly due to the coincident loss of blood. *Bleeding* was formerly a routine method of procedure, and it seems to be indicated when the patient is plethoric and cyanotic. The vein at the bend of the elbow or one of the veins on the back of the hand may be opened and 12 to 20 oz. of blood taken.

The principle of *saline transfusion* for the purpose of increasing the volume of fluid in the circulation and so both diluting the toxins and stimulating excretion by the kidneys is almost universally admitted to be sound. The only drawback alleged to its use is the possibility of encouraging the onset of pulmonary œdema. So long as large volumes of fluid are not rapidly added to the blood this danger is probably a negligible one. The technique of saline transfusion is fully described under Shock and Collapse and Operations, Treatment of. It is sufficient to say here that the most satisfactory method in eclampsia is to use the submammary method. The breast should be lifted up and the needle thrust in at the lower margin of the gland into the loose submammary tissue to avoid the risk of producing abscess or gangrene of the gland. A pint to a pint and a half should be injected, and the same quantity may be given again at the end of 2 hours. Normal Saline solution (drachm of common salt to the pint) is commonly used, but some authorities recommend a solution of sodium bicarbonate (drachm to the pint) with the object of combating the acid intoxication.

In the worst cases, in spite of all forms of treatment and in spite of delivery being completed, the patient grows steadily worse, and finally sinks into a state of coma which ultimately ends in death. In cases of this kind it is proposed to attempt to resuscitate the kidney functions by the operation of *decapsulation*. The kidney is exposed, but need not be raised from its bed. It is steadied by grasping the capsule with toothed forceps, and an incision is then made through the capsule with knife or scissors. The finger is then introduced through the incision and sweeps round between the capsule and kidney substance, the two being very easily separated. The wound is then sutured with a small gauze or tube drain. The operation is neither severe nor difficult, and in view of the numerous good results which have been recorded it seems worth while to give it a trial when delivery has taken place and other treatment is of no avail to control the condition.

Veratrone has been highly recommended, but should be used with caution, as the drug is a dangerous one.

Tweedy has pointed out that many fatal cases die of suffocation during a fit. He urges the importance of skilled assistance being at hand, and advises that when symptoms of suffocation are noted the patient should

be seized by one arm and by the hair of the head and dragged across the bed, the body being turned over, so that she is thrown on her face with the head over the edge of the bed. He says that this manœuvre is followed by the discharge of a quantity of bloody mucus and fluid from the mouth and nose, and claims that patients may in this way be saved from imminent danger of suffocation. He also deprecates very strongly the giving of any food, including milk, until convalescence is well established.

R. J. J.

PUERPERAL FEVER.

Prophylaxis.—The obstetrician should realise that in every case of normal labour an attendant who does not understand or will not trouble to carry out the principles of antiseptic midwifery is a further element of danger added to the ordinary risks of childbirth. It may not be out of place to say here that this fact is already recognised by many of the laity, and is bound to be recognised more and more as scientific education spreads. The midwife in England must now by law be at least possessed of the necessaries for carrying out her office under antiseptic conditions, and for the sake of his professional reputation, if for no higher reason, it is incumbent on the practitioner not to leave it in the power of anyone to say that in any case of confinement a single precaution which he ought to have taken was *not* taken. I am far from suggesting that every case of puerperal sepsis is to be laid at the door of the attendant. Infection is a matter not only of the seed, but of the soil where it is sown, and I grant at once that virulent septicæmia or peritonitis may arise in a case where every possible precaution was observed, and that, on the other hand, a patient exposed to all the dangers of examination or of instrumental delivery in the absence of any attempt at asepsis may never develop a bad symptom. But these cases are the exception, and not the rule, and it is as illogical to doubt the value of asepsis because of the one as it is dangerous to presume on account of the other. Experience shows that while it is impossible to conduct a confinement under absolutely sterile conditions, the precautions which can and should be taken reduce the number of pathogenic microbes in the field of operations to such a point that the resistance to infection of a normal woman is able to prevent them from obtaining either a local or a constitutional mastery over her tissues. An increased dose of microbes or a diminished resistance leads equally to infection, but this fact should only make us the more zealous to insure by antiseptic methods that the bacteria available for the attack shall be reduced to the numbers of a forlorn hope instead of being suffered to remain massed as an invading army on the patient's genitals and on the examining finger.

The precautions which should be observed have been already detailed at length under the heading of Labour (*q.v.*), and it is unnecessary to repeat them here. It will be sufficient to emphasise the following warnings: Be sure to see that the patient's vulva and perineum have been thoroughly washed and disinfected before making a vaginal examination or introducing instruments. Boiled india-rubber gloves *must* be worn for any vaginal examination or manipulation if the hands are chapped, rough

or abraded, or have recently been exposed to contamination by septic material—*e.g.*, pus or fæces—as under such circumstances it is impossible to sterilise the skin. No one, whether doctor or nurse, should have anything to do with a woman in labour while suffering from an active infection on the hands, such as a pimple, suppurating wound or septic finger. Make as few vaginal examinations as possible. Do not hasten the third stage by kneading or massaging the uterus, and wait at least an hour before attempting manual removal of a placenta which has not left the uterus.

In regard to *prophylactic douching*, which is sometimes advocated, statistics do not show any very marked improvement from its use, and the opinion of the best authorities is that in normal cases it is unnecessary and probably harmful, except after such operations as manual removal of a placenta, or when the liq. amnii is stinking and probably infected in a prolonged labour.

In giving an *intra-uterine douche* the patient should be on her back across the bed, with the hips over the edge and a mackintosh below them to save the mattress from being soaked. A double-current uterine tube should be used—either Budin's, Bozemann's or, what I find best of all, Gibson's. The tube should be a large size, at least ½ inch in diameter, and the douche receptacle should be raised only 2 or 3 feet above the patient, so that a plentiful stream of fluid is delivered without much force. At least 4 quarts at a temperature of 105° F. should be used, and the best solution is one of common salt (drachm to the pint). If an antiseptic is used it should be very dilute (1 in 10,000 Perchloride or Biniodide, or drachm to the pint Lysol or Creolin). It is well to keep a hand on the fundus, lest the uterus should dilate suddenly, and after the douche has been given the uterus should be examined to make sure that it is well contracted and that no solution is retained in it; it should then be pushed down into the pelvis so as to expel the fluid from the vagina.

If the patient has a purulent vaginal discharge a *vaginal douche* should be given before delivery, and should be repeated twice a day after delivery. Care should be taken that the vulva is washed clear of lochia with antiseptic lotion night and morning in all cases, and oftener if any laceration of the perineum or vagina has occurred (see under Perineum, Rupture of).

Treatment.—Many distinct lines of treatment have been advocated in puerperal fever, ranging from a policy of absolute non-intervention to the recommendation of such heroic operative measures as ligature of the pelvic veins and even complete hysterectomy. The difficulty in deciding between the rival claims of different methods lies to a large extent in the very doubtful and uncertain prognosis in many given cases of puerperal infection. Every obstetrician of experience can recall patients desperately ill who recovered, and cases seemingly mild which went steadily from bad to worse, the event in neither being much influenced apparently by the treatment adopted. Such experiences as these lead one to considerable scepticism with regard to the results published from time to time in favour of any particular method.

The practitioner should first exclude general or systemic diseases accom-

panied by fever as possible causes for the rise of temperature. He should make sure that he has not to deal with a mastitis or phlebitis, and if abdominal pain be present he should exclude pyelitis, appendicitis and torsion of an ovarian cyst. When he has satisfied himself that the rise of temperature is due to a uterine condition, he should keep clearly before his mind the possibilities. The fever may be due to *septic absorption*, and this may be from lochia retained either in the vagina or in a uterus which has become acutely anteflexed or, less commonly, retroflexed. In such a case the symptoms usually arise in the first week, commonly about the fourth day. The lochial discharge becomes scanty or disappears, and if the uterus is at fault the fundus, which could be felt a day before well up in the abdomen, has become lost to the touch or is felt just behind the pubes. In these cases the rise of temperature and pulse-rate is slow and not very marked, and the general symptoms are comparatively slight, unless the case has been allowed to run on for some time without being diagnosed or treated. A vaginal examination discloses the presence of a pool of fœtid lochia in the vagina or the kink in the uterus. It may be said here that in examining or giving local treatment to any case of puerperal fever the practitioner should always wear boiled rubber gloves, unless he is prepared to give up attendance on all other midwifery cases until the septic patient is out of his hands. These are the cases which are often cured by a smart purge, especially if the patient is encouraged to sit up for the movement of the bowels. They are always cured by a hot (110° F.) douche of saline or very weak antiseptic solution, vaginal or intra-uterine as the case may be. To prevent recurrence of the symptoms the patient should be encouraged to sit up in bed. A mixture containing 15-min. doses of Ext. Ergot. Liq. and 1 to 2 grs. of Quinine may be given three times a day to promote involution and firm contraction of the uterus, and for the same purpose a hot vaginal douche may be given night and morning.

In other cases septic absorption is going on from fragments of decomposing placenta, membrane or retained blood-clot. Here the lochia are copious, very foul and often blood-stained. The same methods of treatment may be adopted as for retained lochia, but in addition it is wise to explore the uterus with the fingers and to peel off the wall any adherent fragments of placenta which can be distinguished. The curette may be used to remove fragments which are firmly adherent. It should be remembered that the placental site is always rough and shaggy, and it is better to err on the side of caution. The intra-uterine manipulation should be followed by a copious hot intra-uterine douche of 1 in 10,000 Perchloride or Biniodide, drachm to the pint Lysol or Creolin, or drachm to the pint common salt. It is recommended to pack the uterus in these cases with iodoform gauze wrung out of 70 per cent. alcohol or Hydrogen Peroxide solution (10 vols.). The cervix for this purpose is seized with volsella, and the pack is carefully applied with uterine dressing forceps up to the fundus. It is allowed to remain for 12 to 24 hours, and its removal is followed by an intra-uterine douche. The douche may be repeated once or twice a day as circumstances dictate until the tempera-

ture comes down to normal. Drug treatment may be on the lines of the Ergot and Quinine mixture mentioned above. If the pulse is rapid and weak, Tr. Digitalis (Mv.) combined with Tr. Nuc. Vom. (Mx.) should be given. The diet should be sloppy but nourishing. Milk, eggs, beef tea, chicken or mutton broth, with arrowroot, cornflour or some other light and easily digested form of starch.

Again, the septic absorption may be taking place from a *puerperal ulcer*, the name given to a sloughing, inflamed or suppurating wound of the perineum or vulva. This condition is recognised on inspection of the vulva, which is swollen and inflamed. On separating the labia the laceration may be seen either covered with an unhealthy slough or with red and angry-looking granulations. No vaginal examination should be made, nor should a douche be given for fear of carrying virulent organisms up to the cervix. Any stitches present should be removed, the wound should be swabbed with pure carbolic acid, and a light iodoform gauze pack introduced between its lips. A compress of 1 in 2,000 perchloride under oiled silk may be applied to the vulva and perineum. The dressing should be repeated twice a day until inflammation has subsided and healthy granulations have sprung up. The perchloride compress may be renewed each time the bladder or bowels are moved.

The lines of treatment in a case of septic absorption, whether from retained lochia or placenta or from an infected wound of the vulva, are easy to lay down, and may be followed with all human assurance of success. In dealing with a *septic infection*, on the other hand, we are face to face with one of the most difficult problems in obstetric therapeutics, and too often the event proves how complete has been our failure to solve it. Nor is the difficulty confined to cases which from the beginning show signs of septic *infection*. Only too often a case of septic *absorption* is combined with or develops into infection. The headache and slight fever due to retained lochia are suddenly succeeded by the rigor that marks systemic infection, the staphylococcus or streptococcus is invading the endometrium or the placental sinuses while a piece of decomposing placenta is inducing a flow of putrid lochia, or a streptococcal inflammation is making its way along the vaginal lymphatics to the parametrium before the slough has disappeared from the surface of a puerperal ulcer. Remembrance of such facts as these should make the practitioner very watchful for the first signs of fever. The temperature at night should always be taken and recorded, and a rise above 100° F. should entail on the part of the attendant at least an inspection of the vulva and an abdominal examination for evidences of pelvic or uterine tenderness. The custom of making visits in the morning often leads to a nightly rise of temperature being overlooked until the condition has become serious enough to produce general and continuous symptoms, and it is remarkable how often in practice one finds on making inquiry that a patient who is supposed to have taken ill only a few hours before has had headache, chilliness, a flush of heat or even a rigor for a night or two previously. Had the temperature been taken in these cases, an early warning would have been given that all was not well, and many

patients would be saved from a long illness, and not a few from death, if the earliest symptoms of sepsis were noted and suitable treatment promptly instituted.

The course and the physical manifestations of infection may vary considerably. Thus, in the cases already considered under the category of septic absorption, the onset of infection may be marked by the occurrence of rigors or there may be only a progressive rise in the temperature and pulse-rate, with a coincident change for the worse in the aspect of the patient. When the case is one of infection from the first, the rise of temperature is usually rapid, and the pulse becomes correspondingly quickened. Rigors usually occur, but are not infrequently absent in the worst cases, in which the temperature also may be comparatively low (100° to 102° F.).

The local conditions are also very variable. In very bad cases the infection may be a systemic one from the beginning, and there may be little local disturbance. In others the uterus itself may be inflamed, tender and flabby, or the connective tissue around it or the peritoneum covering it may be involved (see under Pelvic Inflammation). The uterine discharge may be fœtid or sometimes purulent. The fact that it is quite sweet does not exclude sepsis; if anything, it rather increases the probability that the infection is of a virulent type. Not uncommonly one result of the fever is that the lochia becomes much lessened in amount or ceases altogether.

Of the various lines of treatment that may be followed I shall first consider the expectant treatment, because in the first place it has a large and increasing weight of expert opinion in favour of it; secondly, it is pre-eminently the form of treatment which can be carried out as efficiently by the practitioner as by the specialist, and as readily in an average comfortable home as in a hospital; and, lastly, because, whatever the result, it least exposes the practitioner to the imputation or to the consciousness that the measures he adopted had only the effect of lessening his patient's chances, and in so deadly a disease as puerperal infection our motto should be first and foremost *Minime ne nocuere*. The *rationale* of the treatment is to support the patient's strength and to assist her constitutional resistance in the hope that her tissues will be able to conquer and kill off the invading micro-organisms. She is to be kept absolutely at rest in a warm and well-ventilated room. Her strength is sustained by abundant fluid and easily digested nourishment. Milk, warm or cold, and with or without dilution; eggs raw, whipped or in custard; milk and egg puddings made with arrowroot, cornflour or tapioca; beef tea, beef juice, chicken broth, chicken jelly or mutton broth may be given every 2 hours. It is a good plan to draw up a list, marking down some article of food to be given at a specified time, and let the nurse administer it like medicine.

Stimulants seem to have little effect on the disease, but may be given in doses of half a glass of champagne or a tablespoonful of brandy or whiskey every 4 hours if the patient's appetite seems to be improved or if the administration of the dose is followed by refreshing sleep.

If pain is a marked symptom a hypodermic of Morphine (¼ gr.) may be given, but should be discontinued as soon as possible. A prolonged hot vaginal douche (110° to 114° F.) of saline solution should be given night and morning to induce temporary congestion of the pelvic organs and promote the flow of lochia. For the same purpose Citric Acid (30 grs. in solution every 4 hours) may be given, or the patient may be encouraged to take lemon juice or drink home-made lemonade. She may drink as much plain water or other bland fluids as she likes, as the fluid assists in washing the toxins out of the circulation. If the bowels are confined, an aperient should be given. Often diarrhœa sets in, and should not be hastily checked, as it is probably due to irritation of the intestines by poisonous substances excreted into them. If it is causing much irritation or exhaustion, an attempt may be made to check it by a large enema of normal saline solution, or, that failing, by a starch and opium enema. Distension is common. It may be relieved by hot stupes to the abdomen and by soap-and-water enemata with a drachm of Turpentine in each. Insomnia may be met by the administration of Sulphonal (20 to 30 grs.) or Paraldehyde (℥j. in Aquæ Chlorof. ℥ij.). The patient should be sponged if the temperature rises above 103° F. The onset of rigors should be met by external warmth and the administration of hot brandy or whiskey.

The general medicinal measures recommended are Quinine, either alone or combined with Ergot. The Quinine seems to have a certain amount of influence on the fever, and the Ergot tends to produce involution of the uterus, but care should be taken that the drugs do not do harm by interfering with the patient's appetite. If they do, it is wiser to stop the administration. When the pulse is over 120, the following mixture may be given:

℞ *Tr. Digitalis* ℥ij.
Tr. Nucis Vom. ℥iiss.
Spt. Æther. Nit. ℥iv.
Spt. Chlorof. ℥ij.
Aquæ ad ℥viij. *Misce.*

Fiat mistura. ℥ss. *quartis horis ex aqua.*

If the temperature is above 102° F., Aspirin may be given in 5-gr. doses every 4 hours, but it should be remembered that the profuse perspiration induced by Spt. Æther. Nit. and Aspirin may cause some collapse, and the practitioner should be on his guard to stop the drug on the first warning.

Again, measures may be taken to supplement or to stimulate the natural mechanism by which the body protects itself against infection. One of these measures is the injection of *antistreptococcic serum*, which presumably contains anti-bodies capable of neutralising a certain quantity of the toxins produced by the streptococcus, the organism causing the vast majority of severe and fatal cases of septicæmia. Whether these bodies are present in an amount too small to have any effect or whether the

appropriate bodies are not present at all, the fact remains that the administration of antistreptococcic serum is disappointing. If does not cure, as diphtheria antitoxin, for instance, cures diphtheria, and there is even a difference of opinion as to whether it has any effect at all on the infection. I think that I have seen good done by injecting 20 c.c. of the serum under the skin of the abdominal wall, and repeating the injection at an interval of at least 24 hours. The effect seems most marked, as one would expect, in mild cases and near the beginning of the illness. In bad cases it is practically useless. Attempts have been made to improve the condition by the use of *vaccines*, but the administration of these must be left to a specialist, as the possibilities of doing irreparable damage by injecting during a negative phase of infection render the most skilled supervision absolutely necessary. It is unlikely that the treatment will ever be of value in fulminant cases. It appears more likely to be of service when the infection is subacute, subject to exacerbations with intervals of comparative freedom from symptoms, or establishes itself as a lingering inflammatory condition.

Measures have also been adopted with the view of fostering leucocytosis, in the hope that increase in the number of leucocytes will be followed by increase in the amount of phagocytosis. *Quinine* is credited with the power of calling forth a leucocytosis, and part of its reputation in cases of infection may have been earned by this quality. A more direct effect is produced by the administration of *Collargol*, either by inunction of a drachm of Credé's ointment (Collargol ℥j., adipis præparat. ℥j.) into the skin of the thigh or axilla daily, or by the injection into a vein of 10 c.c. of a 1 or 2 per cent. solution. *Nuclein* or *Nucleinic Acid* has been given by hypodermic injection (1 to 2 drs. of a 2 per cent. solution) for the same purpose. It must be confessed that, though both these drugs produce a leucocytosis, the effect upon the infection is very doubtful. Another method is the "abscess of fixation" produced by the injection of a drachm of Spirit of Turpentine under the skin of the abdomen. It is said that if an abscess forms the effect on the general condition is favourable, but if no tissue reaction results a very bad prognosis may be given.

Good results have been reported after the intravenous injection of Eusol solution in normal saline (120 c.c.) and also of Chloramine-T solution, but sufficient data are not in hand to be certain whether this method will prove to be an advance in the treatment of puerperal infection or not.

When the case has passed the acute stage, open-air treatment, tonics and judicious feeding will be required. Any inflammation persisting will be localised, and may be treated as described under Pelvic Inflammation (*q.v.*). In some cases a chronic pyæmic condition becomes established, and abscesses form in different parts of the body. These should be opened as they form. It is in these conditions that vaccine treatment is likely to prove of much service.

Operative Treatment.—This line of treatment is not incompatible with that just described. The same measures as to feeding, drugs, etc., are just as applicable and as necessary even if operative measures have been taken

or are contemplated. The advocates of the expectant method rely, however, entirely on the patient's powers of resistance, reinforced it may be by appropriate treatment, to deal with the invading microbes; the advocates of operation hope by their interference either to diminish the number of invaders or to seal against them the port of entry. As every breach of surface, including even the abrasions caused by a blunt curette or the point of an intra-uterine douche-tube, opens up a fresh avenue of infection, interference to be rational must be so thorough as to do away with all or all but a feeble remnant of the invading cocci at the same time that the door is so widely opened to them. It is true that the inoculation of fresh raw surfaces made by surgical means may be taken to represent a vaccination, but it is with a vaccine of which we do not know the strength and in a patient of whose resistance we have no precise information, and therefore the chances of good being done on the lines of a vaccine are infinitely less than the probability of harm. We have to consider further that no surgical intervention can touch the cocci which have already invaded the circulating blood or lodged deep in the tissues, and that the power of these to multiply is still present. Lastly, we must remember that septic patients are notoriously bad subjects for anæsthesia and for prolonged operations.

To my mind, the lessons to be drawn from these considerations are, first, that if operation is contemplated it should be done in the initial stages of the attack, if possible while the infection is localised, and certainly not when the patient is already exhausted by fever, pain and want of sleep. Whatever operation is done—and this especially applies to curetting—it should be as thorough as possible, for the fire is not to be stirred, but to be raked out. When the patient is already in a dangerous condition, with rapid pulse, looking very ill, with tympanites or vomiting, operation is a desperate resource, and is more likely to shorten her life than to save it. Other things being equal, the shorter and less severe the operation the better.

I shall briefly describe the more important operations recommended for cases of sepsis. I shall not consider those adapted to the relief of Pelvic Inflammations and their sequelæ, which the practitioner will find fully discussed under that heading, further than to say that where there is evidence that a collection of infective fluid, serum, sero-pus or pus is present, nothing but good can follow its free evacuation, always provided that good drainage can be established.

The most common form of surgical interference is the *curetting of the uterus* with the object of removing the infected endometrium. This can only be done with a sharp curette, and as the uterine muscle is friable and easily perforated in many of these cases, the practitioner will do wisely to avail himself of the services of a specialist unless he has had a good deal of experience of the curette. The curetted uterus should be douched with abundant warm saline fluid, and a gauze drain should be carried up to the fundus or an india-rubber drain-tube may be introduced through the cervix if there is likely to be any hindrance to the free flow of discharges.

If light gauze packing is used it might with advantage take the form of a "saline pack" in which tablets of sodium chloride and citrate are buried in the folds of the gauze, and by gradually dissolving in the secretions provide a hypertonic saline solution which will increase the amount of discharge.

The curettage should be preceded by digital exploration. If there are masses of débris adherent to the uterine wall, and not removable by the finger, there is an indication for curettage. When the uterine cavity is smooth, it is highly improbable that scraping it will do any good.

A similar form of treatment is *écouvillonage*, in which the débris is removed by successive scrubbings with a set of bristles mounted on wire somewhat like a lamp-brush.

It may be mentioned that the *intra-uterine douche* must be looked on as an operative measure on account of the impossibility of giving it without abrading the uterine mucous membrane. Clinical experience bears out this view, for its use is often followed by a rigor, showing that it has caused an inoculation. I think it a useful adjunct to treatment at the commencement of an attack, but its continued use is likely to cause more harm than good in a case of septic infection. It is in its proper place in a case of septic absorption.

Another simple operation is that of *opening the posterior fornix* and draining the pouch of Douglas. It is very useful where a peritoneal exudate of sero-pus or lymph has formed. The operation may be done without an anæsthetic. The cervix is seized with volsella and held upwards. A transverse snip with scissors is made ½ inch behind it through the vaginal wall. The peritoneum presents in the wound, and may be cut or torn through and a gauze drain inserted into the pouch of Douglas.

The major operations have an appalling mortality, and are truly desperate operations. *Incision of the Abdomen*, lavage and drainage for peritonitis has been carried out, but the results are in no way superior to those obtained by posterior vaginal incision, though of course most of the cases operated on were already desperately ill. *Removal of the Uterus* has been practised. It should be confined to cases in which a local cause—sloughing fibroid, abscess of the uterine wall or ruptured uterus—is present, and it seems wiser to wait until the first burst of the infection has blown over, unless one removes the uterus as a prophylactic measure before infection has become established. *Ligature or Resection of the Pelvic Veins* has a comparatively small sphere of usefulness, as it is only indicated in pyæmic cases, in which the primary focus is evidently situated in the uterus.—R. J. J.

PUERPERAL HÆMORRHAGES.

The consideration of one of the commonest and most important of puerperal hæmorrhages—that arising from the inevitable premature separation of an abnormally placed placenta—has been already considered under the heading of Placenta Prævia. The remainder fall naturally

under two headings—those occurring before and those occurring after the birth of the fœtus.

1. Ante-Partum Hæmorrhage.—Excluding as of no moment the slight loss which may occur during the first stage from laceration of the cervix, we have to deal in this section with hæmorrhage arising from a single cause—the premature separation of a normally situated placenta. To this form of bleeding the name "Accidental Hæmorrhage" is very commonly applied. The blood, at first effused between the membranes and the uterine wall, may find its way almost immediately to the os and appear externally (Open Accidental Hæmorrhage), or it may accumulate in quantity within the uterus, causing it to become distended and correspondingly hard, and only after some time appearing externally (Concealed Accidental Hæmorrhage). In rare instances the blood makes its way through the membranes into the amniotic cavity. The accident is a comparatively rare complication of midwifery, and many obstetricians in large practice have seen at most one or two cases. It is most likely to occur in a multipara. There is no method of prophylaxis known. The cases fall into two groups—in one (open accidental hæmorrhage) the hæmorrhage is not very marked, and the general symptoms are slight or absent; in the concealed form the amount of hæmorrhage is considerable, and may be excessive, and general symptoms of shock and collapse are marked, and intense pain over the uterus is a prominent feature.

In the mild cases there is little necessity or scope for treatment. The patient may be allowed to deliver herself, but it is advisable to terminate the second stage as rapidly as possible, for fear that with the descent of the head and consequent retraction of the uterus further separation of the placenta may take place and the child's life be endangered if its passage through the vagina be delayed. It is advisable to put on a firm binder, which at least supports the uterus and makes the mother more comfortable. Whether it has much influence in checking the bleeding is doubtful. When the practitioner is confronted with a case of this kind he should first make quite certain that he has not to deal with a case of marginal placenta prævia, and in the second place he should not leave his patient, for fear of the hæmorrhage increasing in amount.

In the severe cases several different lines of treatment are open to the attendant, and a good deal of controversy has taken place as to which is the more satisfactory.

There is first of all the treatment suggested by Barnes of applying a firm binder and rupturing the membranes with a sterilised stilet, or by introducing a pair of bullet forceps closed through the cervix, opening them, and closing so as to catch the membranes, and then withdrawing.

Secondly, there is the Rotunda treatment, which is carried out as follows: A bowl is filled with small balls of cotton-wool as big as the top joint of the thumb sterilised by boiling and soaked in drachm to the pint solution of Lysol. The patient is put in the cross-bed position, and her vulva shaved, washed and douched with Lysol solution. The fingers of the left hand are introduced into the vagina, and serve as a speculum,

and the right hand packs in the cotton balls, which are wrung out of the lysol solution as they are wanted. The fornices are packed first, so as to form a collar around the cervix, and the remaining plugs are tightly packed into the vagina so as to fill it completely. When the vaginal pack has been applied a tight binder is put on, and a napkin pinned to it is stretched over the vulva so as to prevent any bulging downwards of the vaginal plug. The plug is allowed to remain for 4 to 6 hours, and measures for the relief of collapse, saline transfusion, etc., are meantime instituted if required. When the plug is removed the os is softened and rapidly dilates, whereupon delivery is completed. If bleeding comes through the plug, it should be removed and reapplied.

Lastly, there is the method of immediate delivery either by rapidly dilating the cervix manually or with metal dilators, and then extracting the fœtus by forceps or version or by operative delivery, whether Cæsarean section or vaginal hysterotomy.

In deciding which procedure should be adopted in any given case, the two most important factors to be considered are, first, the amount of blood that is being lost at the time; and, secondly, the amount of collapse that is present. When bleeding is going on rapidly it is absolutely necessary to stop it. On the other hand, when collapse is extreme it is in the highest degree unsurgical to attempt operative measures which must make the condition more grave by added hæmorrhage, even though slight in amount, and by the production of a greater or less degree of shock. Fortunately, when collapse is extreme the hæmorrhage usually ceases for the time. Lastly, we must remember that until the uterus is emptied the normal mechanism for stopping hæmorrhage from the placental site—retraction of the uterus—cannot come into action.

Rupture of the membranes is indicated when the os is dilating or well dilated, as in these circumstances it accelerates delivery. It is also indicated when the uterus is distended by a concealed or partially concealed hæmorrhage, as the escape of the waters permits the overstretched uterine muscle to contract, and the lessening of the uterine distension relieves the acute pain which is a considerable factor in the condition of shock from which these patients are usually suffering. When the membranes have been ruptured and the binder applied an injection of ergotin should be given. If the patient is collapsed, saline transfusion either into a vein or beneath the breasts (see under Hæmorrhage or Operations, After-Treatment) should be practised. If the instruments for transfusion are not available, the patient should be encouraged to drink hot water, warm milk or milk and soda-water in small quantities at frequent intervals, and an injection of ½ pint of saline with ½ oz. of whiskey may be given by the rectum, and repeated in an hour. The head should be kept low and the feet and legs elevated, and external warmth should be applied by means of hot-water bottles.

Plugging the vagina is indicated when labour has not commenced, or when pains are feeble and the cervix not taken up or the os not dilated, as it is a powerful stimulant to uterine contraction, and when properly

applied the vaginal plug by its pressure produces softening and induces dilatation of the os. It is also indicated when rupture of the membranes has failed to check the hæmorrhage, as it is undoubtedly a powerful means of securing hæmostasis when the plugging is carried out thoroughly as described above. When this method of treatment is adopted, ¼ gr. of morphia hypodermically may be given, and if collapse is present measures should be taken to combat it while waiting for the plug to produce dilatation. If on the removal of the plug at the end of 6 hours dilatation does not rapidly take place, the vagina may be plugged again for a further period of 4 to 6 hours. If the os is dilating, but bleeding recommences, the membranes should be ruptured and if that does not stop the hæmorrhage a second plug should be inserted.

Accouchement forcé by rapid dilatation is to be condemned. In those dangerous cases where the patient is already suffering from profound shock and collapse the inevitable additional shock and hæmorrhage entailed by this method is likely to have the worst possible effect. When the symptoms are less severe, at least equally good results may be got by Barnes' or the Rotunda method with infinitely less risk to the patient.

The results that have been obtained by Abdominal Cæsarean Section, followed by supravaginal hysterectomy, are so good that when the services of anyone competent to perform the operation are available, it should, in my opinion, be given the preference over other lines of treatment in concealed accidental hæmorrhage. The operation should be preceded by saline transfusion and injection of morphia, and in my experience the rapid disappearance of shock and the speedy convalescence of patients after this operation are both surprising and gratifying. There is little objection to the sacrifice of the uterus, as in most cases the patient is a multipara, and in all probability the condition of the uterine muscle is such that another pregnancy is neither probable nor desirable.

A final word of warning may be given. These cases are very apt to suffer from hæmorrhage *after* delivery, and the practitioner should be on the watch for it, as a small additional loss of blood may prove fatal. A careful watch should be kept on the uterus even after the placenta is expressed, and it should not be waited for too long. If it has not left the uterus at the end of 5 or 10 minutes it is best to effect manual removal. The hand and forearm must be carefully disinfected by scrubbing with soap and water, rinsing in 70 per cent. spirit, and soaking in 1 in 2,000 perchloride. The whole hand is introduced into the uterus, and the placenta peeled off the fundus, which is pressed down by the other hand on the abdomen. It is recommended not to pull the freed placenta out immediately, but to wait for a contraction of the uterus to expel it and the hand together. In all these cases clots are certain to be left in the uterine cavity, and to remove them as well as to induce firm contraction it is advisable to give a copious hot (110° to 114° F.) intra-uterine douche through a double current intra-uterine nozzle (Gibson's is the best). Pituitrin (1 c.c.) should be given hypodermically, and a careful watch kept on the uterus for at least ½ hour after the placenta has come away.

2. POST-PARTUM HÆMORRHAGE.—Bleeding after delivery may arise from several causes, and the appropriate treatments differ accordingly.

Thus a steady flow of bright red blood immediately following the birth of the fœtus comes from a laceration either of the vagina or cervix. Dark venous blood pours away from the open sinuses of a placental site which cannot retract on account of a partially adherent placenta. The sudden gush of a river of blood or blood and clots from the vagina after the placenta has separated means that the uterine muscle has relaxed and suffered the placental sinuses to reopen. Sudden hæmorrhage with pain and symptoms of shock lead to a suspicion of inversion of the uterus—a very rare accident—and the diagnosis is usually completed by the appearance of the inverted organ at the vulva. Secondary hæmorrhage, coming on more than 6 hours after delivery, means, in practically every case, a piece of retained placenta.

Prophylaxis.—Women who give a history of hæmorrhage at previous confinements should take special care during the pregnancy to maintain their muscles in good order by abundant plain food, regular and sufficient rest and plenty of open-air exercise. A tonic containing strychnine may be given. Dr. Austin has had very striking results from the administration of small doses of quinine during the pregnancy, and a mixture of ergot and quinine has also been recommended.

Conditions predisposing to post-partum hæmorrhage are such abnormalities as placenta prævia, accidental hæmorrhage, hydramnios and twin pregnancy, or the presence of a fibroid in the uterine wall. Women who have borne a number of children, especially if they are getting on to middle life, are prone to hæmorrhage. It is therefore wise in such cases to conserve the patient's strength as much as possible during the first stage, especially if it is at all prolonged, and to terminate the delivery by forceps as soon as the os is fully dilated, unless rapid progress is being made. Deep or prolonged chloroform anæsthesia undoubtedly favours increased loss, and should be avoided. It is a great mistake to hasten the third stage, and unless the uterus is relaxing and filling up with clots no attempt should be made to knead or massage it. The placenta should be carefully examined to see that no cotyledons are missing, and the membranes to see that no hole is present indicating a placenta succenturiata. If the uterus does not contract firmly and well after the placenta has left it, Pituitrin (1 c.c.) should be injected into the buttock and massage should be tried. If contraction is still unsatisfactory at the end of 15 to 20 minutes, I think it is good practice to give a hot (110° to 114° F.) intra-uterine douche, which in nearly every case has the desired effect. Finally, the warning may be given that when the pulse is over 100 the practitioner should not leave the patient until he is absolutely satisfied about the uterine contraction.

Treatment.—When the practitioner is confronted by a post-partum hæmorrhage he should first of all put his hand on the abdomen. If the *uterus* is either *completely relaxed or imperfectly contracted* an attempt should be made to induce contraction by massaging and kneading the

uterus so as to cause the expulsion of clots and to stimulate the uterine muscle. Should this fail and the hæmorrhage still continue, pressure should be made on the aorta as it lies in front of the lower lumbar vertebræ. The closed fist should be used and a fair amount of force exerted so that the circulation through the uterine arteries will be cut off. While this is being done the nurse or attendant should be employed in getting hot water ready for a douche. As soon as this has been done, the obstetrician hands over the contracted uterus or the control of the aorta —whichever method of hæmostasis he is employing—to the nurse, and proceeds to sterilise his hands. This is a most necessary precaution, which should never be omitted, as these patients are very prone to infection, and the saving of a few ounces of blood by omitting the time required for sterilising the hands will be dearly purchased at the price of a dangerous illness or death from puerperal sepsis. When the hands have been washed in soap and water, rinsed in alcohol and immersed in 1 in 2,000 perchloride or biniodide solution, the whole hand is introduced into the uterus if it remains uncontracted, and all clots, fragments of membranes and placenta are rapidly removed. If the placenta is adherent in any part, it is peeled off the uterine wall with the *balls* of the fingers, never with the nails. The other hand should rest on the fundus externally, and should press down the uterus to meet the internal hand. If the uterus does not commence to contract as soon as these measures have been carried out, the clenched fist should be held in the fundus, and the other hand should keep up counter-pressure on the abdomen so as to compress the placental site and stop the bleeding. Under this treatment firm contraction of the uterus usually takes place. To hasten it the nurse may be directed to administer a hypodermic of Pituitrin (1 c.c.). Another method of controlling the uterus, which has the advantage of being more easily carried out, perhaps, is to place the clenched fist in the posterior fornix and to crowd the uterus down on it with the outside hand, for which the hands of an attendant may be substituted when fatigue sets in.

When the uterine muscle has begun to contract a hot douche, as near 120° F. as possible, should be given. Saline solution (drachm to the pint) is the best fluid, and a large double-current tube (Gibson's, Budin's or Bozemann's) should be used. The receptacle should not be at a greater height than 2 feet above the patient. The use of ice, ice-cold water, vinegar and Tr. Ferri Perchlor. is to be avoided. None of them is a better hæmostatic than the hot saline solution, and all of them are likely to be the cause of sepsis.

If the uterus refuses to remain contracted, and relaxation and bleeding recur in spite of thorough emptying of the cavity, massage and hot douches with the administration of Pituitrin, recourse must be had to a uterine pack, which, when properly applied, is an absolute hæmostatic. For this purpose gauze or bandages boiled in water for 5 minutes and then wrung out of drachm to the pint lysol solution may be used. The pieces of gauze or bandage should be firmly knotted or sewn together to make one long strip for ease in removal, and should be placed in a clean basin

which is held near the vulva by an attendant. The patient is in the cross-bed position, with the legs held up by straps or assistants. The cervix is seized with volsella and drawn down to the vulva, where it is held by an assistant. One end of the packing is then taken up with a pair of uterine dressing forceps and carried up to the fundus, which must be carefully and methodically packed. To insure this the left hand grasps the fundus through the abdominal wall, and the packing is done under its guidance. The pack may be left in for 24 hours, and its removal should be followed by a hot intra-uterine douche.

When the *uterus* is felt *firmly contracted and hæmorrhage is going on*, it is evident that the blood is coming from the lower genital passages, usually from a laceration of the perineum, vagina or cervix, or in rare cases from a ruptured varicose vein. The best method of stopping it is by suture. The patient is put in the cross-bed position, and her legs held apart. The perineum is examined first, and if the hæmorrhage is coming from it, silkworm gut sutures are introduced and tied (see under Perineum, Rupture of the). If the hæmorrhage comes from a ruptured vein, it will be seen on the inner surface of the labium, and a suture should be introduced deeply at each end of the rent and tied moderately tightly. If the blood is evidently coming from the vagina or cervix, the cervix should be seized with volsella and drawn down to the vulva, and any tear in it sutured with catgut, or silkworm gut if catgut is not available. The first suture should be introduced deeply *at* the apex of the tear, and the remaining sutures should take a deep bite of the cervical tissues. The cervix may then be released. If hæmorrhage still continues, either the cervical sutures were not properly placed or tied or the bleeding comes from a vaginal rent. To establish the diagnosis a Sims' speculum should be passed. If the blood comes from the cervical tear the sutures should be removed, reapplied and tied more firmly. If it comes from the vagina the tear should be sutured.

When the bleeding comes from a *fibroid tumour* in the wall of the uterus, the correct diagnosis will be arrived at when the hand is introduced into the cavity. In this case the uterus should be plugged as already described.

When the hæmorrhage is due to *inversion of the uterus*, absence of the fundus will be noted on abdominal palpation, and the hand in the vagina will recognise the presence of the tumour. An attempt should be made at immediate reposition by taxis. To effect this the neck of the inverted uterus is grasped with one hand and an endeavour made to reintroduce it through the cervical canal, which is steadied by the other hand on the abdomen. If replacement of the inversion can once be begun, taxis will probably succeed; if it does not, a further attempt may be made under full anæsthesia. That failing, recourse should be had to repositors, which keep up a steady elastic pressure on the inverted fundus.

Secondary Post-Partum Hæmorrhage.—When bleeding comes on more than 6 hours after delivery it is almost invariably due to a piece of retained placenta, and the uterine cavity should be explored at once, the fragment removed with fingers or curette, and an intra-uterine douche given.

General Treatment.—Though the first indication in post-partum hæmorrhage is to stop the bleeding, the practitioner must not overlook the treatment of the immediate collapse and the profound secondary anæmia which are the inevitable results of a considerable loss of blood. In the course of his manipulations for the checking of the flow of blood he should remember to keep the patient's head low and her pelvis and limbs elevated. A diffusible stimulant such as brandy, whiskey, Spt. Ammon. Aromat. or a hypodermic of ether, is called for in cases of syncope, and in such a condition it is often advisable if little blood is being lost at the moment to leave the uterus in the control of the nurse, and devote one's energies to rallying the patient. At the first available moment measures should be taken to replace the loss of fluid by saline transfusion either into a vein or under the breasts, by injections of ½ pint of saline every hour into the rectum, and by frequent sips of warm milk, beef juice or hot water. The saline transfusion in bad cases should be repeated in the course of an hour. To conserve the blood in the brain and viscera the legs may be elevated for 5 minutes and then bandaged firmly from the toes to the trunk (see also under Hæmorrhage and Collapse). During the convalescence a careful watch should be kept for symptoms of sepsis, to which the lowered vitality of the patient renders her specially susceptible. Abundant fluid nourishment should be given, and Iron in an easily digestible form must be administered for a long period (see under Anæmia).—R. J. J.

PUERPERAL MANIA.

As many cases of puerperal mania are due to sepsis, a careful search should be made in each case for such a cause, and the appropriate treatment instituted (see under Puerperal Fever). As regards the mental condition, there is no doubt that the best chance of the patient's complete recovery is given by removal to a special institution. The relations not unnaturally are often opposed to such a course, owing to the stigma attaching to one who has been an inmate in an asylum, and it is a matter for great regret that we have no properly equipped mental hospitals for the reception of acute mental cases with fair prospects of speedy and complete recovery such as these. The practitioner should use his best endeavours to overcome the reluctance of the relatives in the patient's own interests.

The care of a case of mania resolves itself into nursing and feeding. The patient must never be left alone even for a few minutes, as homicidal or suicidal tendencies may show themselves at any moment. Her own child is specially in danger from her, and should be removed entirely from her presence. Overfeeding must be carried out, if necessary through a nasal tube, and if firmness is shown at first the patient usually becomes quite docile and takes what she is given. Milk, eggs, soups and jellies may be given at first, and may be supplemented after a few days with more solid food.

No drug is of any avail in influencing the disease itself, but if sleeplessness is marked Sulphonal may be given in 20 to 40 gr. doses, or—

℞. *Paraldehydi* ℥j.
Pot. Brom. ℥j.
Aquæ Chlorof. ad ℥ij. *Misce.*

Fiat haustus, Hora somni sumendus.

An aperient is usually required at regular intervals.—R. J. J.

PURPURA.

As regards treatment. the best view to accept at the present time is that in the confused group of ailments labelled "purpura" many causal factors are probably at work of which the purpuric symptoms and signs are the chief manifestation, and since these factors are in most instances unknowable, treatment resolves itself into an attempt to alter or improve the blood condition and relieve the varied symptoms as they arise.

Septic foci, as in gonorrhœa, tonsillitis, caries of teeth, rheumatic infection, etc., should be looked for and dealt with. In the large group recognised by Osler as possibly anaphylactic, in persons sensitised for certain proteins, further research may demonstrate valuable preventive measures.

Simple Purpura (Purpura Simplex) occurs mainly in children, and usually without any arthritic manifestations; its natural tendency is towards resolution after a few weeks in bed. Rest in the horizontal position is an essential in the treatment of every variety of purpura, and its importance is demonstrated by the speedy return of the petechiæ in most cases on resuming the vertical position before the complete disappearance of the hæmorrhagic spots.

The diet in simple purpura, as in all the other forms, must be of the most digestible and nourishing kind, and every article liable to favour gastric and intestinal fermentation or decomposition must be avoided. Hence milk should largely enter into it, and in many cases an exclusive milk diet meets all requirements, supplying a large percentage of lime salts. Buttermilk, by supplying the lactic-acid-forming organisms, is especially indicated. Constipation must be guarded against by the occasional use of saline purgatives.

Drugs in simple purpura are seldom clearly indicated; the best routine will be 15 to 20 gr. doses of Calcium Chloride or Lactate; where these have been employed, the tendency is to award them the credit of a curative action, but, as already remarked, the natural tendency of the condition is towards resolution, and it is noteworthy that the symptoms are not likely to recur after the patient has been kept for a few weeks in the horizontal position even when drugs have been withheld.

Purpura Hæmorrhagica (Werlhof's Purpura, Land Scurvy or Morbus Maculosus), as its name implies, is characterised by a marked tendency towards hæmorrhage from the mucous and serous surfaces and into the planes of areolar tissue. Though the septic nature of this condition is highly probable, it affords no help in treatment, since we cannot do more than guess at the origin or site of the sepsis, and though an attempt might

be made to hasten the elimination of the toxin by stimulating the bowel, kidney or skin, the danger of powerful cathartics and diuretics is obvious where a tendency already exists towards intestinal and renal hæmorrhage.

The only available treatment in such cases is to increase the coagulability of the blood as rapidly as possible by the administration of such drugs as Calcium Salts in full doses. It has, however, been maintained by several authorities that this is useless, since the small vessels are always diseased in purpuric conditions. This should not deter the physician from attempting to save life by stopping the hæmorrhage by such means as he knows have often saved life—by lime salts when the bleeding has been due to the rupture of an internal vessel.

Gelatin sterilised and dissolved in water or saline solution (40 grs. in 5 oz.) may be injected into the deep tissue of the buttock; 10 oz. of a 10 per cent. solution may be injected into the rectum, or gelatin in the form of a flavoured jelly may be freely given by the mouth, and is undoubtedly advantageous in bleeding from the gastro-intestinal tract.

Adrenalin Chloride solution has been indiscriminately employed in this condition. Whilst the liquid may be advantageously applied to a bleeding spot, as on the gums, mouth or interior of the nose, or swallowed when the hæmorrhage is proceeding from the stomach, its internal administration can only do harm in severe hæmorrhage in other regions by raising the blood-pressure and increasing the tendency towards escape from the vessels. When these drugs fail, others may still be resorted to upon purely empiric grounds. Turpentine has been largely employed; it may be given in 10-min. capsules every 3 or 4 hours, and sometimes appears to exert a marked hæmostatic action.

Antipyrine and Nitrate of Silver internally have been extolled as possessing powerful action over the internal hæmorrhages in this and other forms of purpura.

Whatever difference of opinion may exist about the value of these empiric agents, there should be none as regards the worthlessness of such drugs as tannin, ergot, alum, lead salts, and all other vegetable and mineral astringents.

Some striking results have been reported from the employment of large doses of Polyvalent Antistreptococcic Serum administered by the rectum in hæmorrhagic and other forms of purpura; 30 c.c. may be injected, and repeated daily in half this dose.

The loss of blood will require in some cases large doses of Normal Saline by the skin, bowel or veins, and it should be kept in mind that this treatment dilutes the toxin in the blood and therefore does good even when the amount of hæmorrhage has been small.

Iron and Arsenic are always clearly indicated in the after-treatment, and some experienced observers consider that Chlorate of Potash added to the tincture of the perchloride of iron possesses almost a specific action. The following routine may be administered in all cases of purpura of mild type:

℞ *Tr. Ferri Perchlor.* ℥iv.
Potassii Chloratis ℥j.
Glycerini ℥j.
Aquæ Chlorof. ad ℥viij. *Misce.*

Fiat mistura. Cpt. ℥ss. *ter die ex aquâ post cib.*

Blood Transfusion is clearly indicated, but with the hæmorrhagic tendency there are obvious difficulties in carrying it out. In desperate cases the procedure successfully inaugurated by Emsheimer may be resorted to. He injected deeply into the gluteal region 20 c.c. of fresh whole human blood with highly satisfactory results. Tissue Extract, prepared by Hess from fresh brain, liver or placenta, promises to be of value in increasing the coagulability of the blood when injected into the veins. Coagulene, a substance prepared from mammalian blood-platelets, has been injected intravenously by Fonio; 20 c.c. of a 5 per cent. solution may be administered.

Purpura Rheumatica (Schönlein's Disease, Peliosis Rheumatica).—The very close relationship of this type of purpura with acute articular rheumatism would at once lead one to expect that Salicylates should prove valuable, but though clearly indicated for the primary disease they exercise little if any action upon the state of the blood and the extent of the extravasations.

Whilst the anti-rheumatic treatment is being pursued and the patient is kept at absolute rest in bed little else as a rule need be done, since, like simple purpura, this type of the condition tends naturally to resolve itself. Should, however, the extravasations become formidable or bleeding occur from the mucous or serous surfaces, Calcium Chloride should be freely given. This drug has a very decided influence on the group of rheumatic cases which has been styled *Purpura Urticans*, and in which extensive wheals or urticarious and erythematous skin lesions complicate the cutaneous eruption, as in the next variety to be mentioned. The rational treatment of rheumatic purpura would be a vaccine obtained from the tonsil, blood or arthritic lesions; the Antistreptococcic Rheumatism Vaccine, as prepared at the Wimpole Institute, might be employed in an initial dose of 10,000,000 organisms, or Polyvalent Antistreptococcic serum given by the rectum.

Henoch's Purpura, in addition to the symmetrical petechiæ and arthritic manifestation, is always associated with marked gastro-intestinal symptoms and erythematous or urticarious eruptions. As the pathology of this type is allied to that of the rheumatic variety of purpura, Salicylates are clearly indicated in the presence of joint pain and swelling.

The presence of intense intestinal irritation points to the probable source of the toxin being in the bowel, and hence most authorities lay stress upon the importance of intestinal antiseptics like Calomel and Turpentine Oil, but unfortunately, owing to the frequent complication of grave nephritis, such treatment cannot be pushed without serious danger. Saline purga-

tives and flushing of the colon with Normal Saline solution and the free administration of Calcium Chloride and Gelatin by the mouth are not open to objection. In all serious cases Saline solution should be given in large amounts by the hypodermic or intravenous methods, and the presence of nephritis and of angio-neurotic œdema is no contra-indication to free saline treatment.

Uræmic symptoms must be met by the hot pack and other agents indicated in the treatment of acute Bright's disease. Polyvalent Anti-streptococcic Serum may be given by the rectum.

The long duration covered by the frequent recurrences of the attacks supplies a rich field for the treatment of various symptoms; the condition of the heart must be closely watched, and Strychnine administered hypodermically as soon as signs of cardiac failure show themselves.

PYÆMIA.

Under the popular and misleading name of " Blood Poisoning " several septic conditions are included, as *Sapræmia, Septicæmia,* and *Pyæmia.* The treatment of these are best dealt with in a single article, since the minor degree of septic intoxication—sapræmia—may easily pass into the more serious condition recognised as septicæmia, and this in its turn may sometimes terminate in the grave form of pyæmia, though each condition may appear and remain throughout clinically as a characteristic entity with the same causal pyogenic organisms present in all three.

Accepting Sapræmia as the form of septic intoxication which ensues when pyogenic organisms multiply in a wound or other local focus of infection and remain outside the blood-stream, the soluble toxins only being absorbed, the indications for treatment are obvious. The wound should be opened up and the most thorough irrigation by mild antiseptics carried out. As in dealing with the more serious types of septic infection, the more freely the incisions are made the better; partial curetting or aspiration should be avoided as tending towards the danger of converting a comparatively innocent infection into one in which the pyogenic organisms obtain an entrance through the open mouths of vessels injured by ineffectual scraping. The antiseptics employed should for similar reasons be such as will not destroy the healthy tissues or retard phagocytosis. A warm saturated solution of Boric Acid or a flushing of the septic area by Hydrogen Peroxide meets all the requirements, and the freest drainage must be provided for.

In the chronic form of sapræmia recognised as *Hectic Fever* the indications are similar—the septic area should be opened up freely and the most efficient drainage established when this is possible. In some cases, especially in those of tuberculous origin, the only procedure available may be to amputate the part in which the diseased process is going on in preference to attempting partial or conservative surgical operations.

A recognition of the pathology of sapræmia is essential in the satisfactory treatment of the condition. The symptoms being the result of the absorption of the chemical or unorganised toxins, as in alkaloidal or

ptomaine poisoning, eliminatory agents are always useful. Saline purgatives to flush out the bowel and diaphoretics and diuretics to expedite the elimination of the toxins by the kidney and skin are clearly indicated. The ineffectual attempts of nature in this direction should be assisted and not thwarted by the surgeon, unless such should become so excessive as to endanger the life of the patient, as exhausting diarrhœa or profuse sweating. No advantage follows the routine administration of antipyretics in septic states with the view of continuously depressing the body temperature. When this reaches a height dangerous to life the wet pack may be employed, but such is rarely necessary. The objections to the newer antipyretics do not maintain as regards Quinine, which, owing to its tonic and possibly to its restorative properties, may be freely given in all septic states. The Tincture of the Perchloride of Iron still holds a high position in the internal treatment of the various types of septic poisoning, and it may be safely combined as a routine with Quinine.

From what we know of the effects of muscular exertion in raising the temperature of phthisical patients, due apparently to the lowering of resisting power to infection, the most complete bodily rest in bed is essential in all forms of septic poisoning.

The diet should be such as will permit of the least labour being thrown on the digestive organs, already weakened by the action of the toxins, and it should at the same time be such as will encourage elimination by the skin, kidney and bowel; hence a purely liquid diet is indicated with abundance of diluent drinks.

Symptomatic treatment will consist in the administration of such agents as will antagonise the effects of the toxins on the different organs. Thus vomiting may be relieved by gastric sedatives, ice and effervescing drinks; profuse diarrhœa must be controlled by astringents when it becomes exhausting, but little good can be expected in this latter case by drenching the patient with the usual vegetable and mineral astringents, which arrest gastric digestion and never reach the intestine. Tannalbin, Tannigen, Tannoform and Tannocol in 10-gr. doses in cachets all pass unchanged through the stomach and exert their local astringent action upon the bowel without upsetting digestion, and any of these drugs may be combined with a small amount of Opium to check increased peristalsis. Cardiac weakness should be met by Pituitrin or Strychnine hypodermically.

Exhaustive sweating may be checked by any of the agents employed for the relief of the night-sweats of phthisis as detailed under Phthisis.

Normal Saline solution is an agent of great value in the treatment of all forms of sepsis, since by its employment the mass of the blood may be increased and the deleterious influence of the toxins diminished temporarily at least. Whilst the rational ideal should be to first perform free venesection in order to "wash" the blood, this unfortunately is generally contra-indicated in sepsis unless in acute cases occurring in sthenic subjects. The saline may be given hypodermically by the bowel or by the veins.

As in the graver forms of septic poisoning the action of the toxins, apart

from bacteriæmia, is invariably present, the applications of the above principle of treatment apply to both septicæmia and pyæmia.

Where infection seems to be arising solely or mainly from a single focus, either in the wound or in the lymphatic glands draining the area, it may be advisable to remove by excision either the wound or the glands.

Septicæmia, though theoretically recognised as that form of septic poisoning in which the pyogenic organisms have found their way into the blood and internal organs, is nevertheless clinically identical with severe sapræmia, since the symptoms are mainly those of poisoning by the toxins. Septicæmia may be identified by finding the infecting micro-organism on culture of the urine or in the blood itself. But the important pathological difference must be always kept in mind—in sapræmia the constitutional signs and symptoms of poisoning pass off rapidly on the removal of the local site containing the microbes, whilst in septicæmia the general infection and continuous production of further quantities of toxins may continue even after amputation of the entire limb in which the original focus of infection was situated.

Nevertheless in every case the primary lesion should be freely dealt with when possible, as in sapræmia, in order to minimise the dose of the toxins. The treatment must be mainly symptomatic and carried out on the lines already detailed, the aim of the surgeon being to assist elimination of the toxins, maintain the strength of the patient, and to dilute the poison by the introduction of large quantities of Normal Saline into the blood-stream, whilst each symptom is met by its appropriate indication.

Wernitz states that the change observed in desperate cases of sepsis treated by rectal injections of Saline is almost incredible, as seen in acute puerperal sepsis, in the summer diarrhœa of children, in typhoid fever, malignant scarlatina and plague. His technique is to start with lavage of the entire colon for 1½ hours, after which the saline is made to trickle into the bowel for about an hour at a time, during which 35 oz. will be absorbed, and this is to be repeated every 2 or 3 hours; the effects are much more satisfactory, he thinks, than when the fluid is put into the veins.

Serum Treatment cannot be said to have held its own in this serious condition; one thing, however, must be said in its favour—that it may safely be regarded as harmless if it fails to do good. The routine method is to inject 30 c.c. of Polyvalent Antistreptococcic Serum and repeat the dose daily or inject 10 c.c. every sixth hour.

Vaccine Treatment.—The above remarks do not apply to the method of using a *vaccine* prepared from a culture of the causal streptococcal organism, and in this lies the future hope of the successful treatment of septicæmia. Many authorities explain the fact that when improvement unmistakably follows the administration of the serum this only occurs when the latter accidentally functions as a vaccine. The dose of the Wimpole Institute vaccine consists of 10,000,000 organisms, but the best procedure is immediately to administer a full dose of antistreptococcal serum or a dose of the above vaccine whilst an autogenous vaccine is being prepared from the patient's blood or tissues.

Pyæmia.—In this type of septic infection not only have the organisms gained free access to the blood, but metastatic deposits occur in various regions, and these continue by multiplication of their cocci and the production of toxins to still further poison the organs and tissues of the body.

The indications for treatment are those already detailed; though the general infection has already been established, it is nevertheless imperative that the primary focus should be prevented from supplying further streams of the *Streptococcus pyogenes* to the circulating fluid. A radical operation should be undertaken in every case in preference to a partial one for the removal of the tissue in which the disease has started.

As the infective process spreads by the breaking down of septic emboli in thrombosed veins, starting usually in the neighbourhood of the primary focus, it is obvious that the best procedure is amputation in such conditions as compound comminuted fractures. In lateral sinus thrombosis or phlebitis in association with ear disease an attempt should be made to prevent the further sweeping onwards of septic emboli by tying the internal jugular vein, and sometimes good results have been obtained by ligaturing the main vein of a limb when amputation is impracticable.

An autogenous vaccine should be prepared without delay from the blood or from one of the metastatic abscesses and the killed organisms (the dose depending on the microbe) injected.

All metastatic or secondary abscesses should be freely incised and drained as soon as detected.

The symptomatic treatment should be conducted upon the lines laid down for the management of sapræmia and septicæmia; free alcoholic stimulation is always necessary, and during the severe rigors a moderate dose of whiskey made into punch by boiling water often affords prompt relief. Quinine is always clearly indicated, and may be freely given in 5-gr. doses. If combined with 15-min. doses of Tinct. Ferri Perchlor., the best routine drug treatment will be secured.

℞ *Tr. Ferri Perchlor.* ℥iv.
Quininæ Sulphatis gr. lxxx.
Potassii Chloratis ℥j.
Glycerini Purif. ℥j.
Aquæ Chloroformi ad ℥viij. *Misce.*

Ft. mistura. Cpt. ℥ss. *ex* ℥ij. *aquæ quater in die.*

Many authorities recommend intravenous injections of antiseptic substances, and Collargol has been advocated by Credé, and 10 c.c. of a 1 per cent. solution may be injected without danger into the main vein in the forearm. Eusol and Dakin's solution have both been used. Whilst they may be introduced into the blood-stream with safety, their curative results have not been established.

The administration of various antiseptics by the mouth has not given the results which theory had led the earlier observers to expect, since it is impossible to saturate the blood to such an extent as will destroy the

cocci without killing the patient. Creosote seems to be the safest drug to employ in this way, and 10 to 15 mins. daily may be administered in the form of capsules.

Normal Saline solution should always be freely resorted to, and is obviously of most use when injected directly into the veins, but preliminary venesection is contra-indicated in a disease associated with such extreme prostration and adynamic symptoms. For similar reasons assiduous feeding by strong soups and other liquid foods is of primary importance.

In the chronic stages of pyæmia, should the patient survive the acute phase, open-air treatment and removal to the pure atmosphere of a seaside resort should be insisted upon.

Obviously little need be said about *preventive* measures, since the importance of asepsis in every case where the continuity of the skin has been broken is now universally recognised. In the case of compound fractures where disinfection of the skin wound is difficult or impossible and in all deep punctured wounds the application of Klapp's or Bier's congestion method is useful in order to flush the injured tissues with a stream of healthy immunising lymph. Wright carries out the same principle by irrigating the injured tissues with a Citrated Hypertonic Salt solution (5 parts of chloride of sodium and half a part of sodium citrate dissolved in 100 of boiling water).

The writer has had extensive experience in the surgical wards before the advent of Listerism, when septic poisoning and pyæmia were almost daily results, and he was satisfied about the preventive value of large doses of Iron administered for some days before operations of all kinds.

To prevent a sapræmia passing into a septicæmia or pyæmia, as sometimes occurs in erysipelas and puerperal septic intoxication, is an important matter. This may usually be accomplished by vaccine treatment, and in the absence of an autogenous killed culture large doses of Polyvalent Antistreptococcic Serum may be tried. The free and speedy evacuation of all purulent collections, the establishment of abundant drainage and the gentlest manipulation of compound fractures are essentials in carrying out preventive treatment of pyæmia in sapræmia and septicæmia.

PYELITIS AND PYELONEPHRITIS.

When inflammation of a suppurative type is confined to the pelvis of the kidney or the calyces, the term "pyelitis" is applied, but more frequently the renal parenchyma is involved, this condition being recognised in the term Pyelonephritis, and often both conditions exist together.

It may be accepted that all forms of pyelitis or of pyelonephritis must be regarded as of septic or infective origin, and this bears directly upon the treatment problem. The microbes may be deposited from the blood; this hæmatogenous type really as regards treatment falls under the lines laid down in the immediately preceding article on Pyæmia, and in this variety of renal suppuration the pelvis of the kidney rarely suffers to any extent, unless some obstructive condition coexists with the infection.

The organisms, however, usually reach the kidney from the bladder or lower urinary tract, travelling along the lymphatics of the ureter and not mounting against the downward current of the urine unless there be almost complete obstruction to the free passage of the urine towards the bladder, as demonstrated by the experimental researches of Eisendrath and Schultz. It is with this latter or urogenous type, which always at first affects the pelvis and calyces of the kidney, that the present article mainly deals.

From the above considerations it becomes the first duty of the surgeon to make a search for the primary cause as soon as the characters of the urine and the symptoms demonstrate the advent of pyelitis, for until the source of infection has been dealt with little can be accomplished successfully in the way of treatment. Thus calculi, enlarged prostate, growths in the bladder, urethral affections and suppurative conditions of the testicle must be dealt with when present. The most frequent of all causes is the use of a septic catheter for the relief of retention of urine, the pyogenic organisms being directly introduced into the bladder on the instrument: a cystitis follows which eventuates in a suppurative pyelitis, and if neglected this is very liable to terminate in pyelonephritis with suppurative destruction of one or both kidneys.

The removal of the cause of the obstructed flow with free irrigation of the diseased bladder by saturated Boric Acid solution and the internal use of antiseptics afford the only chance of cutting short the suppurative inflammation of the renal pelvis.

A well-marked type of pyelitis is not uncommonly met with in which no breach of surface in the urinary tract is found. The form of *Bacillus coli* infection usually met with in children is the most important variety of this type. Without discussing the route by which the bacillus finds its way into the urinary system, whether by the blood or the urethra, the duty of the physician is to disinfect and flush out the urinary tract. Thomson has shown that the urine is always *acid* in these cases, and by the administration of full doses of alkalies as the Citrate of Potassium (20 grs. *ter die*) the growth of the bacilli is rapidly inhibited, and the fever, increased frequency of micturition, pus in the urine and other symptoms soon subside as the secretion becomes alkaline under the influence of the drug. Normal saline by the bowel or hypodermically further aids recovery by flushing the urinary tract.

Contrary to theoretical considerations, the writer has frequently found the combination of Hexamine with an alkali do well, where both had failed when used separately.

The *pyelitis of pregnancy* is of the same nature, but unlike the infection in children it often fails to respond to simple alkalies alone. Urotropine 10 grs., or other urinary antiseptics as New Urotropine (Helmitol) 20 grs., Cystopurin 20 grs., Hetralin 20 grs. or Creosote 3 mins. should be employed. Hanna Thomson points out that Urotropine, if given in combination with Sodium Benzoate, never causes irritation about the neck of the bladder, and always proves effectual in ridding the urinary tract of the bacilli. Abundant

demulcent draughts or copious libations of weak alkaline waters, as effervescing Potash Water or Vichy, and the free injection of Normal Saline solution should also be employed to wash out the genito-urinary system.

In chronic cases of *Bacillus coli* pyelitis or cystitis resort should be had to Vaccine treatment; an autogenous culture should be made, and 200,000,000 of the killed organisms should be deeply injected into the buttock at least once a week. The Anti-Bacillus Coli Serum (20 c.c.) may be injected in acute cases till a culture is made ready from the bacilli obtained from the urine, and some surgeons combine the serum and vaccine treatments in the same patient.

Kretschmer and Gaarde employ Lavage of the pelvis of the kidney through a ureteral catheter used through a cystoscope, by a 1 per cent. Nitrate of Silver Solution, using 5-7 c.c.; at the same time alternating the reaction of the urine by the administration of Alkalies and Acid Sodium Phosphate combined with Urotropine, an autogenous vaccine being also injected.

Typhoid Fever Pyelitis must be treated on the above lines, and usually yields to full doses of Urotropine, which cause the typhoid bacillus to disappear from the urine.

The simple inflammation of the renal pelvis which follows the administration of such drugs as cantharides, copaiba, turpentine, etc., as a rule rapidly subsides on the suspension of the irritating diuretic and the free use of weak alkaline and demulcent draughts.

All chronic cases of pyelitis not yielding to the above internal antiseptic treatment fall into the operative group. Some surgeons, however, before resorting to nephrotomy or nephrectomy wash out the renal pelvis through the ureter by a catheter passed through the bladder, and then inject weak Perchloride of Mercury or Nitrate of Silver solution.

The class of case requiring operation is usually one which, beginning in an infective cystitis, invades the renal pelvis and finally ends in a pyelonephritis on one side. This is often described as an Ascending Suppurative Nephritis or case of Surgical Kidney. Calculous Pyelitis, which is dealt with under Stone in the Kidney, and the so-called Strumous Pyelitis, which is a chronic tuberculous condition of the kidney, Pyonephrosis and Hydronephrosis also belong to the same category.

The surgeon, after satisfying himself by ureteral catheterisation, phloridzin administration, freezing of the blood, or by Wright's method, that the integrity of the opposite organ is safe, proceeds to perform *nephrotomy* by making an incision in the lumbar region, exposing the diseased organ, which is then freely incised and explored and any calculi present removed; it is then flushed out with warm saline solution, the wound in the kidney closed, and thorough drainage established.

Nephrectomy or entire removal of the diseased kidney is decided upon in acute cases where the organ is hopelessly invaded; the operation usually is a sequel to the preliminary nephrotomy made through the loin incision, and affords in many cases of acute infective pyelonephritis the only hope of saving life.

PYONEPHROSIS.

In this condition there is added to the infective pyelitis and pyelonephritis an obstruction of the ureter more or less complete which prevents the discharge of the pus into the bladder. Though complete obstruction existed, the purulent contents of the sac or renal tumour have been known to dry up, and become inspissated and shrivelled so as to form a harmless membranous bag. It is nevertheless unwise to count upon such a possibility owing to the risks of general sepsis or of the rupture of the sac, and operative interference should not be delayed.

A free incision having been made in the loin (as for nephrolithotomy) from the outer edge of the erector spinæ extending downwards and forwards to the anterior superior iliac spine, the kidney is freely exposed and incised so as to permit free evacuation of the collected pus. The finger is thrust into the renal pelvis and the entire organ carefully palpated for calculi, which, if present, should be removed through the incised wound in the organ. A sound is passed down the entrance to the ureter, and if a stone is found there it may be displaced upwards by manipulation and removed through the renal pelvis. The suppurating cavity in the interior of the kidney is next freely irrigated by hot Boric Solution, dusted with Iodoform and thoroughly drained. Should the kidney be found extensively destroyed by the pressure of the purulent secretion, nephrectomy is certainly preferable to nephrotomy, and when the sac fails to shrivel and the pus continues to be secreted after the operation of nephrotomy, the major operation should be resorted to and the diseased sac entirely removed, provided the opposite kidney is able to function sufficiently. In some cases it may be necessary to perform a double nephrotomy and drain both kidneys from the loin. Under Hydronephrosis the treatment of non-purulent collections of fluid in the kidney caused by obstruction of the ureter is detailed.

PYOPNEUMOTHORAX.

The treatment of pus and air in the plural cavity will be that indicated in empyema (Pyothorax), and can only be carried out successfully by evacuation of the pus through a free incision between the ribs, with in most instances the necessary removal of portions of the latter and the establishment of thorough drainage.

PYORRHŒA ALVEOLARIS.

In all advanced cases it is useless to attempt the saving of the tooth, which should be extracted; this, moreover, will give freer admittance of remedial agents to the neighbouring sockets which are beginning to be invaded by the microbes.

The involved tooth must be stripped for its entire length of its tartar and a strong antiseptic, as concentrated Carbolic Acid solution or Tincture of Iodine in minute quantity, should be applied to its surface on a little

cotton-wool on the point of a fine probe; this will work its way between the diseased gum and the tooth. The most absolute cleanliness is essential, and one of the best cleansers is a little lemon-juice brushed with cotton-wool or lint over the swollen gum at its junction with the tooth. Peroxide of Hydrogen is much recommended, but the writer has recently obtained better results by the application with a soft damp toothbrush of Perborate of Sodium in powder; this gives off free hydrogen peroxide, and the resulting borax solution is also a good cleanser of the mouth.

Where pockets exist these must be reached by whatever antiseptic is employed by injecting it with a fine syringe, and free drainage should be provided. It will often be necessary to excise the tag of gum tissue with the scalpel so as to obliterate the pocket. Whittles claims that the disease is curable by the application of Protargol in glycerin on the electrode of a primary interrupted current. All local treatment is, however, highly unsatisfactory in most cases, and some authorities strongly advocate Vaccine treatment. The vaccine, according to Goadby, should be prepared from whatever microbe to which the patient's blood exhibits an abnormal opsonic index. The casual microbe has not yet been demonstrated. Kolle claims the discovery of a specific spirochæte, and he states marked improvement follows a single intravenous injection of Neosalvarsan, while two doses of 0·3 grm. cured the disease in ten days in several cases.

Preventive treatment affords the only hope of successfully dealing with all septic conditions of the mouth, and as the importance of oral sepsis is becoming more clearly recognised as a factor in many grave blood and stomach diseases, systematic and patient cleansing of the teeth, gums and mouth will alone prevent the advent of dental caries and of pyorrhœa.

PYO-SALPINX—see under Pelvic Inflammation.

RANULA.

A free incision should be made under cocaine through the bluish mucous covering of the cyst, and its walls as far as possible dissected out. Often a considerable portion of the sac cannot be removed, in which case the wall which is left should be scraped, dried and swabbed with a 1 in 12 solution of Chloride of Zinc, strong Tincture of Iodine or pure Carbolic Acid, after which the cavity must be firmly packed with Iodoform gauze and permitted to granulate from the bottom.

Hyoid cysts bulging into the floor of the mouth are best treated by a free dissection carried out through the skin of the neck below the chin, and this route is sometimes selected for the removal of large sublingual ranulæ.

When a ranula is met with in its very early stage it may be successfully dealt with by snipping out with a scissors a small window-like piece of mucous membrane, including cyst wall, swabbing the interior with dry wool, and leaving in for a day a plug soaked in equal parts Weak Tincture

and Strong Tincture of Iodine, after which the cavity may be allowed to heal up naturally without further packing.

A minute seton of horsehair is often sufficient to secure the withering up of a small ranula.

RAYNAUD'S DISEASE.

Much may be done to prevent the seizures by keeping the patient in a uniformly warm atmosphere, hence in all severe types of the disorder, when means permit, removal to a warm equable climate for the winter should be recommended. Body clothing is of importance; woollen garments alone should be worn next the skin, thick woollen stockings, heavy-soled boots and knitted wool or loose fur-lined gloves should be worn when the patient ventures out in the open air in cold weather. In severe frost he had better keep indoors entirely when possible.

As an attack may at any time be brought on by washing the hands in cold water, this must never be used for ablution; warm but not hot water should always be employed. Gentle Massage of the limbs and Swedish movements or regulated exercises should be carried out in cold weather when the patient is unable to take walking. The diet should be liberal, and in lean subjects animal fats may be freely used. As probably the attacks are of toxic origin, the eliminatory organs should be kept in an active state, and this may be assisted by a generous use of liquid articles of diet and an occasional saline purgative.

Drug treatment should consist in the administration of tonics and Cod-Liver Oil, and in the exhibition of agents which tend to correct any underlying condition with which the affection is sometimes found to be associated. Thus in malarial patients Quinine may be freely prescribed, and in syphilitic subjects large doses of Iodides are clearly indicated, and anæmic individuals should be saturated by a non-astringent Iron preparation.

During an attack of local asphyxia (dead fingers) the parts should be gently rubbed and enveloped in a layer of wool. Barlow recommends Galvanism. He immerses the affected limb in a vessel of tepid salt solution, and drops one pole of a constant-current battery into the liquid and places the other pole in contact with the skin of the limb above the water level, using as strong a current as the patient can bear with frequent breaks of contact, the patient being also directed to make voluntary movements with his fingers or toes. In chronic cases shampooing and Swedish movements are added to this method.

When the pain is excessive Opium will be indicated internally, but Antipyrine, Aspirin and Indian Hemp may first be tried. One large dose of Alcohol in hot water is also efficacious, but for obvious reasons should only be resorted to very occasionally. Vaso-constrictors and vaso-dilators have been tried with but little success, but the plan of interrupting the circulation by applying a tourniquet for a couple of minutes to the affected limb in order to arrest the vaso-motor mechanism for two or three times daily has been followed by good results.

Gangrene, which is liable to occur and involve the pads of the fingers and toes or the ears, must be met by the appropriate surgical measures mentioned under Gangrene.

The treatment of the somewhat allied condition known as Erythromelalgia or Red Neuralgia must be carried out on the same lines, but when the pain of the attack is at its height during the acme of the bright redness, the local application of cold water affords considerable relief. An important point in the treatment is absolute rest in the horizontal position and elevation of the affected limb. Sometimes this strange affection occurs in patients subject to attacks of Raynaud's disease.

RECTUM, Cancer of—see under Cancer.

RECTUM, Inflammation of—see Proctitis.

RECTUM, Ulceration of—see under Proctitis.

RELAPSING OR FAMINE FEVER.

This disease is associated with starvation, over-crowding, and bad ventilation, hence the preventive indications are obvious. Though distinct from typhus, its management may be briefly described as that which would be suitable in a smart attack of that fever occurring in a broken-down patient; in some epidemics both diseases may be found side by side.

Abundance of liquid and easily digested food, administered *cautiously at first*: Alcoholic stimulants, to be given as indicated by the pulse and collapse; Quinine, for the high temperature; and continued rest in bed after the fall in the fever, and the steady administration of every sustaining agent, so that, if relapse occurs, the patient may be well prepared for the further drain upon his vital powers, were generally all that could be done to tide the patient over the attack.

The drug treatment of this disease has hitherto proved a failure; no drug has been known which produced a lethal action on the spirochæte, but the remarkable effect of a single injection of Salvarsan has introduced a new era in therapeutics, and by the use of this agent the disease can be speedily and effectually cured by injections as in the treatment of syphilis. Brunor has had equally brilliant success with Galyl in 0·4 grm. doses by the veins; similar results are obtainable from Sudyl; these are arsenical compounds analogous to salvarsan.

RETENTION OF URINE.

Before treatment can be undertaken the surgeon must differentiate carefully between suppression and retention, and he should endeavour to find out the cause of the retention, which is but a symptom or result of several distinct diseased conditions, as atony of the bladder or more commonly obstruction in the urethra from reflex spasm, stricture, enlarged prostate, calculi, inflammatory swelling or spinal disease.

There is perhaps no condition in which the novice is so liable to make a grave mistake—a mistake which is also not infrequently committed

by the careless though experienced practitioner. This consists in overlooking the serious condition, in which after a paralytic distension of the bladder from retention the dribbling overflow of the greatly distended organ is regarded as a simple incontinence of urine. The error is most likely to occur in the profound toxæmia of long-continued fevers, where it may be the cause of death.

The history of each case will almost always give the clue to the cause and nature of the retention. Thus in a patient in advanced life with a history of failing power in emptying the bladder, and in the absence of a history of stricture, enlargement of the prostate is almost certain. Here, as already mentioned under Prostate, Enlargement of (p. 787), the surgeon should attempt to pass a soft vulcanised rubber instrument of the size of about 12 (English). The catheter should not be passed till the patient has been placed in a hot bath, and often micturition occurs in hospital cases especially after 20 or 30 minutes in the bath. When the rubber instrument fails, a rare event, the gum elastic or French coudé may be tried. The writer, after failing with the rubber, generally finds that a large-curved silver instrument is the best in acute cases. With skill and *confidence* this will seldom fail in entering the bladder. The novice is almost certain to try the smaller sizes, but a No. 10 (English) long silver prostatic catheter with a wide curve is a good instrument.

The catheter must be rendered aseptic inside and out, and it should be well lubricated with sterile vaseline or K.Y. Jelly; the greatest patience and gentleness are essential, and sometimes the introduction of the left index-finger into the rectum will greatly assist, but force of any kind is never justified.

The silver instrument should be slowly introduced with its beak pressing against the floor of the urethra till the penile portion of the urethra is traversed in order to avoid catching the extremity of the instrument in the lacunæ of the ceiling of the passage; the operator's hand being depressed as the prostatic urethra is reached, the openings in the floor of the passage are similarly avoided. In old prostatic cases the introduction of the metal catheter is usually facilitated by placing the patient in the upright position, but this should never be attempted after prolonged submersion in a hot bath owing to the danger of syncope. Where there has been much residual urine present before the retention has set in some warm saline or boric solution should be injected to avoid the danger of collapse, and the flow from the catheter should be rendered as slow as possible for the same reason, the urine being only partially removed at first by permitting 10 or 15 oz. to flow, when the catheter left *in situ* may be plugged for half an hour or more before removing the entire contents.

Where the difficulty of introducing an instrument is very great, especially when some previous operator has succeeded in making a number of false passages, it will be necessary after its introduction to tie in the instrument for a time (the tying in of a silver catheter is, when *possible*, to be avoided).

When the passage of an instrument is impossible after reasonable

patience has been exercised, and where the patient urgently requires relief, his bladder may be tapped by the aspirator above the pubes—a simple and safe operation, owing to the distension of the bladder—after which often a rubber catheter can be passed through the urethra and tied in for several days: or the bladder may be tapped above the pubes by a curved trochar and canula, the latter being left *in situ*; a long rubber catheter or tube is passed through it, and the urine is continuously siphoned off into a vessel beneath the patient's bed. (See under Prostate, Enlargement of.)

In retention from organic stricture of the urethra, it is necessary to keep in mind the pathology of the affection. In this lies the secret of successful treatment. A few hours before the attack of retention probably the patient passed his urine freely, though in a small stream. The element of *spasm* and *swelling* of the urethral mucous membrane from some recent chill or irritant becomes superadded to the organic narrowing, and affords the explanation of the sudden blocking up of the urethra.

A *hot* bath and a full opiate before resorting to the use of the catheter should be administered; sometimes the patient will be able to pass his urine in the bath.

After the failure of these the patient should be put to bed, and a No. 1 or 2 gum-elastic instrument without a stilet should be passed down to the stricture, if necessary under chloroform anæsthesia, and with patience and gentleness it may be coaxed through. After the opening up of the anterior portion of the stricture the writer has often succeeded in passing through a No. ½ or a No. 0. Where these fail a No. 1 silver catheter may be tried, but in inexperienced and rough hands this is a dangerous instrument, as every hospital house surgeon knows. When the bladder is entered and the urine drawn off, the instrument should be tied in, and the greater the difficulty experienced in passing it, the more reason is there for tying in the catheter, so as to avoid further irritation when the bladder again fills. After a few days a larger instrument may be passed and tied in, and the routine treatment for stricture may be then commenced.

It will frequently happen that no hollow instrument will pass through a stricture. Before resorting to aspiration or operative measures trial should be made of filiform bougies of various shapes, bent, curved, angled, etc. If one of these can be coaxed through the narrows and tied in it will allow of the slow discharge of urine by its side. At the same time general treatment, such as an opiate, aperient, hot bath, and other measures are adopted. The patient after relieving himself temporarily from time to time will ultimately empty the bladder. Should the filiform bougie be also a guide to an internal urethrotome, it may *next day* be used for the introduction of this instrument and internal urethrotomy performed.

Where the bladder cannot be relieved by the urethral route, it may be punctured with the aspirator needle above the pubes, or a suprapubic opening may be made by a long curved trochar and canula, which may be retained for a few days or the operation of Cock or Wheelhouse may be performed. (See under Stricture of the Urethra, Urinary Fistula, etc.)

If the retention is caused by a small impacted calculus this should be removed by suitable forceps, or if too close to the bladder, a gum-elastic or silver catheter may be gently worked past it, when steps can afterwards be undertaken for its removal. Where the gentlest possible trial of the forceps fails, there is nothing left but to cut down in the middle line upon the calculus; where the blocking is situated in the penile urethra it is best to manipulate the stone backwards into the membranous urethra, from which it can be extracted by a median perineal incision. Where this fails the penile urethra should be freely divided with a sharp knife, and when the stone is extracted the lips of the urethral wound should be neatly stitched over a soft catheter, which should then be left *in situ* for a few days.

The so-called spasmodic stricture has generally an organic basis, there being nearly always some slight structural narrowing on which the spasm is grafted. It yields to the hot bath and opium, or to the passage of a fair-sized catheter. The retention caused by reflex spasm following operations yields easily to the passage of a full-sized rubber instrument, and this is true also of the retention from atony of the bladder and spinal paralysis, and of the form of retention occurring after a large dose of morphia or in fevers.

Where swelling or inflammation of the urethra, as in gonorrhœa, is the cause of retention, a very *hot* bath and a warm urethral injection of distilled water, or a drachm of cocaine solution (5 per cent.), with a smart Saline purge, and if necessary leeching the anterior portion of the perineum, may be tried, after which a rectal injection of 30 mins. of Laudanum or the introduction of a Morphia suppository may be resorted to. In unyielding cases a medium-sized soft rubber catheter may be introduced under chloroform anæsthesia.

Hysterical retention should not be relieved by the catheter till a hot bath or cold douche and other antihysterical remedies have been tried, as the patient rapidly acquires the habit of desiring the catheter through loss of power over the expulsive mechanism. But where a gravid or a displaced uterus containing a fibroid tumour exists a male gum-elastic catheter should be passed through the urethra till the bladder is reached before attempting reduction of the displaced uterus.

Where retention is caused by clotting of blood in the bladder, as from a villous or malignant growth or tuberculosis of the cavity wall, the best procedure is to open the bladder above the pubes, wash the organ out thoroughly and drain. In desperate bladder hæmorrhage associated with greatly enlarged prostate it may be necessary to remove the prostate without waiting for the arrest of the bleeding. As a rule it will be advisable to wait for the arrest of the hæmorrhage before resorting to an attempt to remove the cause. In villous growths in the female bladder causing retention from large clots, the best procedure is to dilate the urethra rapidly and reach the bleeding surface, which may be then operated on by galvano-cautery or strong Perchloride of Iron solution. The treatment of these cases will depend on the result of a cystoscopic examination of the bladder.

RETINA, Diseases of—see under Optic Nerve.

RETRO-PHARYNGEAL ABSCESS—see under Pharyngitis.

RHEUMATISM, Acute.

Rest in bed must be insisted upon as soon as the joint symptoms of rheumatic fever appear, as evidenced by pain, heat, redness and swelling with fever and perspiration. There is, perhaps, no other diseased condition where absolute rest in the horizontal position is more clearly necessary. Endocarditis followed by *permanent* valvular mischief is decidedly less likely to occur in patients who have taken early to bed after the development of rheumatic fever and remained there afterwards for *a long period.*

The sick-room should be selected upon the ordinary sanitary principles, and it is better that it should not be upon the ground floor. The air of the room should be kept at a uniform temperature, and currents of cold atmosphere are to be avoided by arranging screens at a little distance around the patient's bed. The bed should consist of a good hair mattress upon the top of a woven wire one or above a hard straw palliasse, feather beds being objectionable, both on account of the patient sinking into them and also because of his profuse sweating. Sheets (especially linen) must be dispensed with, and it adds greatly to the comfort of the patient if he be placed between light or thin flannel blankets. The bed-clothes should not be abundant, eider-down coverlets should be discarded, and a loose and thin flannel night-dress, which speedily absorbs the cutaneous moisture, is to be preferred to linen or cotton, and it should be slit down the middle and the sleeves treated in the same manner so as to permit of easy access to the cardiac region and the joints. Loosely-fitting drawers of the same material may also be worn. A bed-pan and urinal are essentials.

Diet.—This may with advantage consist entirely of milk, with farinaceous foods occasionally, and at a later stage beef tea, soups, chicken jelly, or concentrated beef essences may be administered after the subsidence of joint pains and fever. Latham insists upon the importance of a pure milk diet, and points out that soups and beef essences cause relapses. Other writers do not agree with him in this. Thirst may be relieved by small quantities of ice sucked in the mouth, or by the frequent administration of a wineglassful of equal parts of iced Kali water and milk, or by lemon juice diluted with three or four parts of water. Yeo's plan of administering lemonade made by boiling a lemon in 1 pint water and adding 20 or 30 grs. Bicarbonate of Potash is a good way to relieve thirst, as it does not interfere with the administration of milk; the essential oil of lemon contained in the rind is liable to upset the stomach. The writer prefers effervescing Potash or Kali water to which a little fresh lemon juice has been added just before administration. This will also take the place of the 20 grs. Citrate of Soda recommended to be added to each pint of milk. When the patient is able to take 4 pints milk daily diluted with kali water, all difficulty in dieting is removed.

Unless in the presence of complications, Alcohol should be avoided as a routine; but a moderate amount — a wineglassful of whiskey daily —may be permitted to those who have long accustomed themselves to it.

By the free use of the milk diet and alkaline drinks the eliminatory organs are kept active and the bowel may occasionally be flushed with a saline purgative. Constipation must be avoided, especially as the thoracic pressure is liable to be dangerously increased when the constipated patient attempts to use the bed-pan; hence the routine administration of a copious enema every second day at least is a wise precaution, as much mischief in cardiac cases may thereby be prevented.

Drug Treatment.—Salicylates should always be prescribed as a routine, though some eminent authorities recommend a pure Expectant or Peppermint water treatment, and publish excellent results from its use; nevertheless it is highly probable that these savants would resort very soon to the salicylic treatment should they themselves be unfortunate enough to become the victims of an acute attack of rheumatism, with its unbearable pains and discomforts.

Since the introduction of the Salicylic treatment its literature would fill a small library, and volumes might be made up of statistics attempting to prove its efficacy or its failure in influencing the *duration* of the disease and its effects upon preventing or determining *cardiac complications*. It cannot be denied that the salicylic treatment affords the most certain and speedy means by which all the arthritic symptoms of acute rheumatism may be relieved, but it must be granted that it still remains to be proven that this treatment has the power of cutting short the actual *duration* of the disease to any considerable extent. As regards the effect upon the cardiac complications likely to occur during the attack, it must again be admitted that clear proof is still wanting to demonstrate that it lessens to any appreciable degree the occurrence of endo- or peri-carditis, though these complications are undoubtedly relieved by full doses as long as the arthritic manifestations and fever still continue.

By closely watching the cases long after recovery, the writer believes that it may be possible to prove that of a number of patients who have suffered from rheumatic endocarditis, a smaller percentage of those who had received salicylic treatment will eventually develop *permanent* valvular mischief than of those subjected to expectant or other methods. This is obviously a very difficult point to settle, but of late years the results of hospital and private cases (but chiefly the latter) have led the writer to gravitate towards a conclusion in favour of the *permanent* benefit arising from the salicylic treatment and of the drug possessing some degree of specific action in neutralising the toxins of the disease.

These remedies do not appear to prevent relapses, and indeed it would seem upon the contrary that relapses are, if anything, more frequent than when the Alkaline treatment is alone used. This is, however, owing to the patient indulging in exercises or movements whilst the pains are in

complete abeyance under the influence of the salicylates before the attack has run its normal course.

The drugs embraced under the general term of Salicylic remedies include Salicylate of Soda, Salicin, Salicylic Acid, Oil of Wintergreen, Salol, Aspirin, Diaspirin, Novaspirin, Benzosalin, Salacetol, Saloquinine, Salophen, and other new salicylic derivatives.

Maclagan recommended Salicin, some still adhere to the Acid, but the great majority of physicians rely upon the Salicylate of Soda, and, upon the whole, it is from many points of view the drug best suited to the great bulk of cases. Salol in full doses is dangerous, owing to its high percentage of carbolic acid and its slower excretion.

Since Charteris isolated a substance from the artificial acid and its soda salt, and experimentally demonstrated it to be the cause of certain toxic effects noticed after large doses of these drugs, the sodium salicylate treatment has become universally accepted as the best. Only the "physiologically pure" acid or its soda salt should be used in medicine, and much larger doses than those formerly employed may be given with perfect safety.

One dose of 30 grs. of the purified salicylate of soda may be given as soon as the patient comes under observation, and 20 grs. may be given every three or four hours afterwards. In twenty-four hours after the inauguration of this treatment sometimes all fever has disappeared, and the joint trouble may be noticed to have entirely given way. In the writer's wards the students complain that they never see "rheumatic *fever*," as the symptoms of the disease are, as a rule, entirely removed by the salicylic treatment before they get a sight of the patient.

Some physicians prefer to give 15 grs. of the soda salt every hour for four or five doses, then every three or four hours, but each case may be treated upon its merits, and as the temperature falls the amount and frequency of the dose may be diminished. The best plan will be to proportion the size of the dose to the length of time from the commencement of the patient's illness till he came under observation. Thus, given a patient ill for several days with many joints affected, it will be well to save time by giving 30 grs. of the soda salt immediately, and 20 grs. every two or three hours, according to the effect upon pain and temperature. 15-gr. doses three times a day should be given for a week after the subsidence of the pain and fever.

It is a significant fact that in rheumatic fever patients the total excretion of salicyl is markedly less than in non-rheumatic cases, showing the probability of a chemical neutralisation of the salicylate by the toxin of the disease. Lees regards the salicylate of soda as a *specific* in acute rheumatism if given *early* and in *full doses*. He insists upon the necessity of combining with it twice its weight of Sodium Bicarbonate in order to prevent respiratory symptoms; he gives 20 grs. of the salicylate every 2 hours during the day and every 4 hours during the night. This dosage works out at about 180 to 200 grs. in 24 hours, and half this amount he gives to a child 6 to 10 years old, and increases it in severe cases to the adult dose.

℞ *Sodii Salicyl. gr.* cccxx.
Sodii Bicarbonatis ℥iss.
Syr. Aurantii Flor. ℥ss.
Aquæ Chloroformi ad ℥xvj. *Misce.*
Ft. mistura. Cpt. ℥j. *ut dictu.*

The writer has never ventured to push the drug in the above heroic doses. Poynton, who considers that the salicylate should be administered as a routine for the relief of the arthritic manifestations, apart from the consideration of its specific action, recommends that 20 grs. salicylate with 15 grs. bicarbonate of soda should be given every 2 hours for 6 doses, every 3 hours for 4 doses, and then every 4 hours. This dosage works out at about 200 grs. during the first 24 hours if given during the night, and 120 grs. on the succeeding days, and appears to be a safe limit for a strong adult as long as the joint pains are severe, provided the administration is not continued during the night.

The salicylate of soda may be prescribed in 20-gr. doses as a powder to be taken in effervescing Potash water. The advantages of this plan are obvious—it is more palatable, and it combines the salicylic treatment with the alkaline. The drug should be stopped or suspended for several hours as soon as its full physiological effects as buzzing in the ears, giddiness, deafness, etc., are established, but such results are now seldom witnessed when the pure salt or acid is employed.

Pure Salicylic Acid is advocated by Latham, who insists that the natural and not the synthetic product should be used. He gives 100 grs. daily and sometimes 150 grs., often combining Calomel with it, and he maintains that it is a true antidote to the rheumatic poison and that when the temperature falls 50 grs. daily may produce cerebral symptoms.

In the writer's experience of the disease he has never seen a case where the new-fangled plan of giving salicylates by a vein was indicated or necessary. The same remark applies to the intra-muscular injections of Magnesium Sulphate. Salicin may be given in cachets in doses of 20 grs. every 4 hours; it is less depressant but certainly less analgesic in its action.

Aspirin, though invaluable in chronic rheumatism and rheumatic neuritis, is not well borne in the acute disease, and there is great difficulty in saturating the blood with it owing to its interfering with the functions of the stomach, through which it is supposed to pass unchanged. If prescribed with bicarbonate of soda it is decomposed at once into sodium salicylate and acetate.

Saloquinine is the tasteless quinic ester of salicylic acid, and its salicylate—Rheumatin—which is also tasteless, may be given in 15-gr. doses every 4 hours; both these substances are valuable in the treatment of the acute rheumatism of children when the unpleasant taste of the soda salt is strongly objected to. A child of 7 years may get 5 grs. They may be advantageously employed in adult cases during the later stages of the attack.

Alkaline Treatment of Acute Rheumatism.—This was the routine before the introduction of the salicylates, and though founded upon a probably incorrect idea of the pathology of the disease, nevertheless it still maintains its priority in every case where, from cardiac depression or other cause, salicylates cannot be pushed. The almost universal practice of the best authorities is showing a return to the old method of treatment by combining alkalies and salicylates, and with our present knowledge this must be accepted as the most satisfactory and safest plan for dealing with rheumatic fever.

When the alkaline treatment alone is pursued the Bicarbonate of Potash is the salt generally selected, and it should be given in doses sufficient to rapidly render the urine alkaline. 30 grs. may be given every 3 or 4 hours, and after the effect upon the renal secretion has been thoroughly established, 15 or 20 grs. four or six times a day may be given for many days, or even for several weeks, till the disappearance of pain and fever indicates that the disease has exhausted itself. The addition of Citric Acid or fresh Lemon Juice to each dose of the alkali in no way diminishes its good effects, and where a more decidedly alkaline action is desired the Tartrate or Acetate of Potash may also be given.

When the combined plan is employed, the usual practice, as already described, is to combine soda bicarbonate with the salicylates, but there is no reason why the potash salt may not be similarly administered as in the following mixture:

℞. *Sodii Salicylatis* ʒiv.
Potassii Bicarbonatis ʒvj.
Liquor. Morphinæ Hydrochlor. ʒiss.
Aquæ Camphoræ ad ℥xvj. *Misce.*

Fiat mistura. Capiat ʒi. *quater in die.*

Or, as already mentioned, the Bicarbonate may be given in the form of a strong aerated potash water (30 grs. to 10 oz.), to which the salicylate is added just before swallowing, or 30 grs. of the bicarbonate may be added to half a tumblerful of soda water, in which 20 grs. of the salicylate have been dissolved.

Or the following plan may be adopted:

℞. *Potassi Bicarbonatis* ʒvj.
Aquæ Destillatæ ℥xij. *Misce.*

Fiat mistura. Signa.—"*One of the powders* (*i.e.*, 20 *grs. Salicylate of Soda*) *to be dissolved in two tablespoonfuls of this mixture, after which a tablespoonful of Lemon Juice is to be added, and the whole to be taken during effervescence every four hours.*"

Garrod's method of treatment consisted in a combination of alkalies with full doses of Quinine.

Rees's treatment by Citric Acid or Lemon Juice alone has fallen into

disuse, but when combined with alkalies the resulting potassium or sodium citrate is a most valuable agent as administered in the above recipe, and the amount of lemon juice may be doubled without diminishing the alkaline effect.

The newer antipyretics—Antipyrine, Phenacetin, Exalgin, etc.—speedily reduce fever and relieve the joint pains considerably, but by common consent their employment as routine agents has been abandoned, owing to the profuse sweating, depression and sometimes collapse which often follow full doses.

Hyperpyrexia, which is so liable to supervene in acute rheumatism, should never be combated by these antipyretic drugs, neither should salicylates or quinine be depended upon. The only way to save life in this grave complication is to resort to the cold pack or cold bath, and since movement of the painful joints usually prohibits the bath, the best plan is to place the patient upon a wire mattress protected by a mackintosh with a sheet around him and pour cold water over this till the hyperpyretic temperature has been reduced.

The old routine of administering Opium has entirely given way to the salicylates, but occasionally it will be found necessary to resort to opiates for the relief of unusually severe pains and restlessness or of insomnia. The latter condition cannot be relieved by the simple hypnotics, since the sleeplessness is nearly always due to pain, and hence opium or morphia should be given in one full dose at bed-time along with the last dose of the salicylate.

The treatment of the cardiac complications, whilst mainly that of the primary condition, will be found detailed in the articles on Endocarditis and Pericarditis.

Serum Treatment.—Various attempts have been made of late years to treat acute rheumatism by a serum prepared from various strains of streptococci. Thus Menzer, obtaining cultures from the organisms existing in the fauces in the so-called rheumatic sore throat, has injected animals with these in increasing doses, and he maintains that the serum from these immunised animals has a powerful curative influence in acute rheumatism. Vaccines from *Streptococcus rheumaticus* have been employed, and Sherman reports most favourably on the results. Others have employed cultures of staphylococcus and of *Bacillus coli*.

The initial dose of the Wimpole Institute *Streptococcus rheumaticus* vaccine is 10,000,000 organisms. Until the causal organism of rheumatic fever has been isolated and placed beyond the possibility of doubt the methods of serum and vaccine treatment may be regarded as a groping in the dark, though it can hardly be doubted that the streptococcic vaccine has proved of great value in the treatment of some of the complications of the disease.

The dose of Menzer's serum is 5 to 10 c.c., but much larger doses have been administered. It seems almost certain that this *serum* really functions as a *vaccine*, since marked exacerbations of the arthritis and pyrexia supervene after each injection.

Gürlich and Schichhold maintain that the primary focus of infection in all cases of acute and subacute articular rheumatism is situated in the tonsil, and the last-mentioned authority carries out as a routine the entire removal of the tonsil. He slits up the lacunæ and proceeds to remove the portions of the tonsillar tissue between the incisions till the whole gland is excised. This he claims to have done in 70 cases with great success. Not only do the symptoms of joint trouble rapidly disappear, but he claims that this method of treatment prevents relapses or return of the attack, and so complete is the disappearance of all the usual evidences of the disease that salicylates are not necessary.

Local Treatment.—There are many agents which may be advantageously employed to relieve the arthritic manifestations. Absolute rest of the affected joints is the most important of these, but rarely will splints be deemed necessary. The meddlesome plan of applying lotions, liniments, counter-irritants, etc., is seldom justified, as these entail more or less movement of the articulation.

Fuller's alkaline lotion is still recommended in many textbooks: it consists of 1 oz. Laudanum, ½ oz. Bicarbonate of Potash, 2 oz. Glycerin, and 9 oz. Rose Water, which is recommended to be applied round the joints on lint. The opium in this preparation cannot effect any anodyne result, and any virtue it possesses can be better obtained by sponging the joint surface with a weak alkaline solution.

Painting or smearing the joint with the synthetic Oil of Wintergreen or Methyl Salicylate is often resorted to. The plan of applying strong Aconite and Belladonna liniments under oiled silk is a dangerous practice, as absorption is liable to occur.

The best routine to follow is to envelop the affected articulations in a layer of warmed absorbent wool fastened by a many-tailed bandage without any impervious dressing, as the latter is apt to cause retention of the irritating sweat. Some practitioners resort to the routine application of Antiphlogistine (Cataplasma Salicylicum Co.) or of Cataplasma Kaolini U.S., which contains Thymol, Methyl Salicylate, Oil of Peppermint with Kaolin, Boric Acid and Glycerin.

Blisters.—These have been employed from remote periods, to be discarded and again brought into use from time to time under the influence of supposed advances in our knowledge of the pathology of inflammatory action. The late Dr. A. Harkin employed blistering in a different way from any of his predecessors; influenced by his theory that the endocardium and the pericardial sac were to be regarded in the light of large joint surfaces, his first step in the treatment of acute rheumatism in every case was to apply a large blister over the cardiac area. The writer saw many cases which Harkin treated in this manner, and was surprised to find that a rapid and sometimes complete relief of all the classic symptoms of acute rheumatism followed, the joint pains, local swelling, redness and heat, together with the high temperature of the body, speedily disappearing. In some cases the symptoms never returned or returned in a minor degree, whilst in others after a few days salicylates had to be

resorted to, but the constitutional effects were unmistakable in most cases, though the joints were never blistered. It seemed probable that the absorbed cantharidin exerted some constitutional action. Caton afterwards advocated the plan of preventing endocarditis through stimulating the trophic centres by vesicating the skin between the nipple and clavicle which is supplied by the first four dorsal nerves.

These methods are not to be confounded with the practice of employing blisters as mere counter-irritants to the inflamed joints for the relief of pain as advocated by Davies and many others, but the above considerations seem to prove that when blisters are employed in this latter manner they may effect far-reaching results and should be resorted to more frequently than is generally practised. Osler recommends passing the thermo-cautery over the skin of the joint for the relief of pain.

Another method of relieving the joint pains practised by Stromeyer is to apply the ice-bag, and Lees strongly recommends this agent for the relief of the cardiac pain and distress in acute rheumatism of the cardiac type.

The convalescent period requires prolonged rest almost as rigidly enforced as in the acute stage of the disease. The importance of this has been already dealt with in the articles on Endocarditis as the most powerful factor in the prevention of *permanent* valvular lesions, and it is a significant fact that the period of rest after the attack has passed off is being steadily lengthened till some authorities have recommended that more or less complete rest should be maintained for six months. This must, however, be considered unnecessary in simple cases, though it is clearly indicated where the heart has been seriously engaged, and in most cases occurring during childhood.

Massage, electricity, hydropathy, passive movements and the internal administration of Iodides in full doses should in most cases be kept up during the first month or six weeks of convalescence. A change to a dry inland residence is most desirable when practicable.

Many authorities emphasise the importance of a minute examination for any septic focus as pyorrhœa, otitis, enlarged tonsils, etc., which should be radically dealt with in order to minimise the liability to further attacks. It is obvious that the greatest care as regards clothing and exposure to cold and damp should be always maintained.

Acute Rheumatism in Children.—Great advances have been made in the diagnosis of this condition, which was generally overlooked in former years. Though the disease is to be considered as identical with the acute affection of adults, there are several well-marked differences to be observed which have their bearing on therapeutics. The most important of these is the far greater frequency of serious cardiac manifestations and the minor part which the arthritic manifestations play in the clinical picture, so that the disease in children has been termed "Acute Carditis," or "Cardiac Rheumatism." Not only do the endocardium and the pericardium suffer severely, but the heart muscle is rapidly affected. as seen in the acute dilatation of the left ventricle frequently following

the rapid myositis caused by the rheumatic toxins, and these grave conditions may exist when the only joint symptoms may be so slight as to be mistaken for the so-called "growing pains" of childhood. Subcutaneous nodules may be found present in more than 50 per cent. of such cases.

Absolute rest is even more essential than in adult cases, and though the joint pains call for little interference, it seems advisable to commence the routine administration of Salicylates, but these should be always combined with full doses of alkalies. In the presence of severe cardiac weakness the salicylates cannot be pushed, but moderate doses (5 grs.) of Saloquinine or Rheumatin may be administered in combination with Strychnine.

For the relief of cardiac pain, which is often severe, a thick layer of the Cataplasma Kaolini laid over the entire cardiac area may be used. The warm-water rubber bottle, the ice-bag and absorbent wool each has its advocates. In marked dilatation of the ventricle, half a dozen leeches may be applied and a smart saline purgative given by the mouth and a dose of Strychnine hypodermically. At a later stage Digitalis or Strophanthus will be indicated. It will often be necessary to resort to a moderate amount of Morphia to quiet distress and promote sleep, and it should be combined with a full dose of Sodium Bromide.

Pericarditis may require tapping. (See under Pericarditis.)

Menzer's Serum and Vaccine treatment have been also recommended in the treatment of the acute rheumatism of childhood.

As already stated, the rest should be prolonged into several months in order to prevent permanent damage and deformity of the cardiac valves, and during this stage Iodides may be advantageously employed.

Much importance has of late been attached to the part played by local septic conditions of the mouth, naso-pharynx and tonsils in the acute rheumatism of childhood, and Schichhold even recommends the total enucleation of the tonsils during the attack. It certainly should be the rule to deal radically with these and with adenoids and suppurating gums and carious teeth during or after convalescence in order to diminish the risks of further rheumatic seizures.

The child should be enveloped in warm woollen underclothing, and should wear thick-soled boots and be long protected from the risks of cold and damp.

RHEUMATISM, Chronic.

The term is one most difficult of definition. This may to a considerable extent be removed by eliminating from the category all cases of subacute rheumatism belonging to the rheumatic fever type of the disease. As pointed out by Stockman, if the acute affection is of an infective nature caused by a specific micro-organism, it is quite as irrational to speak of a chronic rheumatism as it would be to recognise a chronic diphtheria or a chronic typhoid fever. But recent observation has demonstrated the existence of the typhoid carrier, and the bacillus of diphtheria has been

proved to remain for indefinite periods in the throats of adenoid patients. Hence it is not so easy to eliminate those cases of subacute or relapsing rheumatism which follow or succeed upon acute attacks, but if we regard these cases as *sequelæ* of rheumatic fever, the air becomes cleared for the recognition of a distinct entity under the name of " chronic rheumatism."

Since the introduction of the term " Fibrositis " this has steadily been accepted as covering the ground of the pathology of chronic rheumatism, the term implying a hyperplasia of the white fibrous tissue in various regions, the result of a low type of inflammatory action. This Fibrositis may involve the white fibres entering into the ligaments, periosteum, insertion of the tendons and fascia, &c., about a joint; when attacking the fibrous tissue of muscles it is known as " lumbago," " wry neck," &c.

When there is any doubt about the diagnosis between fibrositis involving the structure entering into a joint and a subacute form of or a sequela of acute rheumatism, the treatment suitable for the late or convalescing stage of the latter affection is clearly indicated. The joint should be put into a state of complete rest and Salicylates should be administered. Aspirin is the form in which the salicylates are best administered. Though the drug cannot be said to exercise anything like a specific action in the various forms of fibrositis or chronic rheumatism, there can be no doubt about its analgesic properties, whether the seat of the lesion be in the immediate vicinity of a joint, in a mass of muscle or involving the sheath of a large nerve like the sciatic.

The treatment of a true fibrositis in which there is no suspicion of any acute rheumatic origin is to be carried out at first upon similar lines. The physician must guard against any premature attempt to break down adhesions by forcible massage, which may only increase the intensity of the fibrositis, as he must also keep in mind the evils of prolonged rest, which may cause a hopeless induration of all the fibrous structures entering into the articulation.

The best routine treatment is during the stage of acute pain to administer Salicylates, in conjunction with the hot bath, Turkish bath, or, better still, with the radiant heat or electric arc bath. The hot-vapour or hot-air bath or the dry heat from a rubber water-bottle or sand-bath is also frequently employed.

Tallermann's metal cylinder, heated like an oven by numerous gas jets, into which the affected limb can be placed, is also a favourite method of applying dry heat. Hot fomentations are to be avoided as being less efficacious and more liable to be followed by relapses.

Anodyne applications innumerable are recommended; one of the best of these is Methyl Salicylate or the artificial oil of winter-green; it may be gently rubbed over the affected joint or Martindale's Methysal Balm, which contains Menthol in addition, may be used. These applications can be applied with advantage after a preliminary exposure to a mild degree of dry or moist heat. Luff's Anodyne consisting of equal parts of Menthol, Chloral Hydrate and Camphor is a most efficacious local analgesic liquid preparation, which should be gently rubbed in with the finger-tips

after being painted on the skin following a warm fomentation. Some practitioners employ the Oil of Peppermint or Liniment of Menthol, B.P.C. (Menthol 3, Chloroform 4, Olive Oil to 16). The A.B.C. Liniment, consisting of equal parts of the liniments of aconite, belladonna and chloroform, is also much used.

Ionisation or cataphoresis is a valuable adjunct to the use of radiant heat. Luff employs a 2 per cent. solution of Iodide of Lithium in joint cases, and a 2 per cent. Salicylate of Sodium solution in muscular rheumatism; the iodine and salicyl ions being driven into the affected tissues act as powerful local analgesics. In all chronic cases the value of counter-irritants is unmistakable, and the best of all procedures is to apply at intervals small blisters over the affected joints.

A very valuable treatment consists in sprinkling Flowers of Sulphur over the joint before enveloping in cotton-wool and an impervious dressing and then directing the patient to expose the limb to the heat from an ordinary fire.

Stockman insists upon the necessity of effecting the permanent removal of the fibroid proliferations and, for this purpose nothing is so efficacious as skilful massage. This treatment, however, should not be attempted in the early stages. Commencing the process with gentle effleurage to remove congestion and serous effusion, he advises that the oiled skin be rubbed with increasing firmness till the indurations can be treated with the knuckles pressed firmly against them, and eventually an hour's massage can be tolerated, but the treatment to be curative must be persevered in for weeks, and in old-standing cases for many months.

In joint cases especially, passive movements must be assiduously carried out, and active muscular exercises when these cause only a moderate degree of pain are to be perseveringly practised. The vigorous masseur by forcible joint manipulations may seriously increase the mischief, and when any marked increase of pain remains after massage or movements of any kind, it may be taken as proof that gentler operations must be afterwards pursued.

This treatment should be combined with hydropathic measures as the Scotch and the Aix douche or massage douche, the horizontal jet, the percussion column, needle bath, &c.

Electricity in various forms may be employed—the constant current (stabile anodal applications) for the relief of pain and the stabile kathodal for the stimulation of muscles. Faradisation, sinusoidal currents and static electricity are also pressed into service, and high-frequency currents and the hydro-electric bath can be used when the Faradic current cannot be borne.

Thermo-penetration or Diathermy is now on its trial; it differs from all other methods of producing heat by the fact that the heat is produced in the tissues to be acted upon. The Simon apparatus and Poulsen lamp are employed, and currents from 400 to 800 milliamperes are made to traverse the tissues.

Stockman recommends the excision of well-defined nodules by the

knife or by the injection of a few minims of a 1 per cent. Chromic-Acid solution. The value of injections of 1 per cent. Osmic Acid solution into the indurated sheath of the sciatic has been long recognised.

The determination of a chronic rheumatic fibrositis to joints in the vicinity of fractures is a well-recognised condition due to prolonged rest, and should be avoided by early massage and passive movements.

Whilst the above vigorous local measures are being carried out, drug treatment may be tried. It cannot, however, be said that any known drug of the thousands vaunted possesses a specific action over the fibroid induration. It is hardly necessary to again affirm that the temporary relief afforded by the entire group of salicylic preparations is due simply to their analgesic action. Aspirin may be employed for considerable periods for the relief of pain. Guaiacum especially in the form of the Chelsea Pensioner, which also contains Sulphur, has been long in use and does in many cases ease pain and diminish somewhat the stiffness.

The only drug which can claim to be really useful is Iodine, though it often fails; in some cases of short standing it unquestionably appears to aid in the absorption of the fibroid indurations. Iodide of Sodium or Potassium should be given a trial in all cases, but it must be employed in full doses (10 to 15 grs.) three times a day. For the acute fibrositis of lumbago, wry neck and some types of so-called " sciatica," free Iodine—5 mins. of the weak tincture—is certainly more effective than the iodine salts, and in all cases in which iodine treatment is being tried a local application of the strong tincture may advantageously be employed as a counter-irritant to the affected region. The method of giving large doses of Iodides in the morning followed by Chlorine Water in the evening with the view of setting the iodine free has much to be said for it.

Fibrolysin, which is a solution of sodium salicylate combined with thiosinnamin, has been extolled as an absorbent of the fibroid indurations. 40 mins. of the 15 per cent. liquid may be injected deeply in the neighbourhood of the nodules. This has in some cases effected the cure of Dupuytren's contraction, which Luff regards as a rheumatic fibrositis. When this agent is employed, its use should be associated with massage and active or passive movements to facilitate the absorption of indurations.

Colloidal Sulphur has been injected with success into the muscles by Comrie in trench rheumatism and by Jeanneney into the veins in chronic joint cases. For the muscles 1 c.c. of a 1 in 1,000 solution mixed with twice its bulk of a 5 per cent. saline solution is used.

Much attention has of late years been given to the importance of the observation that chronic rheumatism has been known to disappear in beekeepers who have been often stung when working with these insects. Burton recommends that the method of administering the poison (formic acid) of the bee-sting should be resorted to in the treatment of chronic arthritic rheumatism and sciatica.

He describes in the *B. M. J.* for October, 1908, the details of the method which he practises in order to submit the rheumatic patient to the influence of the sting of the bee by applying the insect to the affected spot with

specially designed forceps, and he publishes cases where a highly satisfactory result has been obtained. The severe pain caused by the stinging tends to become of much shorter duration in subsequent applications of the remedy.

The dietary in chronic rheumatism, to which so much fanciful importance had formerly been attached, should be dictated by common sense. Whilst excess of animal food is best avoided, there are no justifiable grounds for insisting upon a rigid vegetarian regimen. The diet which is most easily assimilated by the patient and which keeps the eliminatory organs in the most healthy condition is certain to be safe. On the same principle the bowel function must be carefully attended to, constipation being avoided. In acute fibrositis, a smart saline purge following a moderate dose of Calomel is always indicated. Intestinal antiseptics, at the best a doubtful class of drugs, have been extolled, but little if any benefit can be attributed to them in chronic rheumatism.

Clothing is an important consideration in a diseased condition in which exposure to cold and damp and sudden variations of temperature play such an important causal rôle. Hence woollen garments and warm footwear must be worn, but the tendency so common amongst rheumatic patients to overclothe themselves must be guarded against, being quite as pernicious as the dangers of under clothing, since it exposes them to chills after profuse sweating. The introduction of pieces of wash-leather into the under-garments covering the affected joint is a good plan.

Climate to those who can afford to winter in a warm, bracing and equable atmosphere is most desirable, but some patients affirm that the effects of a hot climate are quite as trying on the joint and muscular pains as cold; this arises probably from their difficulty in regulating their clothing to the standard necessary to combat sudden variations of temperature. Many patients do better in inland situations than at seaside resorts.

RHEUMATISM, Gonorrhœal.

The disease should be treated by local agents applied at the entrance of the poison—the urethra, vagina, vulva, or conjunctiva—if such treatment has been neglected or inefficiently carried out. Drugs are of very little value in the treatment of the joint affection. In the early painful stage absolute rest of the affected articulation is imperative, but the physician must ever be mindful of the remarkable tendency of the gonococcal inflammation towards the formation of adhesions of a most obstinate nature, and if rest be prolonged ankylosis is almost certain to become intractable.

Salicylates may be employed to relieve pain, but as a rule their analgesic effects are so slight that many authorities profess that a differential diagnosis can be made between gonorrhœal and ordinary rheumatism by noting the failure of full doses.

Iodides even in colossal doses generally fail to make any impression upon the arthritic manifestations. Mercurials, Quinine and agents useful in other infections are also generally useless.

The only reliable method of constitutional treatment consists in Vaccine Therapy. This has of late years been proved to produce marked specific results, though these plans of treatment have usually failed in dealing with the acute urethritis in gonorrhœal infection. Serum therapy may be dismissed with a few words; the antigonococcic serum usually employed is a *polyvalent antistreptococcic* preparation, and though Parkinson has obtained successful results from the rectal administration of 10 c.c. daily, the best procedure is to resort to vaccine treatment. The serum obtained by injecting animals with the gonococcus was proved by Dowson to be a good medium for the cultivation of the cocci, but the polyvalent anti-streptococcic serum inhibited their growth—a fact which establishes that the latter serum when injected possesses the power of either neutralising the toxins or preventing the growth of the cocci in the tissues as believed by Parkinson.

Vaccine treatment is carried out by the injection of a gonorrhœal vaccine prepared by cultivating the cocci obtained from a first attack of gonorrhœal urethritis before local treatment has been started. The Wimpole Institute vaccine is obtainable in sterile tubes containing from 10 to 1,000 million killed organisms. Many specialists advocate the superior advantages to be obtained by employing an autogenous vaccine, though others maintain that almost equal results may be obtained by using a stock vaccine prepared from a dozen different strains. The ideal procedure would be to start treatment with a stock vaccine and afterwards to prepare a culture from the urethral discharge when this is still procurable or from the joint fluid, as many authorities insist upon the mixed nature of the joint infection.

Eyre and Stewart in order to avoid a prolonged negative phase recommend that a dose not exceeding 5 million organisms should be at first injected at short intervals. These doses may be rapidly increased to 25 millions and in chronic cases to 500 millions at intervals of 5 to 7 days. By early resort to vaccine treatment ankylosis may be effectually prevented provided the urethral affection is at the same time skilfully treated locally.

When ankylosis has already occurred, the vaccine treatment alone is of little or no avail.

With the vaccine therapy in all cases local joint treatment must be assiduously carried out. Pain may be relieved by anodyne applications and by counter-irritation with strong Iodine preparations or blisters. The application of Bier's elastic bandage to induce hyperæmia often affords considerable relief. In the dry form of gonorrhœal arthritis and especially in the polyarthritic type which involves the small joints of the hand and wrist, Tallermann's heated cylinder may be used with advantage or any of the hot-air or thermo-electric appliances mentioned under Rheumatism may be resorted to. After the application of heat, massage and passive movements should be industriously employed to prevent ankylosis, and some authorities recommend that the vaccine should be injected directly into the affected joints or into the tissues in their immediate vicinity.

When much fluid has accumulated in the articulation, aspiration should be performed or a free incision having been made the cavity is to be thoroughly irrigated with hot Saline solution and a 10 per cent. Carbolic Acid or a 1 per cent. solution of Protargol injected.

When suppuration has occurred, free opening of the joint is imperative, after which the diseased synovial membrane should be completely curetted or dissected away as in the operation of arthrectomy or erasion. Drainage or packing with Iodoform gauze will be indicated in most of these latter cases. After the relief of the acute symptoms, the incised joint must be treated by passive movement to prevent ankylosis, but in the knee, where arthrodesis (removal of cartilages) or excision may be necessary, firm bone union is desirable.

RHEUMATISM, Muscular.

This, as detailed in the article on Chronic Rheumatism and Lumbago, is now to be regarded as a fibrositis not having any necessary association with acute rheumatism, though often relievable by Salicylates in free doses. The various methods of treatment by massage, movements, blistering, douching, electricity, etc., have been already discussed upon p. 850, and the plans of acupuncture, aquapuncture and deep parenchymatous injections will be described under Sciatica.

RHEUMATOID ARTHRITIS, Chronic.

Arthritis Deformans, Osteo-arthritis, Rheumatic Gout, Chronic Rheumatic Arthritis, Arthritis Sicca and Arthritis Nodosa are some of the synonyms of this obstinate affection which is essentially distinct from either rheumatism or gout.

The disease is too often regarded as invariably progressive and incurable, but if taken in its early stage unquestionably arrest in its progress is sometimes possible, and some observers are satisfied that a cure may be accomplished, though others regard the cured cases as instances of mistaken diagnosis.

The progress of any scientific treatment of the affection is necessarily retarded by the diversity of the views held about its pathology. Whether the diseased condition of the joints is to be regarded as the local manifestation of a microbic infection or of a toxæmia arising in the intestinal canal or is simply the result of retarded eliminatory action or perverted nervous function, all authorities agree upon cold and damp as being powerful etiological factors in the production of the disease.

Clothing and *climate* consequently become important preventive agents as they also are by far the most important considerations to be attended to in the treatment of the disease once the symptoms justify a diagnosis, as no improvement need be expected unless the patient can be completely removed from his surroundings and transported to a drier atmosphere, where the variations of temperature are less marked than in this changeable climate—a warm, dry, equable climate being acknowledged on all hands to be an essential factor in successful treatment.

As a winter resort Las Palmas, Algiers, Egypt and South Africa are suitable, whilst in summer Seville and other Continental resorts are popular. In connection with these places the baths are of great importance, but these will be mentioned later on. As a rule inland resorts are preferable to seaside places.

As regards clothing, the body should be encased in light woollen garments, worn if possible next the skin, but over-clothing is to be avoided. The writer recommends a thin flannel vest and drawers, with a piece of wash-leather inserted inside the fabric next to the skin over the large joints, as at the shoulders, elbows and knees. The practice of piling on garment over garment, so as to keep the patient always in a state of perspiration, is to be condemned. The foot-covering is not to be neglected, and cork insoles or overshoes are essentials in wet weather. As pointed out in the author's " Practice of Medicine," the monarticular cases are especially liable to be made worse by excessive clothing, as it seems certain that by keeping the other joints deeply enveloped in woollen fabrics *the resistance of the exposed articulations is reduced* and the hands become soon affected seriously. All undue exposure to cold and damp, or drying east winds, it is needless to say, should be avoided.

If the patient's residence is upon damp, cold clay, he should be strongly advised to change it for one on a dry, sandy, elevated well-drained soil, and when this is impossible he should be advised to sleep and live as near to his attic or as far from the ground level as possible. The worst cases are observed in Ireland amongst individuals who live mostly on the ground story of farmhouses with earthen floors.

Diet.—As regards diet, everything which tends to improve nutrition must be freely given. No matter which of the various views of the pathology of the affection may be accepted, there is always evidence of serious impairment of nutrition, and this calls for the most liberal and varied dietary. Mixed food—fresh meat and plenty of fresh vegetables—with a very limited supply of malt liquor, or none at all, should form the basis of the dietary. A Koumiss or fermented milk diet is often beneficial.

Celery, eaten raw or stewed, is a popular remedy, and experience proves that there is some truth in the belief, though the writer thinks that the Spanish onion is the best of all vegetabes for constant use by the victims of this affection. In Ireland, where the disease is so very common, it is supposed that the excessive use of ill-cured bacon has something to answer for in inducing the disease.

Fats are an important item in the dietary, and above all other foods or drugs stands Cod-Liver Oil. It should be regarded not as a medicine, but as a food, and, in conjunction with the Extract of Malt, should be given at the termination of every meal. In hereditary cases, where rheumatic or arthritic pains first show themselves in the offspring of parents in whom the disease is well marked, this food or drug should be pushed.

Butter and Cream should also be freely administered, and excess of starchy foods forbidden.

Sometimes an impression has been made upon the disease by a prolonged

trial of a purely vegetarian diet, but it is a grave mistake, as pointed out by Garrod, to treat the disease as if it were a form of gout by the routine exclusion of animal food. All dietetic measures which promote bowel, kidney and skin elimination should be advocated, and constipation must be avoided by the use of enough vegetable material.

Every error or departure from the normal standard of health must be carefully sought for, and remedied as soon as discovered. Thus prolonged mental exertion, worry, super-lactation, menstrual disorders, frequent pregnancies and renal disease may be found to be the exciting causes.

The convalescent stages of such affections as influenza and typhoid fever should be treated by prolonged good feeding, rest and change of air in all subjects showing signs of joint trouble.

Open-air exercise except in the worst weather should be practised. There is nothing so deleterious at any stage of the disease, and especially in the early period, as resting indoors. Walking, even when painful, should be perseveringly indulged in, and exercise should be provided for the muscles and joints of the upper extremities by gymnastics or some simple manual occupation as carpentering, but severe strain of the joints must be guarded against. Even when the patient becomes unable to walk he should be advised to spend as much time as possible driving in the open air and sunshine, and when in bed he should be encouraged to freely exercise his legs while lying on his back. Bed in the day-time should be strictly forbidden except in acute cases and in patients wholly crippled; but young subjects who suffer chiefly from the atrophic type of the disease should be encouraged to go to bed at an early hour and to remain there for at least 10 hours, as advised by Tubby. The habit of sitting up late and breakfasting in bed should be strictly forbidden in both the young and old. The question of exercises will be fully considered later on in discussing local treatment.

Drug Treatment.—It would perhaps be difficult to mention any active drug which has not at some time or other been vaunted as a remedy for this obstinate disease. Formerly the class of agents known as alteratives, including Arsenic, Iodine, Guaiacum, Colchicum, Sulphur, Actæa Racemosa and even mercurials were much employed. Later on, Salicylates and their derivatives were extensively used, and as these agents were proving a disappointment the theory of the nature of the affection being a toxæmia arising in the intestines came into acceptance and their reputation revived. The salicylates are thus prescribed because empirically they have been found useful in acute rheumatism, because they act as analgesics, and, thirdly, the less soluble ones are supposed to act as intestinal disinfectants. Hence Aspirin, Salol, Benzosalin, Novaspirin and other derivatives which slowly yield free salicylic acid in the intestine are selected for the treatment of rheumatoid arthritis. Beyond the slight relief of pain which they sometimes accomplish their administration cannot be said to produce any lasting benefit.

Guaiacol has been very extensively employed by Luff (3,000 cases), and he affirms that when administered in sufficient quantity for long

periods it arrests the disease, reduces the joint swelling, and relieves pain probably by inhibiting the growth of the specific organisms in the bowel and by neutralising its toxin in the blood and tissues. He gives 10 grs. of Guaiacol Carbonate in cachets thrice daily, and slowly increases this to 20 grs., which should be continued for at least 12 months, and he recommends that Iodide of Potassium in solution should be administered in conjunction with the guaiacol carbonate treatment. From similar considerations Bannatyne recommends Benzosol or guaiacol benzoate (10-gr. doses) and Quinine Salicylate. Saloquinine or its Salicylate (Rheumatin) appears to be preferable to the simple salicylate of quinine.

As regards drug treatment it therefore appears from the published results of the last-mentioned authorities that the best routine in all cases of rheumatoid arthritis is to persevere with full doses of Guaiacol Carbonate, changing from time to time to Benzosol or Saloquinine in similar amounts when better effects can be obtained.

There is no doubt that Sulphur and Guaiacum Resin as in the Chelsea Pensioner Electuary and also Ichthyol often afford considerable relief to the wearying joint pains, probably acting in a manner similar to the guaiacol and benzosol treatment by neutralising the toxins in the blood. Arsenic, Iodine, Iron and Quinine will always find a place in a chronic ailment where anæmia and debility continually manifest their presence.

Fibrolysin injections have been strongly recommended on the same grounds as they have been advocated in chronic rheumatism or fibrositis, with the view of dissolving nodular growths. This method should always have a trial in those rare cases where an important joint like that of the jaw becomes locked and where surgical interference is clearly indicated.

Vaccine treatment has been resorted to with doubtful success, but it should have a trial in those desperate cases of *acute* rheumatoid arthritis which constitute one of the most serious ailments that can affect the human subject, rendering him absolutely helpless for life by locking all the joints in the body and condemning him to drag out a miserable existence in bed. The Polyvalent Antistreptococcic Vaccine should be injected in doses of 25 to 50 millions of the killed organisms. Sherman advocates the injection of a mixed vaccine containing 100 millions each of *Staphylococcus aureus* and *S. albus*, given alternately each week with doses of 30 millions of streptococcus. The hope of dealing effectually with the grave type of acute case lies in the possibility of the preparation of an autogenous vaccine from the joints, as everything points to the probability of the pathology of these examples of the disease being an infection by an acute septic micro-organism and not the result of a toxæmia arising from intestinal fermentation. Crowe, who has studied exhaustively the bacteriology of the disease, affirms that the *Staphylococcus deformans*, which he found in 90 per cent. of acute cases in the urine, is the true causal factor, and believes that a vaccine prepared from it gives every hope of a successful treatment of the disease.

Local Treatment.—For the relief of pain anodyne applications innumerable are in constant use, nearly every physician having his own favourite

liniment. Any of the local analgesics mentioned under Rheumatism may be employed; the writer's routine is Methyl Salicylate gently rubbed into the tender joint either in its pure state or with Menthol as in Methysal Balm of Martindale or as the odourless methylester—Mesotan—which must be diluted with twice its bulk of olive oil. Bannatyne recommends Guaiacol mixed with olive oil or with Tincture of Iodine.

Every known form of counter-irritation and every counter-irritant drug have been tried, from Chili Paste and Iodine to Cantharides and the cautery iron.

As regards the milder counter-irritants and anodynes it is probable that a considerable degree of their benefits is attributable to the friction necessary for their application.

Blisters.—As in the case of acute rheumatism, the accumulated evidence regarding the value of blisters has led to the use of these agents in two very different methods. Thus in one a marked general or spinal effect is obtainable according to Midelton without applying the vesicant to the affected articulations. He applies a series of blisters $4 \times 1\frac{1}{2}$ inches along each side of the spine over the lumbar and sometimes over the cervical enlargement, and keeps the blistered surface raw by dressing it with a mixture of Savin and Resin ointments. This treatment is supposed to act like Harkin's and Caton's plans, but probably the good effects, of which in some cases there can be no doubt, are, as the writer believes, to be attributed to some antiseptic action of the absorbed cantharidin. The other plan is to blister the affected joints one by one; by both methods pain may be considerably relieved and often the swelling is lessened and the range of motion increased. The thermo-cautery lightly passed over the affected articulation is also useful as a pain reliever.

Bier's method of causing congestion of the limb is employed in a modified way by Ewart. He applies an elastic tourniquet to the limb after stroking and elevation so as to produce local anæmia for about one minute, after which the pressure is suddenly removed so as to cause arterial flushing and suctional drainage.

Movement of the Joints.—Of all the local methods of treatment none are, however, so important as *passive* movements. From first to last during all stages of the disease the joints should not be permitted to rest except for short periods during acute exacerbations of pain, as only in this way can stiffness, rigidity and ankylosis or locking of the articulations by osteophytic growths be prevented. It is a mistake to dread evil results from passive movements. When these are carried out with skill and gentleness, pain is often considerably relieved and not aggravated. The chief obstacle in employing gentle passive motion is the involuntary interference of the patient, who usually anticipates pain from the movements. If the physician or nurse exercises sufficent patience till all spasm of the muscles has passed away and a complete passive condition of the limb has been obtained by gentle stroking, then the movements can often be carried out without any pain or distress being produced. The patient must be taught to neither attempt resistance nor assistance to the

operator's manipulations. The passive movements may be carried out most advantageously after any of the thermal methods of treatment to be afterwards described.

Active voluntary exercises should follow the passive movements, and the patient must be directed to persevere with these even when they cause pain.

Massage is indicated in every case of long standing, and should always be combined with passive movements; at first gentle effleurage or stroking followed by petrissage or kneading and tapotement or tapping. The main manipulation, however, should be friction massage exercised in the immediate neighbourhood of the affected joint and at a later stage vibration massage or mechanical vibration by the Ruk vibrator may be freely resorted to.

Electricity has been employed in every form, but speaking generally this agent may be regarded as useless unless when combined with passive or active movements, massage and other local procedures. The constant or galvanic current may be employed to improve the tone of the muscles, the stabile or labile kathodal method being the best procedure. The induced or interrupted current is most used, being conveniently obtained from the ordinary cheap induction-coil battery, but it is painful and often of little value. The hydro-electric bath is in repute, and when employed in conjunction with local hydropathic methods—douching, etc.—should be worth a trial. Some electricians prefer static electricity, and the craze for high-frequency and sinusoidal currents has extended to hydro treatment.

The X rays and Radium emanations have also been extensively employed, but with doubtful results.

Heat.—In almost every conceivable form the thermal treatment of rheumatoid arthritis has been elaborated. The late Professor A. Gordon utilised dry heat in its simplest form. The patient was directed to partially undress and expose the joint before a strong coal fire as long as he could comfortably bear the heat, after which the articulation was covered with a layer of brown paper and an ordinary smoothing iron heated to about 200° F. was passed over the joint, the paper intervening; this still proves one of the simplest and best methods of applying dry heat when the hip-joint is affected. Some physicians apply the actual cautery at a black heat.

The sand-bath, Tallermann's cylinder, the various forms of simple hot-air and Turkish baths are all in frequent use. The Dowsing thermo-electric apparatus in which *luminous* radiant heat is applied to the joint or to the entire limb or body without heating the surrounding air is perhaps the best of all forms, since experiments as detailed by Luke demonstrated that luminous radiant heat possesses greater penetrative power than non-luminous heat. A temperature of 230° C. may safely be applied to the entire body by means of this apparatus, and a heat of 260° C. may be without danger applied to a limb or joint; the last-mentioned temperature is equivalent to 500° F. In the Greville electro-

thermic generator the *invisible* rays beyond the red in the spectrum are alone employed, and a temperature of 200° to 250° C. is easily procurable from an electric-light main. The heat in the Tallermann cylinder may be safely applied up to 300° F. (148° C.).

Excellent heat effects are produced by *Diathermy* where by employing currents 400 to 800 milliamperes from Simon's apparatus and the Poulsen lamp the interior of the joint can be submitted to great heat for 15 or 20 minutes at a time; this method of employing heat is also known as "Thermo-penetration," and differs from other methods of using heat.

Moist heat in the form of poultices, fomentations, vapour, Russian and hot-water baths is decidedly inferior to dry heat. Perhaps the best form for the general or local employment of moist heat is the mud-bath.

The previous statement made about the value of electricity applies almost equally to the use of dry and moist heat; these agents are of little use unless when followed by passive movements and massage. The local application of dry heat often renders joint motion possible where previously stiffness and apparent ankylosis had rendered the articulation fixed, but a speedy relapse to the rigid condition is the invariable rule in these cases unless when perseveringly followed up by exercises and thorough local massage.

Hydrotherapy and Spa Treatment.—Though obviously this includes the application of moist heat, it may be referred to at further length. The list of spas where thermal and medicated waters are employed both externally and internally is almost interminable. At home, Bath, Buxton, Strathpeffer, Harrogate, Woodhall, Llandrindod Wells, and Llangammarch are favourite resorts, and at Matlock Bath every arrangement for the treatment of the disease is carried out upon pure hydropathic and thermo-therapeutic lines. Of these, Bath is decidedly the most valuable on account of the high temperature of its saline springs and the mildness of its winter, and every hydropathic, electric and massage requirement can be obtained there as well as at Buxton, Harrogate and the other spas. The brine baths of Droitwich and Nantwich, though more suitable for chronic rheumatism or fibrositis, are also sometimes useful, but often they aggravate at least during the time of their employment. The thermal springs abroad are very popular—Baden-Baden, Aix-la-Chapelle, Wiesbaden, Carlsbad, Dax, Wilbad, Vichy, Aix-les-Bains, etc. Many other resorts devoid of thermal springs are also in favour, as Baden, Franzensbad, Pyrmont, etc.

The advantages derivable from a course of treatment at any of these places are due mainly to the bathing, massage, douchage, etc., though the value of the alkaline and sulphurous waters internally cannot be entirely overlooked, since metabolism and elimination become markedly increased under their use, but it must be remembered in the spa treatment of rheumatoid arthritis that lowering or depressing agents should always be avoided, and acute cases cannot be sent away.

The douching—horizontal jet, percussion, needle and filiform douches—should be combined with massage. The Scotch douche, which consists

in the application of the horizontal douche with cold and hot water alternately, is much employed. The Aix douche is the most valuable form of hydropathic treatment; it is also known as the "massage douche," in which massage is employed under a warm douche whilst the spine is acted upon by a continuous-needle spray, the séance being completed by a warm needle spray bath which is gradually cooled to the temperature of the air. A modification of Aix douche is practised at Vichy, which starts with a steam or hot vapour bath preliminary to the massage.

Electricity, passive and active movements, radiant heat, luminous thermo-electric and Greville baths and the electric-light bath, in which the body is exposed to the light from arc lamps, with but slight elevation of temperature, may all be employed in conjunction with hydropathy and massage or mechanical vibration.

Cataphoresis.—This treatment of late years has been followed by excellent results especially in the mono-arthritic type of the disease. The joint in Somerville's method is surrounded with many layers of lint saturated with a weak solution of Salicylate, Iodide or Chloride of Sodium; over this is bound a layer of metal gauze connected with the negative pole of a galvanic battery, whilst the positive electrode is placed over a large pad of lint soaked in salt solution applied to any indifferent region of the body. When the current is turned on, the salicylic, iodine or chlorine ion is driven in through the skin. The operation can be conducted to best advantage after the application of radiant heat.

Surgical Treatment.—When the joint has become distended with fluid, as in the atrophic type of the disease, this should be removed by aspiration, after which firm strapping over Scott's dressing may be applied.

Various substances have been injected into the synovial cavity in the dry and hypertrophic forms of the disease, but the results have been generally unsatisfactory; cataphoresis will accomplish anything which such a method can accomplish, and no danger need be expected. Buedinger injects a small quantity of sterilised liquefied Vaseline into the joint and states that by this plan a freer range of motion can be obtained.

The breaking down of adhesions under chloroform anæsthesia would appear to be clearly indicated in most cases where the crippling of the joint is complete, but this plan has given sometimes disastrous results. Owing to the erosion of cartilage in the advanced stage of the disease little movement can be expected to return after such a measure, and fracture of the bones is easily produced owing to their atrophic condition.

When the locking of an important joint can be demonstrated by the use of the X rays to be due to any osteophytic growth, it may be really necessary to open the articulation and remove the bone, whether this be loose or attached.

Excision of the affected joint is generally a futile procedure in advanced cases and an unnecessary one in the earlier stages of the disease, but it may become an imperative operation even in acute general cases when an

articulation of primary importance like the jaw becomes hopelessly locked. It has been resorted to in acute cases with the view of eradicating the disease, but with disappointing results.

Deformities should be guarded against through the correction of faulty positions of the limb maintained during treatment; contractures are liable to occur necessitating tenotomy and section of muscles when a considerable range of movement still exists in the joint. Often such contractures can be straightened out by the application of a slowly extending force operating through a pulley and weight. In knee and hip cases the Thomas Splint may be advantageously employed sometimes, or a steel apparatus adjusted to a leathern pelvic girdle with hinge-joints opposite the knee, hip or ankle, which will permit of a range of motion short of producing acute pain.

RHINITIS.

The treatment of acute and chronic inflammation of the membrane lining the nasal passages will be found discussed in the articles on Catarrh and Hay Fever.

Hypertrophic rhinitis in its *recurring* form is seen in hay fever, where the various methods of treatment will be found detailed. Its typically chronic and persistent form may be regarded as the sequel to chronic nasal catarrh, and hence the treatment of hypertrophic rhinitis and of this affection is identical.

When cleansing of the nose and naso-pharynx, the removal of adenoids and the continual use of the alkaline Borax solution sniffed up several times daily fail, the case should be met by operation.

The simplest operative procedure is to apply cocaine and reduce the inferior turbinate bone by pencilling it with the galvano-cautery heated to a dull red, which should be drawn in a horizontal direction over the anterior surface. The operation should be repeated in about a fortnight, when the posterior end may be similarly scarred, each bone being dealt with at a separate sitting.

Should the thickening of the membrane not show signs of shrinking after a couple of operations, a series of deep punctures may be made into the mucosa by a sharp-pointed galvano cautery. After cauterisation a piece of Boric Acid ointment should be inserted upon cotton-wool. This method is better and safer than the application of strong caustics like Chromic or Nitric Acids, which are liable to be followed by adhesions between the bone and septum.

When there is narrowing of the air-way, a more radical procedure is necessary. The anterior end of the inferior turbinate bone should be removed after cocainisation by cutting through its attachment by scissors, punch forceps or a strong steel wire snare; after which the nostril should be plugged for a few hours to restrain any hæmorrhage and the nasal douche used regularly.

The posterior end of the bone may likewise be removed by snaring; after the introduction of the loop through the nose the snare is guided

into position by the finger introduced through the mouth and the mucous and osseous tissue slowly divided to minimise hæmorrhage.

In very aggravated cases with much narrowing the entire inferior turbinate should be removed by the spokeshave or ringed knife, or it may be snipped away piecemeal by the snare, scissors or punch forceps applied at intervals.

The treatment of *syphilitic* rhinitis known as "snuffles" in the congenital disease must be carried out by Mercury or Salvarsan administered internally. In the type of syphilitic rhinitis occurring in later years diseased bone is usually present which must be removed and the local measures described under Ozæna should be persistently employed.

Diphtheritic rhinitis calls for the serum therapy suitable to the primary affection, whilst the local condition calls for free douching with antiseptic solutions.

Dry rhinitis (*Rhinitis sicca*) corresponds to the type of a dry bronchial catarrh. The treatment is that of atrophic rhinitis, since the most constant feature in the affection is the formation of dry crusts. These must be removed by syringing with a weak alkaline borax lotion, after which the introduction of a small portion of Diluted Citrine Ointment (made with lanolin) two or three times a day is the best routine. Any gouty tendency, glycosuria or alcoholic habit will require attention.

The treatment of *Atrophic Rhinitis* is fully detailed in the article on Ozæna.

RHINOSCLEROMA.

This specific local infection, which leads to complete stenosis of the nasal passages, is only seen in individuals who have resided in foreign districts where the disease has been prevalent. The best treatment where the disease has been recognised in its early stage is to excise the nodular growth and freely cauterise its base with Salicylic Acid. A glycerin extract of the specific bacillus has been injected into the hard masses and Salicylic Acid solution (1 in 50) has been similarly employed with some success. Politzer has succeeded in entirely removing the disease by the employment of the X rays during 20 exposures of five minutes each, spread over a period of six weeks.

RICKETS.

Whatever view be accepted regarding the pathology or etiology of rickets, all authorities are agreed that the treatment must be mainly dietetic.

Other important agents must not, however, be overlooked in the management of all cases of the disease. These are abundance of open air and as much sunshine as the seasonal conditions permit and suitable clothing to prevent chills.

As regards prophylaxis, the same dietetic provisions which are indicated in the treatment of the established disease are equally successful in its prevention, and to these must be added the necessity of proper feeding

and improved hygiene in the case of the mother during pregnancy and lactation. Factors in the production of rickets which are constantly overlooked are the food and care of the cow which produces the milk for the infant's use. The animal requires good food, sunshine and warmth, and as regards the former the practice of feeding milch cows on the refuse grains from the distillery has, in the writer's opinion, much to answer for; this food is often in a state of incipient putrefaction, and its use causes an abundant secretion of milk with a small amount of cream.

The first duty of the physician, therefore, is to institute a careful inquiry into every detail of feeding and everything connected with the sanitary surroundings of the child, and to have any violation of the laws of health promptly rectified.

A too rigid adherence to some one particular artificial food may be the cause, and a change in this direction may be imperatively necessary. The physician must bear in mind the sometimes marked peculiarities which exist in young children, and any hard and fast lines for feeding must be considerably relaxed. One infant will thrive upon the milk of a cow which will be poison to another and apparently a stronger child. Patience and discrimination in this matter are, therefore, of the greatest importance at the very outset.

It is too rigidly maintained that the cause of rickets must be due to the absence from the diet of some particular constituent or constituents essential to healthy nutrition. The deficiency has been supposed to be either in the fats, carbohydrates, salts or proteids, but although the disease is rare except in bottle-fed children it may supervene when the usual substitute—cow's milk—is employed in such a form as to contain the fats, salts and proteids in sufficient amounts. Moreover, the same cow's milk in exactly the same form may be used as the exclusive food of another child who remains healthy. The explanation of these contradictory results probably lies in the theory that a serious error in the digestive function is present whereby the necessary constituent (present in suitable proportions in the milk or food) is not being assimilated.

Various opinions have been held, and still are held, upon which of the essentials is wanting. The absence of lime salts, proteid and fats have all in turn been blamed. The solution of the difficulty is not made easier by the knowledge that the milk of a healthy mother contains proteid, fat and salts in such proportions as prevent the possibility of rickets, and that when cow's milk is used instead, with such additions as are necessary to make it identical in composition, rickets supervenes sometimes.

It is maintained that an insufficient amount of fat is absorbed, and this is probably an etiological factor of the disease. Though cow's milk contains quite enough fat for the maintenance of healthy nutrition, the superabundance of proteids in the form of casein taxes the digestive powers of the infant beyond their effective limits, with the result that both fats and proteids are assimilated in insufficient amount.

An obvious and simple expedient would be to dilute the cow's milk

till the requisite amount of proteid present in human milk is provided, but when this is so proportioned it will be found that the fat and sugar have fallen below the standard necessary to insure healthy nutrition.

The difficulty is usually overcome by providing a healthy wet nurse, but as this is often an impossibility for many reasons, the physician is driven to the selection of substitutes, the most obvious of which must be the milk of the cow in some form or other associated with accessory feeding.

If the precipitation of the casein in indigestible curd is visible in the motions much may be done by the employment of drugs which will promote active digestion in the stomach and bowel. The following mixture may be given to a child under 12 months old, and ½ gr. Hyd. cum Creta should at the same time be administered night and morning for a few days:

℞. *Glycerin. Papain.* ʒiij.
Syrupi Simplicis ʒvj.
Aquæ Chlorof. ad ʒij. *Misce.*

Fiat mistura. Cpt. ʒj. *quater in die post cibum.*

Many physicians still adhere to the time-honoured combination of 1 gr. powdered Rhubarb with 4 of Bicarbonate of Soda.

Predigestion or peptonisation of the milk is indicated when the intestinal or gastric irritation is acute, but this must not be pursued for long periods.

The cow's milk must be diluted with water or lime water or barley water 1 to 3 or 4 at first, according to requirements. A small quantity of cream is to be added and enough beef juice to increase the amount of fat and proteids; occasionally a little sugar may be necessary when the milk must be highly diluted.

Where cream is not well borne, no food or drug is so serviceable as Cod-Lver Oil, which not only supplies sufficient fat, but unquestionably assists in the absorption of the proteids and lime salts in the food, and in many instances its administration meets every requirement in the management of rickets when the child is able to take cow's milk. Its internal administration may often be advantageously supplemented by inunction and the employment of the cod-liver oil binder applied to the abdomen under mackintosh where the wasting is extreme.

The use of hypodermic injections of Sea-Water Plasma when the precipitated casein has caused gastro-enteritis is a valuable aid in some cases.

Later on starchy foods should be administered, but the promiscuous use of these in young infants before the development of the glands whose secretions digest amylaceous substances often leads to the dyspeptic condition which produces rickets; hence the serious objections to many of the popular patent foods containing starch. A little carefully boiled wheaten flour mixed with the milk may be tried at first, after which oaten flour, fine sago or arrowroot may be permitted, and finally well-boiled oaten meal porridge can be safely used.

A very valuable addition to the milk dietary may be had by permitting the child to suck a large piece of undercooked or almost raw meat held in the nurse's fingers; when carefully administered in this way, there is no danger of the solid parts being swallowed. As soon as possible it will be most advisable to vary the diet, and egg-yolk with a little stewed fruit or a spoonful of freshly expressed orange-juice may be given. In the case of the children of the poor a well-made mutton broth with the vegetables strained out before use and the fat carefully skimmed off affords a most valuable addition to the milk and farinaceous food.

Drug Treatment.—This must be considered as always taking a secondary place in the management of rickets if we consider Cod-Liver Oil as a food and not as a drug in the ordinary sense of the word. The pathological fact of the deficiency of calcium salts in the softened bones led formerly to the administration of the phosphate and other salts of lime, but as these pass unaltered through the system the practice has been wisely abandoned by all who recognise the difference in the pharmacology of the mineral phosphates and of the free element or organic phosphates.

Free phosphorus exerts a specific action on the growth of bone, and by many authorities is regarded as the ideal drug treatment of the disease. It should never be administered in doses exceeding $\frac{1}{200}$ gr. 1 min. of the B.P. Phosphorated Oil is supposed to contain about $\frac{1}{100}$ gr. of the pure substance, but owing to oxidation usually old specimens of the oil are much weaker; nevertheless ½ min. is quite enough for a child six months old, and it should always be prescribed in Cod-Liver Oil as in the following:

℞ *Olei Phosphorat.* ℥. xx.
Olei Morrhuæ ʒiv. *Misce.*
Ft. mistura. *Sumat* ʒj. *ter in die post cibum.*

The organic phosphorus contained in the Glycerophosphates, in Lecithin and in the proprietary preparations known as Sanatogen and Phytin acts as free phosphorus, and may be employed as a substitute for the nauseous phosphorated oil. As pointed out elsewhere by the writer, the undue prolongation of phosphorus treatment may cause the bones to become finally hardened in their abnormally curved position, an event seldom seen in patients who have recovered from rickets unless where neglect has permitted great deformity from pressure, etc.

Upon the theory that rickets is due to a faulty action in the ductless glands Thyroid, Suprarenal, Pituitary and Thymus, Gland extracts have been employed, and also a number of blood tonics as Arsenic, Iron, Quinine, etc., and also X rays, but the dietetic treatment of the disease is so certainly efficacious that the physician will be wise to direct his entire attention to this and leave drugs severely alone, unless for the treatment of the dyspepsia or the gastro-enteritis which is sometimes present; complications as convulsions, laryngismus, pain and restlessness will require the administration of Bromides, but very rarely of opiates in

any form. Local applications to the bones and joints are not indicated, though skilful massage in the convalescent stages always proves useful.

Bathing, except in the very acute phase of the ailment, is always advantageous, and the employment of a warm sea-water bath in which seaweed or wrack has been boiled may be used. Whilst the child is partially immersed in the bath and supported by the nurse's hands placed under the armpits, the trunk may be sponged with water gradually cooled to the temperature of the surrounding atmosphere. Later on the cold water may be allowed to flow from a height over the child's body, whilst the feet are immersed in the warm bath.

Sponging is continually indicated for the removal of profuse perspiration, the skin being mopped with a sponge wrung out of tepid water, after which cold may be applied in the same manner.

Deformities.—Next in importance to diet comes the means of preventing permanent deformities. The child should be compelled to lie in the horizontal position in order to take the weight of the trunk off the yielding bones, and obviously this is a vital matter in female children to prevent pelvic distortion. Though in the great majority of mild cases the bent bones tend naturally to unfold their abnormal curves as the child advances in years, this result should not be too confidently counted upon.

The children of the better-off classes where an efficient nurse can be provided should spend most of their days lying flat in a perambulator as they are wheeled about in the open air and sunshine. The children of the poorer classes should be prevented from walking or crawling by the application of a straight splint applied to the outer aspect of each lower extremity, and extending from the pelvic bones to 4 or 6 inches beyond the foot. Spinal deformities as kyphosis and scoliosis are liable to be produced by permitting the child to sit up in bed or to be carried about on the nurse's arm. Should these deformities be present when the case first comes under observation they are a clear and imperative indication for the maintenance of the horizontal position in all children under 5 or 6 years of age. A hard mattress and a double Thomas's splint extending from the occiput to the feet should be used to enable the child to spend a good portion of each day in the open air; at night and in the morning the spinal muscles should be well massaged.

Bending of the leg bones, if the child be under 5 years, will probably yield to horizontal rest and assiduous massage, douching and electric stimulation of the muscles.

Deformities in older subjects where the rest treatment of rickets has been neglected will often require the operations necessary for the correction of coxa vara, coxa valga, genu valgum and varum, flat-foot, etc.

Late Rickets.—The treatment suitable to the infantile type of the disease should be followed, whether the pathology of this condition be accepted as a relapse from a primary rickets or of the nature of a commencing osteomalacia. Prolonged rest in these cases, which usually appear after the age of 7 or 8 and before the advent of 17, is necessary,

as the deformities liable to follow are more serious than in the case of the infantile type.

Scurvy-Rickets.—This cannot be regarded as a variety of rickets, but must be accepted as infantile scurvy which occurs in a rickety child, and is usually the result of exclusive feeding on patent foods or on milk which has been submitted to prolonged boiling with the view of sterilising it; the disease occurs nearly always amongst the children of the better class. The treatment is that indicated for rickets with the addition of a small amount of fresh vegetable or fruit juice, mashed potato and raw meat juice. (See under Scurvy.)

RIGOR.

The main treatment must obviously be that indicated for the primary disease, but during and immediately after the prolonged shivering fit certain symptomatic treatment should be resorted to independent of that of the malady causing the rigor.

Following up the natural instinct of the patient, who generally has a marked desire to get as near to any convenient source of heat as possible, the physician should insist that he take immediately to his bed, where he may be surrounded by dry warm blankets, hot-water bottles and excess of clothing. Stimulants may be freely given. One full dose of Brandy or Whiskey should be administered as soon as possible. It is advisable to give this with some very hot water and a little sugar. When the heat has been brought to the surface of the body the excessive clothing may be gradually removed. As a rule it is not advisable to resort to cold sponging during the hot stage, as this may bring on another rigor. In the sweating stage much relief may be obtained by dry sponging of the entire cutaneous surface.

Nitrite of Amyl and Chloroform sometimes cut short the attack; but, upon the whole, it is advisable to maintain a position of neutrality, and await further symptoms. Quinine often prevents or modifies the severity of recurring attacks; but, owing to its slowness of action, it has no effect whatever upon the rigor if administered during its presence. It is of most value in the rigors of pyæmia. The newer antipyretics do not give any more satisfactory results. The old-fashioned plan of giving a speedy emetic at the very outset, when this is feasible, sometimes appears to modify the severity and duration of the rigors which usher in acute inflammatory or zymotic affections. When there is much constitutional excitement or apprehension on the part of the patient, a hypodermic injection of Morphia often is of great benefit. It should, however, be used with caution if renal disease is marked. In the rigors following the use of the catheter, if given immediately after the first feeling of chilliness, the rigor may be prevented, but the patient should instantly be wrapped up in warm blankets.

RINGWORM—see Tinea.

RODENT ULCER.

This must be recognised as a form of true cancer and treated accordingly; a very considerable advance has been made within the past few years in the methods of dealing with this most obstinate disease. The plans of applying caustics and the thermo-cautery have been totally abandoned, and even the knife has been almost laid aside since the curative powers of Radium and the X rays have been demonstrated. When the ulcer is small and situated on the side of the nose, temple or cheek without having involved the eyelids, complete excision by the scalpel is certainly the most rapid method of dealing with it, but skin-grafting may be necessary, and in all cases a more or less unsightly scar remains, since not only the ulcerated surface, but its "rolled" or rounded ridgelike border must be included well within the sweep of the incision, otherwise a return is certain. As a rule also it will be advisable to employ the X rays in order to insure a complete cure.

For early cases the X ray is the ideal form of treatment. Three or four applications may be sufficient, and the subsequent cicatrix is scarcely noticeable. For more extensive ulcers the treatment may run into weeks or months, a very serious consideration with poor patients living at a distance from the institution at which this treatment is carried out. The period necessary for treatment depends on the thickness of new cell formation, hence the duration of treatment may be much curtailed by a preliminary curetting, or excision, done under local anæsthesia; this aids the action of the rays and shortens the period from months to weeks. As the ulcer is usually situated in proximity to the orbit, great care must be exercised in the protection of the skin of the eyelids and of the conjunctiva by a layer of sheet lead or by the use of special focussing tubes. As the treatment should never be undertaken except by the X-ray specialist, it is therefore unnecessary to go into details regarding the various forms of apparatus employed.

Recurrences are frequent, these being due to some portion of the thickened margin escaping the full action of the rays, but such event need not be regarded as a grave omen, since further exposure after curetting will effectually meet the new requirements.

Neglected cases which were formerly regarded as outside the reach of surgery may be successfully dealt with by the above method, but when the cavity of the orbit has become invaded the best procedure will be to enucleate its entire contents before applying the rays. When the bones and cartilage of the nose have become invaded by the ulceration, the rays afford the only means of checking the progress of the destruction in these tissues.

Radium emanations have proved almost, and in some cases quite as satisfactory as the X rays, and Wickham states that their penetrative power is greater than that of the rays when employed as an auxiliary to surgical treatment. The emanations from a 5-milligramme sealed glass tube or mica button may be easily obtained by placing either form

of appliance in contact with the ulcerated surface for about 30 minutes at a time at intervals of about 3 weeks. There is less danger of injury to healthy parts than with the use of the X rays, and the emanations have been successfully employed for the cure of the burns caused by the rays. In many cases complete cure of rodent ulcer has been obtained by as few as five applications of this agent.

Harris employs the rays in combination with Zinc Ionization, using the rays after the zinc has penetrated the cells, thus utilising the secondary radiations emanating from the zinc molecules. Roberts obtains similar results by employing the secondary radiations from thin plates of Silver or Copper placed between the tube and the ulcer. The Finsen lamp, Ultra-violet Rays, Fluorescent light, High-frequency currents, Cytolysis, Fulguration and Cataphoresis have all been employed with some degree of success, but the results are in no sense comparable with those obtained by the X rays and Radium. Carbonic Snow has been employed successfully in some cases and is easy of application. In small ulcers it gives very satisfactory results.

ROSACEA.

Reflex irritation from the stomach, ovaries or nasal cavities is maintained to be the cause of this disfiguring condition of the nose by some, whilst others believe it to arise from invasion by the seborrhœa microbe. The first step in treatment should therefore be a preliminary scrutiny of the condition of the digestive and menstrual functions, and any departure from the normal standard will demand rectification. Though the disease is not necessarily associated with alcoholism, it is made worse by it.

The diet should be such as experience dictates to be freest from any local reflex consequences. Leredde strongly advocates a purely vegetarian regimen, and undoubtedly fresh and easily digested vegetables should form a large proportion of the dietary in all cases, with moderate amounts of white meat, fish, and farinaceous foods, when the latter cause no dyspeptic symptoms. Strong tea and strong coffee and alcohol should be entirely given up, cocoa or a weak China tea being substituted for these. Exposure to cold winds increases the erythematous condition, and this may to a certain extent be neutralised by the application of a skin-coloured powder like Calamine (or the lotion about to be mentioned) before the patient exposes himself in cold weather.

Constipation should be guarded against, and a morning saline purge always affords some relief.

Sulphur internally is a favourite drug, but better results are obtainable from the sulphur-containing Ichthyol in 10-min. capsules after each meal, but even this treatment should not be employed when dyspeptic symptoms follow the administration of the drug. In the presence of a marked gastric sensory neurosis large doses of Sodium Bicarbonate, Creosote in capsule or small doses of Antipyrine with 20 mins. Liquid Extract of Coca may be administered.

Local Treatment.—When the disease is found in the early or erythematous stage a simple drying lotion like the following may be applied as often as convenient:

℞. *Zinci Oxidi* ʒij.
Calaminæ Præparati ʒiv.
Spirit. Vini Rectif. ℥ij.
Aquæ Rosæ ad ℥x. *Misce.*

Ft. Lotio. Signa.—*"To be applied with a small sponge twice a day or oftener to the affected skin."*

When the skin is very dry, 4 or 6 drs. Glycerin may be substituted for the spirit, or the same ingredients may be combined in an ointment, as:

℞. *Calaminæ Præp. gr.* xl.
Zinci Oxidi gr. xx.
Lanolin. et Vaselin. āā ʒj. *Misce.*

As a rule applications such as are suitable in the treatment of acne are indicated. Sulphur is a valuable application, especially when there is much accompanying inflammation of the sebaceous glands; it may be added in the amount of 2 drs. to the above lotion and 40 grs. to the ointment, the precipitated being preferable to the sublimed preparation.

In cases of longer standing, Resorcin or Salicylic Acid is indicated when there is considerable induration of the skin, in order to hasten desquamation and get rid of the horny layer.

The resorcin may be employed in almost any strength according to the effect desired. A mild application like the following may be painted on daily for 3 or 4 days, viz.:

℞. *Resorcini* ʒss.
Ichthyol ʒj.
Collodium ad ℥ij. *Misce.*

Lassar's Strong Resorcin Paste consists of Resorcin, Zinc Oxide, Starch, of each 1 mixed with 2 of Liquid Paraffin (*i.e.*, 1 in 5). Ihle's Paste is only 1 in 24, and from this strength up to 1 in 2 is employed.

The dilatation of the small vessels which causes much unsightliness may be treated by electrolysis or multiple scarification and the application of Adrenalin. Some dermatologists succeed by passing the electro- or thermo-cautery lightly over the congeries of permanently enlarged vessels, and Abrahams injects a few minims of 95 per cent. Alcohol around the dilated vessels.

Good results have been obtained by exposure to Ultra-violet Rays. When the condition known as *Rhinophyma* exists in which large tomato-like or pendulous hypertrophic masses are present, these must be dealt with by the surgeon. Where much pustulation is present the existing

acne may be considerably relieved by Vaccine treatment, but this cannot be expected to influence the extensive excrescences or lobular tumours.

The most radical and only satisfactory surgical procedure in cases of very great deformity is that of "decortication" practised by Ollier, who dissects out the entire hypertrophic growths down to the osteo-cartilaginous skeleton of the nose, leaving the raw surface to granulate under Iodoform dressing. Skin-grafting when skilfully carried out shortens the healing process and lessens the scar deformity.

ROSEOLA, OR ROSE-RASH.

This requires no treatment as a rule, save such as is suitable for the primary malady to which the term "roseola" is loosely applied. Thus it is sometimes wrongly employed as a synonym for Rötheln, and by some authorities it is accepted as identical with the so-called "Fourth Disease" of Clement Lucas, whilst many still apply the term to various non-exudative erythemas caused by the administration of drugs and sera.

In the absence of the discovery of any exciting cause, the safest routine will be to administer ½-oz. doses of Fluid Magnesia preceded by a smart saline purge. If there be any itching, a bath or sponging with Bicarbonate of Soda solution 1 oz. to the gallon may be employed.

RÖTHELN, OR RUBELLA.

The treatment of German Measles is identical with that of an unusually mild attack of measles. The child should be put to bed in a well-ventilated room or permitted to lie upon a couch when his temperature remains under 100°. (Often the temperature never exceeds the normal.) Save a restriction of the diet to milk and farinaceous foods, the administration of a mild saline purgative and isolation to prevent the spread of the disease to others, nothing else is necessary. The enlargement of the cervical and other glands does not as a rule call for any interference, and friction, fomentations or poulticing should not be employed. A layer of warm wool around the neck or jaws is all that is necessary when stiffness or pain is experienced. As a rule the child feels quite well in a couple of days, and may safely be permitted to mix with others in 3 weeks after the commencement of the disease. It will be advisable, however, to prescribe a few warm baths well stained with Condy's Fluid to hasten the desquamation and make certain against any possible spreading of the disease. Drummond believes that a small quantity of Cinnamon swallowed daily with meals is a prophylactic.

RUPIA.

As one of the manifestations of syphilis, this must be treated constitutionally as well as locally. Whether the limpet-shell crusts appear in the late secondary or in the tertiary period, the internal administration of Mercury will always as a rule be necessary, since the skin lesions respond but slowly to Iodides, but Iodides are always clearly indicated in con-

junction with mercurials. Rupial eruptions, according to Hutchinson, usually occur in syphilitic patients after mercury has been given in too large doses, and has disagreed and been wholly laid aside.

Donovan's solution is the best preparation for routine internal treatment, and may be given in the full dose of 20 mins. thrice daily after food. Salivation should be avoided and the mercurial administration must be stopped as soon as the first signs of gum tenderness show themselves; then Iodides in 10 to 20 gr. doses may be given for several weeks. One dose of Salvarsan may be injected before commencing mercurial treatment.

The crusts should be softened with a Boric Acid poultice and the cleaned ulcers dressed with Calomel or weak Red Precipitate Ointment or Black Wash. Very indolent or spreading sores should be curetted and lightly touched with the strong Pernitrate of Mercury solution.

Occasionally rupia will be met with in cachectic subjects which will tax all the skill and patience of the physician. The writer has seen such cases in Fournier's wards which defied all treatment till the Serum from healthy dogs was administered hypodermically. He has had the recent experience of one case where the ulcerations spread so deeply that death from exhaustion was only prevented by the administration of a Vaccine prepared from the secretion of the ulcers. All such intractable cases appear certainly to be instances of a dual infection caused by the admission of some destructive organisms to the ulcerated surface, and hence the importance of the use of an autogenous vaccine and the continuous disinfection of the ulcerated surface. Severe rupial ulceration will demand in all cases the most careful attention to the general health of the patient and a diet as varied and strengthening as the digestive powers of the patient will permit. The liability to relapses will justify the physician in recommending a long ocean voyage in severe cases.

SACRO-ILIAC JOINT DISEASE.

As this condition is nearly always of a tuberculous origin, the treatment will be based upon the general principles laid down for knee-joint and hip-joint affections. Thus, absolute rest to the affected surfaces must be rigidly maintained for a long period. In children this can be effected by a double Thomas's splint and plaster bandage; in adults a large leather splint may be moulded to the pelvis and leg. Abscesses should be opened as soon as their presence is demonstrated, and if these fail to heal, all sinuses may be opened up and any diseased bone removed, and the cavity scraped and thorough drainage established. The greatest importance is to be attached to the prevention of the admission of septic micro-organisms; hence many surgeons advise, when rest and splint treatment fail to effect a marked change, that the joint should be cut down upon before suppuration is permitted. The strictest antiseptic precautions being maintained, the bone constituting the posterior angle of the iliac crest should be removed and the adjacent diseased caseous tissue thoroughly gouged out, after which the cavity should be plugged with Iodoform gauze.

The injection of warmed Bismuth Jelly into the sinuses in old-standing cases has given better results than scraping and other partial operations.

The constitutional remedies and general directions as to diet, environment, etc., apply to this affection, and its constant tuberculous nature will suggest many of the agents mentioned under Phthisis and Tuberculosis. In some cases Vaccine treatment has proved valuable.

SALPINGITIS.

The treatment of inflammations of the Fallopian tube is in the main the treatment of Pelvic Peritonitis, Ovaritis and Endometritis, and will be found under these headings. The special treatment of suppurative inflammation of the tubes will be found detailed under the heading of Pelvic Inflammation.

SARCOMA—see under Cancer.

SCABIES.

In mild cases of itch the use of almost any one of the innumerable parasiticides will kill the acarus and its ova, but the most harmless to the patient and the one most certain and cleanly in its action is Sulphur when properly used.

The speediest cure is Vlemingkx's solution, by means of which a sharp attack of itch may sometimes be removed in a few hours. This solution is prepared by boiling Lime or Lime Putty with Sulphur in a large quantity of water, and after the sediment subsides a brilliant clear yellow solution remains, which is the remedy under consideration. The proportions of the ingredients are of little matter, but it is well to have them in excess, and the water will only dissolve a small amount of the Pentasulphide of Calcium. 8 oz. of Sublimed Sulphur and 4 oz. of Slaked Lime will make a gallon of the fluid, and with this a large school of children affected with scabies may be effectually treated when the ailment is not of long standing. All that is necessary is to take a small sponge and swab the solution freely into the skin. As the liquid comes into contact with the organic matter contained in the secretions of the skin it gives off free sulphuretted hydrogen, and leaves a fine powdery residue, filling up the furrows on the cutaneous surface. The patient may have a previous hot bath with soft soap; little irritation is caused by the remedy, but when there is already much traumatic eczema present, and where the liquid is rubbed in or applied frequently, it may produce considerable irritation.

The patient may put on his clothes immediately after the sponging, when the excess of the liquid will cause destruction to any wandering male or young female insects adhering to them, but upon the whole it will be safer to fumigate the clothes and bedding by burning sulphur in the room or by baking them in a hot chamber. It is well to make several applications to insure complete destruction to any young which may have escaped the action of the liquid owing to their deep position in the burrows.

Sublimed sulphur may also be applied in its dry state, and well rubbed into the skin and sprinkled over the inner surface of the flannel or woollen under-garments and over the bed-sheets every night. It can be rubbed into the hands and between the fingers, after which a leather glove may be worn. This method, which is cleanly, is not at all so efficacious as the solution.

The most certain and reliable of all methods of using sulphur is to give the patient a hot bath, in which the body is to be thoroughly scrubbed with a hair-brush and soft soap, so as to open up the burrows of the itch insect, after which Sulphur Ointment is to be rubbed in for several minutes with the palms of the hands into every part of the cutaneous surface, except the face and scalp. This can be best done before going to bed, the patient sleeping in a combination dress. This treatment must be continued for several days—three or four at least—to insure a thorough permeation of the furrows by the sulphur. In patients with tender skins, an ointment of half the B.P. strength may be employed. The patient should be directed to change his clothing every day whilst under treatment, but not to wash off the ointment by bathing in the morning. In military practice, after the bath, scrubbing and rubbing in of the ointment, or of a mixture in equal parts of Soft Soap and Sulphur Ointment, a blanket, smeared over with the ointment, is wrapped round the patient's body. Bruce and Hodgson treat scabies successfully by exposing the patient after a hot bath and scrubbing to the fumes of burning sulphur for 50 minutes in a specially constructed box which permits the patient to breathe pure air during the fumigation.

Where much dermatitis follows this thorough method, a bath containing starch gives great relief. Thorough disinfection of the inner clothing by baking them in an oven or by boiling is necessary in all cases.

Beta-Naphthol, Peruvian Balsam, Storax, Tar, Stavesacre, Green Soap, Cocculus Indicus, Creosote, Oils of Cade, Cajuput, Anise, etc., have been used from time to time, but Sulphur meets every requirement. Peruvian Balsam and a 1 in 10 ointment of Beta-naphthol are very satisfactory methods of treating the disease when it is confined to the hands, but these applications are unsuitable when a large area of the skin is to be acted on.

It may be necessary to treat the eczema and irritation, partly the result of the parasite, and partly the result of the remedy; some bland unirritating ointment, lard or oil easily accomplishes this, but it is unnecessary to remind the practitioner that dermatitis cannot be removed till the destruction of the parasite has been effected.

SCALDS—see under Burns.

SCARLATINA.

Prophylaxis.—A tendency has been showing itself of late years towards minimising the high degree of the infectiousness of the scarlatinal poison, probably because the infectivity of the desquamated epithelium had been

greatly exaggerated and the comparative immunity of infants to the disease is now more fully realised. There are, however, few, if any, infectious diseases in which preventive measures are so imperative, since the mortality of the disease rises so unmistakably with the age of the child after the first year of life, though it falls after the age of eight to ten years of life. There are, moreover, good reasons for believing that if the individual can be protected during the period of childhood and early adolescence he is likely to escape the disease altogether.

These considerations are of vital importance when the question of idiosyncrasy as regards susceptibility in certain families is remembered, many reported cases showing the obliteration of a family of young children, only the grown-up members escaping.

Hence the importance of rigid isolation, and where the patient cannot be at once removed to hospital the other children should be sent away from the home without delay. The period of most intense contagiousness corresponds with the acme of the eruption and fever and not with the desquamation stage; the disease should be regarded as contagious from the time that the first throat symptoms and fever show themselves. The fact that the poison is often borne in milk has been abundantly demonstrated in many epidemics, and is obviously of great importance in prophylaxis. The part played by fomites must be remembered, and the tenacity to life of the virus is most remarkable; an infected article of clothing worn during the acute stage of the disease and locked up for more than a year has often conveyed the malady in an intense form. Hence also the vital importance of a subsequent thorough disinfection of every nook and cranny in the sick-room, the repapering of the walls and the destruction of all bedding and carpets and the removal of every unnecessary article of furniture from the sick-room before the patient is placed in it.

The important question of methods of treatment which bear upon the checking of the spread of the disease from the affected to the healthy has occupied much attention of late years. The plan of early inunction of the patient's body with Eucalyptus Oil has been, in the writer's opinion, an advance, but in the hands of many it has become a danger by leading to the practice of permitting the patient to mix too early with the unaffected. The physician is wise who still maintains that complete safety can only be maintained by a period of isolation extending over at least six weeks, even when disinfecting baths, antiseptic throat applications and eucalyptus inunctions have been carried out, and this period must be prolonged considerably when any suppurative ear lesion exists.

Though the incubation stage may be a period of hours, it sometimes is prolonged to several days; hence a quarantine of 8 days for those known to have been exposed is necessary.

Vaccine prophylaxis has been tried on a large scale in Russia with most satisfactory results by Gabritschewsky, who affirms that complete immunity can be obtained by three injections of a killed culture of streptococci obtained from a patient suffering from scarlatina, the dose being

½ c.c. of a concentrated bouillon culture. It is still to be determined how long this immunity will last, but it has been proved that it affords almost complete protection during an epidemic of the disease.

The treatment of the established disease will commence with the selection, preparation, heating and ventilation of the sick-room and with directions for the diet, etc. These may be taken as identical with the requirements necessary for the preliminary treatment of a case of measles as detailed in the article on Measles. A room as thoroughly isolated as possible from the other parts of the house should be chosen, and it should have an adjoining chamber or dressing-room for the nurse, who should not be permitted to wander about and infect the other parts of the house. It is unnecessary to repeat the caution already given of having everything except indispensables removed from the sick chamber before the patient's entrance into it, nor is it necessary to point out the imperative need of a thorough disinfection of the room in which the patient first showed the symptoms of the disease in case he cannot remain there.

A sheet should be fastened outside the door of the sick-room, and this should be kept moist by a 1 in 80 Carbolic solution or a 1 in 200 of Chlorinated Lime or Chlorinated Soda, and a large vessel containing diluted Condy's Fluid should be kept on the landing for the immersion of all drinking and eating utensils.

Given a mild case of simple scarlatina without complications the less officious the physician and the nurse are the better. A milk diet at first, followed in a few days by light farinaceous foods, bread and butter, weak tea and thin soups are all that is required, fish and chicken being permitted as soon as the fever entirely subsides and the throat congestion has disappeared.

The temperature of the room may be kept about 60° F., and though the freest ventilation and sunlight are desirable, when the patient is permitted to dress and sit up (by the end of a week), he must, owing to the possibilities of renal complications, be carefully protected from chills. Attention should be paid to the state of the bowels, and as a rule it will be desirable to give a mild saline at the commencement of treatment.

Bathing is undesirable in the early stages, and unless the temperature remains high, sponging of the entire surface of the body should be dispensed with. Any simple diaphoretic mixture may be prescribed, and as rheumatic pains are sometimes experienced in the joints even in mild cases, the following may be ordered:

℞ *Sodii Salicylatis* ʒiss.
Spirit. Mindereri ℥iss.
Syrup. Aurant. Flor. ℥j.
Aquæ ad ℥iv. *Misce.*

Ft. mistura. Cpt. ℥j. *ter in die.*

In the treatment of such a mild case of the disease as is under consideration there will be no necessity to treat the throat locally; should, however,

any pain in swallowing be experienced, a Carbolic Spray (1 in 100) may be freely employed. The use of this spray is urged as a routine antiseptic, and much stronger solutions are recommended by Milne and others with the view of diminishing the infectivity of the disease, and this is carried out in conjunction with the following:

Inunction of the entire body with Eucalyptus Oil, including the hair and scalp, is started immediately the disease declares itself, the oil being applied twice a day for the first four days and once a day for a week afterwards.

Milne claims for this routine that the severity of the disease is lessened and that the scarlatina patient may freely be permitted to dress and move about among healthy individuals by the end of 10 days from the onset though he be desquamating liberally. The results of this method are challenged by Goodall and others.

By the end of 4 days after the temperature has become normal in the commonly met with mild cases of the disease the patient may be permitted to dress and sit up; before doing so a warm bath should be administered, and the writer's practice is to order the water to be deeply stained with Condy's Fluid. After careful drying before the fire in the sick-room an anointing oil consisting of 1 part Eucalyptus and 4 of Olive Oil may be rubbed over the skin. The bathing should be repeated daily and the feet and hands may be two or three times a day well scrubbed with a hair-brush and soap to hasten the removal of the dead epithelium. The child should be kept within doors for a month in severe winter weather, but in summer he may be permitted to go into the open air in about 10 days or sometimes less.

Scarlatina Anginosa.—This will require active measures both constitutional and local. The pyrexia, if only moderately severe, may be met by small doses of the newer antipyretics as Antipyrine, etc., or full doses of Quinine; but as a rule the effect of these is very transient, and in all cases where the temperature reaches say 104° the only reliable method of reducing the fever heat is by assiduous Sponging, the Cold Bath or Cold Pack. Whilst cold sponging meets the ordinary severe form of this septic type of the disease, the cold pack should without hesitation be at once resorted to in all cases where the temperature reaches 105° or upwards. Owing to the youthful age of the patient the cold pack is easily applied. A large bath towel saturated with water at about 90° should be loosely wound round the patient's body and after the lapse of 5 minutes water at about 70° may be made to trickle over this till the body heat falls to about 102°. The duration of the pack and its repetition will depend upon the effects produced as indicated by the thermometer used every 15 minutes; except in the severest cases, when the pyrexia falls to 102° in the pack it will continue to fall farther when the patient is taken out of it. Kerley does not hesitate to apply the pack continuously for 48 or even 72 hours, ice being applied to the head and the hot-water bottle to the feet in the presence of the high fever accompanying some of the complications of the disease. The pack not only reduces the fever,

but it is the best remedy for the intense restlessness, delirium or insomnia.

As regards the use of drugs internally to destroy the causal micro-organisms or their toxins, no chemical substance is known which can be regarded as possessing any specific action. Illingworth's treatment by Biniodide of Mercury introduced with this intention has not stood the test of experience, and the same may be said of Chlorate of Potassium, Carbonate of Ammonia, Oxygen, Benzoates, Salicylates, and Sulphocarbolates.

Serum Therapy and Vaccine Treatment.—The results of injections of a Polyvalent Antistreptococcic Serum prepared by injecting different strains of the coccus into the horse cannot be regarded as very satisfactory. Given in the usual dose of 50 c.c., the serum, however, cannot do harm, and may favourably affect general nutrition. The intravenous injection of 50-100 c.c. of the blood serum from convalescing scarlatina patients has been successfully tried by several physicians: this method of treatment is obviously only indicated in serious toxic cases.

There cannot be a doubt about the value of an autogenous vaccine in the treatment of some of the grave complications, and whilst such is being prepared from the secretion of the patient's ear or throat lesion, a stock *Streptococcus conglomeratus* vaccine should be injected in doses of at least 25 millions. Great diversity of opinion still exists about the value of routine Antistreptococcic vaccine treatment in scarlatina, and the weight of evidence appears to be certainly against it.

Local Treatment.—In all forms of the anginose type of scarlatina the application of local antiseptic solutions should be assiduously employed from the start, since these may prevent or minimise suppurative cellulitis and other grave complications; moreover, by destroying the virus at the seat of its rapid production constitutional toxæmia may be diminished, since the throat secretions are being continually swallowed by children.

As a routine the following spray may be frequently used:

℞ *Glycerini Ac. Carbolici* ʒv.
Glycerini Ac. Borici ʒiv.
Aquæ Rosæ ad ʒxij. *Misce.*

By older children this when diluted with half its volume of water may be used as a gargle. Stronger solutions (1 in 20) of Carbolic Acid or even the Glycerin of this drug may be carefully applied as a swab occasionally.

When the secretion is foul and profuse, sprays should not be entirely depended upon, but the throat and nasal passages should be syringed twice a day with a 1 in 30 solution of Carbolic Acid, 1 in 1,000 Perchloride of Mercury or 1 in 50 Permanganate of Potassium solution. Warm saturated Boric Acid solution is an efficient cleanser, and a 1 in 4 solution of Argyrol or 1 in 20 Collargol may be used as a swab, after cleansing with the boric-acid solution, carbolic spray or 1 in 4 Hydrogen Peroxide solution.

Chlorine is one of the most reliable of antiseptics, and Caiger's method of preparing a solution of the free gas for irrigating the throat and nares is convenient. He pours 100 mins. strong Hydrochloric Acid on 3 drs. Potassium Chlorate in an empty pint phial, and after evolution ceases water is added at short intervals till the bottle is filled up. This solution may be used as a nasal douche and throat wash every 2 or 3 hours. Iodine (3 drs. weak tincture to 20 oz. water) may be used in a similar manner, and 2 drs. Carbolic Acid may be added to this for a spray.

To the swelling in the neck cold or iced compresses and warm antiseptic poultices should be applied according to the amount of comfort derived from either class of application, but when deep fluctuation appears a warm boric compress under oiled silk should be employed, and as the pus approaches the surface a free incision should be made and the abscess cavity thoroughly irrigated by warm Boric solution or Hydrogen Peroxide. Abscesses in the tonsil should be opened early. When brawny swelling in the neck appears, the pressure on the trachea must be relieved promptly by free incisions without waiting for pointing.

Laryngeal symptoms are an indication for the use of the steam-spray, bronchitis kettle, and the agents useful in the treatment of diphtheria; suffocative signs may demand the prompt opening of the trachea. The appearance of a diphtheritic membrane on the tonsils or fauces is a clear indication for the injection of the Antidiphtheritic Serum, and this should be employed in all cases of doubtful nature, since no harm can possibly follow from its use.

It is almost needless to emphasize the importance of feeding in all septic cases; strong beef juices, nourishing soups, alcoholic stimulation, beaten-up eggs and rectal alimentation will be needed.

Malignant scarlatina is nearly always fatal. Though the rash may show little sign of development, the hyperpyrexia must be promptly met by the cold pack, and comatose symptoms should be attacked by the ice-bag applied to the shaven scalp, whilst a mustard poultice is placed over the nucha. Normal serum may prove useful in some cases, but the advisability of subsequent venesection has not been proven; nevertheless, the writer, in the presence of a profound and probably fatal comatose condition, would not hesitate to recommend it. Lumbar puncture has been proved to be useful in cases wherever meningeal congestion has been present and the intravenous injection of Collargol has been recommended. The hypodermic injection of Pilocarpine where the rash is suppressed is a treatment which is open to the gravest doubt, since the heart is always profoundly depressed by the toxins of the disease. Strychnine hypodermically will be often indicated, and it may advantageously be administered before placing the patient in the cold pack. Polyvalent Antistreptococcic serum should always be injected when procurable.

Treatment of Complications.—Some of these have been already incidentally dealt with. *Rheumatic inflammation of the joints* is best relieved by full doses of Salicylates and by enveloping the articulations in

dry cotton-wool without the application of any impervious dressing. In all such cases a very vital point is to compel the patient to remain in the horizontal position in bed all through the month or six weeks' convalescence, and longer if necessary. There is quite as much danger of the heart at some remote period suffering from permanent valvular crippling as if the attack was one of rheumatic fever. Paine has, moreover, demonstrated the presence of a minute diplococcus in so-called "scarlatinal rheumatism" apparently identical with the *Diplococcus rheumaticus*, and which is capable of producing arthritis, and cardiac mischief when injected into rabbits.

Cardiac complications are to be treated as in rheumatic fever, and the supervention of ulcerative endocarditis is a clear indication for the administration of an autogenous vaccine prepared from the patient's blood.

Otitis.—This is a complication which sometimes leads to permanent deafness; it should be met by prompt treatment. The preventive measures consist of continuous irrigation and sterilisation of the naso-pharynx and a 25 per cent. Argyrol solution as a swab may advantageously be employed after cleansing.

Earache may be relieved by Cocaine—the pure alkaloid 4 per cent. dissolved in warm oil being instilled into the meatus, and leeches may be applied over the mastoid behind the ear. The important matter is to inspect the tympanum twice daily, and as soon as bulging manifests itself to make a free incision. The after-treatment and that of such complications as suppuration of the mastoid cells and abscesses under the dura mater must be met by the radical operation first introduced by the late Dr. Joseph Nelson (see under Ear Diseases, Otitis Media). Vaccine treatment should always be resorted to in chronic cases.

Nephritis.—No importance need be attached to the slight albuminuria which nearly always appears when the fever is at its height, but in the later stages of convalescence the urine should always be closely watched for evidence of glomerulitis, otherwise the first symptom of this grave condition may show itself in a uræmic convulsion or a sudden attack of coma. The treatment must be that approved of for acute Bright's Disease or for uræmia—viz., a strong saline purge—as soon as the patient is able to swallow and immediate resort to the hot mustard pack and the administration of Pilocarpine hypodermically as soon as sweating is established. Saline Solution should be injected and venesection performed in comatose and convulsive cases.

Buttersack recommends the prolonged administration of Urotropine up to the end of the third week as a certain preventive of nephritis.

Hæmorrhagic manifestations as in the so-called "hæmorrhagic type of scarlatina" are a clear indication for the administration of Calcium Chloride or Lactate.

Cellulitis and Rhinorrhœa.—The treatment of these complications has been detailed in the description of the management of the anginose or septic type of the disease.

Puerperal Scarlatina and the scarlatina arising during pregnancy are to be treated upon the same lines as in the management of the ordinary disease. Many cases of so-called "puerperal scarlatina" are really examples of severe sepsis.

SCIATICA.

Before commencing treatment there should be a minute investigation into every possible cause of local nerve irritation. There can be little hope of successful treatment till such affections as sacro-iliac and hip-joint or vertebral disease, and pelvic tumours of osseous or fibrous nature are excluded. Formerly sciatica was regarded as a true *neuralgia* of the nerve, and the agents supposed to alter or modify the nutrition of nerve tissue were employed. By all clinicians during recent years the view is accepted that the great majority of cases of sciatica should be regarded as examples of *neuritis*, and that the origin of the neuritis is a fibrositis, involving the sheath or the white fibrous tissue of the nerve trunk.

The treatment of neuritis and fibrositis has already been dealt with in the articles on Neuritis and Rheumatism, Chronic, and the treatment of sciatica must be based on the same lines. For convenience the various remedial agents may be here again enumerated as they apply to sciatica.

Rest in bed is essential in all cases. In the early stages of mild attacks, though the patient may be able to walk about without much suffering, he should be ordered to bed, as the action of the muscles tends to cause a considerable degree of pressure on the inflamed nerve, and a mild case is often converted into a very severe one by muscular exercise.

Acute pain and tenderness in the nerve are indications for the application of a long splint or a series of sand-bags so applied around the limb as to prevent the muscles of the thigh or buttock being brought into action. A dry heat should be maintained by the application of warm wool to the limb, which should be kept in place by a many-tailed bandage. Sublimed Sulphur, sprinkled upon the wool before application to the limb, is often useful.

Internal remedies embrace a long list of the agents in use for the relief of pain; narcotics by the mouth must, however, be avoided in a diseased condition so liable to become chronic. When Morphia is imperatively demanded for the relief of agonising pain, it should be reserved for hypodermic use in the manner to be described later on.

Salicylates, or their derivatives, as enumerated in the article on Acute Rheumatism, afford the most satisfactory results; the best form for the administration of this class of drug is Aspirin, which may be given in cachets to the amount of 40 grs. daily. Bee stings have been resorted to on the rheumatic theory of the disease, and some excellent results have been reported by Burton. Iodides, in the later stages of the disease, are clearly indicated, but must be administered in full doses; 60 grs. daily of Sodium Iodide is not too large an amount, and this dosage may be tolerated when smaller quantities are badly borne.

Where there are reasons for regarding the sciatica as a pure neuralgia

of the nerve, Quinine in 5 to 10 gr. doses may be tried, and it may be combined with Gelsemium, and in gouty patients with Colchicum or Salicylates. The Salicylate of Quinine and Xaxaquin—the acetyl-salicylate—are given in 5-gr. doses, and Saloquinine and its salicylate—Rheumatin—in 15-gr. doses. Phosphorus, as in Sanatogen or as free phosphorus or as Glycerophosphates, is extolled in the neuralgia type of sciatica. Cod-Liver Oil is always useful, and Arsenic and Iron are indicated in all anæmic cases.

Local Treatment will consist in the application of heat by the various methods detailed under Rheumatism, Chronic, as by the electro-thermic bath of Dowsing, the hot-air, vapour, Turkish, or Russian baths. These latter mentioned, as well as hot-water baths, are contra-indicated in the acute stage of the disease, where the pain is always aggravated by the movements necessary in the application of these agents—hence the advantage of any appliance for the local use of dry heat without necessitating the patient moving from his bed. The radiant heat bath can be readily employed, as the patient lies at complete rest in the horizontal position, and when the electricity necessary for its production is not available, a series of hot-water rubber bottles or of heated sand-bags, or the spirit-lamp arrangement employed in the treatment of Bright's Disease may be used.

As elsewhere described, a very hot smoothing-iron may be passed for several minutes along the course of the nerve, the skin being protected by a single layer of brown paper. This method of using dry heat for the relief of pain is not to be confused with the caustic or counter-irritant action which is obtainable from the actual cautery, which is also sometimes advocated. At a later period hot douches are indicated; these should be reserved for the chronic stage when the patient is able to leave his bed and avail himself of the advantage to be obtained from the various modifications of hydropathy as the Scotch, Aix massage douche, etc., carried out at Harrogate, Peebles, Bath, Matlock, Buxton. Brine bath treatment is of great value; this is procurable at Droitwich and at the more accessible Nantwich. At the latter resort the baths can be obtained, with excellent hotel accommodation, on the level of the patient's sleeping and living rooms—a desideratum when walking is very painful or impossible. At both of these resorts massage and electrical treatment can be obtained.

Massage, as in fibrositis, is an agent of great value when skilfully and perseveringly employed. In the early stages of the disease it may greatly aggravate the malady, and even in chronic cases its rough or too thorough administration may convert a mild chronic into an acute sciatic neuritis.

Electricity has been employed in every conceivable form; the writer has obtained the best results from the daily use of the constant current. Luke speaks highly of the hydro-electric bath, whilst some authorities extol static electricity and the sinusoidal current.

Blistering relieves pain, and in some instances effects changes in the

nerve or its sheath, which unmistakably hasten resolution and the absorption of fibroid thickening and nodosities.

As regards local remedies and anodyne applications, there is practically no end, and the methods by which these have been employed are also numerous. Thus Acupuncture, Aquapuncture, and Parenchymatous Injections of Narcotics or local anæsthetics have been long employed. The writer's routine method of local treatment by Morphia combines all these methods, together with that of blistering, and affords, in his opinion, the best all-round plan of treating both acute and severe chronic cases.

It consists in the administration of a moderate dose of Morphia by a hypodermic syringe capable of holding about 2 drs. of liquid. The requisite amount of the narcotic ($\frac{1}{4}$ gr. to $\frac{1}{3}$ gr.) in solution is added to enough water or saline solution to fill the syringe. The course of the nerve being mapped out on the surface, a series of four to six small areas of the skin are rendered anæsthetic by the application of strong Carbolic Acid; this is accomplished by applying the stopper of the bottle containing the acid to the skin for a few seconds, making four to six small, circular marks, over the course of the nerve, between the sacro-sciatic notch and the calf of the leg. These insure sterilisation of the skin and sufficient local anæsthesia to prevent the needle punctures being felt, whilst afterwards they act as a series of small blisters. Into the centre of each spot the needle is thrust firmly at right angles to the surface and to a depth according to the leanness or fatness of the patient, sufficient to penetrate the nerve trunk. About 20 mins. are injected at each spot, and the nerve behind the head of the fibula may also receive a puncture.

In a sudden and severe attack of sciatic neuritis one such multiple injection, given early in the disease, may sometimes cause the disappearance of all symptoms; but rarely will so striking a result be observed. The injections should not be repeated oftener than once in two days, and the danger of the opium habit being acquired should prevent more than half a dozen of such operations; but they may be continued for weeks by omitting the morphia, and using only Normal Saline solution. Next day, between the areas cauterised by the acid, three or four small, circular blisters, about the size of a penny-piece, may be applied, keeping in the course of the line of the nerve.

Alcohol (70 per cent.) has been injected into the trunk of the nerve in doses of 1 to 2 Pravaz-syringefuls (16 to 32 mins.) by Schlösser, as in the treatment of neuralgia of the fifth nerve, but this has been followed by complete motor and sensory paralysis, which, however, passes off after the expiration of many months.

Lange's treatment is conducted on somewhat different lines to the writer's method; he injects from 2 to 3 oz. Normal Saline solution alone or containing 0·1 per cent. Beta Eucaine, and Schlesinger injects 2 to 3 drs. normal saline cooled to zero Centigrade. These injections are only made into the tissue around the nerve at one spot, generally close to the notch. Cures reported after the use of various Vaccines are probably due to the physical effects of the fluid injections.

Cocaine, injected hypodermically or by the deep parenchymatous method, is a favourite local treatment, and the drug has been injected into the spinal canal after lumbar puncture. Ether has been also employed like strong alcohol, but its injection is not free from the danger of causing paralysis. Osmic Acid, in 1 per cent. solution, has been employed by injecting 5 to 15 mins. hypodermically or deeply into the nerve. The former method is probably a useless one, and if this drug be employed at all, it should be used by injecting it into the nerve substance. The writer has seen some most intractable cases yield to this treatment, but he injects half or one-third the full dose at two or three spots along the course of the nerve. Sometimes most severe pain and reaction follow the injections.

Salicylic Acid, Iodine and Cocaine Ionisations have been employed by the cataphoresis method, but these are useless in fat subjects owing to the depth of the nerve.

The X rays and Radium emanations have been employed with success in some cases. The X rays have "cured," according to Babinski, when everything else had failed. Mechanical vibration should always have a trial, but it is usually futile unless when combined with massage and other methods. Of local anodyne applications, those already mentioned as suitable for the treatment of chronic rheumatism may be tried, as Methyl Salicylate, Chloroform, Aconite and Belladonna. Liniments are often useful. Pain may sometimes be rapidly relieved by Ether or Ethyl Chloride spray, applied over the course of the nerve. Camphor, Iodine, Menthol, Guaiacol, and Salicylic Acid may be advantageously applied in the liquid form, known as Oleogens. Mild and severe counter-irritants, short of producing vesication, are much employed, and the most popular of these is Chili or Capsicum paste. Strong Tincture of Iodine applied along the course of the nerve seems to be beneficial in thin subjects.

Massage, electricity, mechanical vibration and douching or other forms of hydropathy should be reserved for the chronic stages of the affection, and the use of these agents is best carried out during the convalescing period at a suitable hydropathic institution, where treatment is scientifically followed, and where the change of air, of scene, and of dietary will be further augmented by the administration of natural mineral waters, which promote the elimination of effete compounds. A change to a warm, equable climate, like that of Egypt, is most desirable in long-standing cases before the patient is permitted to resume his usual occupation.

Surgical Treatment.—Where, notwithstanding the persevering use of the before-mentioned list of treatments, the pain and lameness persist, resort to surgical procedures is clearly indicated.

Acupuncture has already been incidentally mentioned; this consists in so-called "needling" of the nerve by piercing it in several places with a series of stout, sharp-pointed needles, introduced deeply at right angles to the surface; these may be left *in situ* for 15 to 30 minutes. As any benefits derivable from this painful operation may be easily obtained by

using the hypodermic needle in the manner already described for the administration of morphia, cocaine, osmic acid, alcohol or normal serum, as a method of treatment *per se* it should be abandoned.

Nerve stretching has often proved valuable. This should be first tried (without dividing the skin) by forcibly flexing the hip beyond a right angle, the knee being afterwards gradually extended to a straight line with the thigh; but the operation, to be successful, should be performed under general anæsthesia. Failing relief by this method a free incision should be made over the course of the nerve, starting below the border of the gluteus maximus, the trunk of the sciatic shoul l be pulled out by the bent finger or a strong blunt hook, and a considerable degree of force applied steadily till the nerve is thoroughly loosened from its bed. Some surgeons supplement the stretching by the procedure known as "harrowing," in which a series of superficial longitudinal incisions are made into the sheath to divide enlarged veins and any adhesions present, after which the limb is put up on a long splint and allowed to rest for several days before beginning passive movements.

Neurotomy (division of the nerve) or excision of a portion of the trunk is abandoned owing to the paralysis and contractures which are almost certain to follow.

SCLEREMA NEONATORUM.

This condition, appearing in new-born infants, is also known as Fat Sclerema, and is often associated with or allied to Œdema Neonatorum or Sclerœdema, but must not be confounded with sclerodermia.

There are good grounds for regarding the induration of the skin as due to the solidification of the infantile fat, and the treatment is obvious. The infant should be at once removed from the unhealthy environment with which it is nearly always associated, and it should be promptly placed in an Incubator so as to maintain a steady temperature at a little above the normal. As sucking or even opening the mouth may be difficult or impossible, the child should be fed on peptonised milk through a soft rubber catheter, which is an efficient substitute for the stomach-tube of the adult. At a later stage gentle massage and inunction with Cod-Liver Oil should be persevered with. Some authorities advocate the administration of mild Mercurials, but owing to the asthenia present these must be used with caution. The treatment of Œdema Neonatorum should be conducted upon the same lines, as the body temperature is always depressed, and the fat is usually in an indurated or solidified condition; the application of heat by an incubator and resort to forced feeding are indicated. By these means the life of the child may be saved, though death from asthenia in both conditions is to be expected in the majority of cases.

SCLERODERMIA.

In the diffuse hide-bound type of this rare affection, warm flannel clothing should be provided, and the patient must be protected from all exposure to cold. The administration of Cod-Liver Oil as an adjunct

to the most nutritious diet and improved hygiene should be persevered with.

Drugs are as a rule not to be depended upon, but in those cases associated with rheumatic pains in the joints, Salicylates have proved of some value. Vaso-dilators, as Spt. Æther. Nit., and Glonoin, have been recommended, but their value is doubtful. Arsenic, Iron, Phosphorus, Gold and Silver Salts have been tried and usually found wanting in any specific action on the indurated condition.

Several cures have been reported from Thyroid feeding, though in other cases this has signally failed. Some authorities, believing that the pituitary gland is at fault, advise Pituitary feeding, and others recommend mixed Gland treatment, using Martindale's four-gland tablets, one of which contains 1 gr. each of Thyroid, Suprarenal, Thymus and Pituitary substance.

Massage, hot douching, radiant heat and Turkish baths, combined with the persevering inunction of an animal fat, afford the best routine method of treatment. Passive movements and exercises are always demanded for the contractures (sterodactylia) which tend to deform the hands. X-ray and Radium emanations have been employed, and the injection of Fibrolysin has been resorted to in order to cause absorption of the proliferated fibroid tissue present around the sheaths of the smaller bloodvessels and lymphatics. Cerebrin or brain extract has also been recommended.

Circumscribed Sclerodermia, known also as Morphœa or Addison's Keliod, is more common than the diffuse type of the affection. It should be treated upon similar lines by persevering massage, electricity, douching and X rays. Electrolysis has proved successful in the removal of small patches, employed as for the treatment of nævoid growths. The injection of 5 to 10 mins. Thiosinamin, 10 per cent. solution, or of 40 mins. Fibrolysin into the neighbourhood of the indurated patches should always have a trial. Thiosinamin Plaster Mulls (10 per cent.) may also be employed over larger patches.

SCLEROSIS, Disseminated.

This disease always progresses to a fatal termination, though sometimes long periods of spontaneous arrest are noticed, which formerly led to the belief that the affection was susceptible to the action of various alterative drugs which had happened to be administered. Chloride of Gold and Sodium $\frac{1}{10}$ gr., in pill form, Nitrate of Silver, Mercury, Phosphorus and Iodides have proved themselves futile in staying the progressive advance of the interstitial inflammation or degeneration of the nerve elements.

Fibrolysin injections, administered with the view of causing absorption of the proliferated fibroid tissue of the neuroglia, have been recommended, but unfortunately there cannot be said to be any evidence of their efficacy. A toxic origin of the disease has long been suspected, and some authorities ascribe to a microbe all the phenomena, with the inevitable result that

a Vaccine has been prepared from the spinal fluid and a cure reported. By skilful nursing, warm clothing, rest in bed after each acute exacerbation of the disease, improved hygiene and careful dieting much can be done to relieve the discomfort of the victims of this disease; a change to a warmer climate in winter is generally beneficial. In bed-ridden subjects, the prevention of bedsores will require attention, and when the catheter is necessary, scrupulous sterilisation of the instrument will ward off cystitis and prolong life. Electricity and massage and other agents useful in paralytic conditions are seldom indicated; their energetic employment may do harm.

SCLEROSIS, Lateral.

This is the name given to primary spastic paraplegia, the treatment for which will be found detailed under Paralysis, Spastic, where the newer methods of injecting alcohol into the nerve-trunks going to the spastic muscles and of resecting the posterior roots of the spinal nerves in the cervical and lumbar regions will be found described.

SCLERITIS.

The treatment of deep inflammation of the sclerotic is similar to that of the choroiditis and iritis, which are usually associated with it. Rest to the eye, leeches or dry cupping of the temple, followed by warm fomentations, Atropine, bandaging of the eye and at a later stage iridectomy for the relief of any staphylomatous changes will be indicated.

Superficial inflammation or *Episcleritis* is also a most intractable though less serious affection. Pain may be relieved locally by leeching and hot fomentations followed by Atropine instillations or Glycerin and Belladonna applied over the temple. A smart saline purge should be promptly administered, after which Salicylate of Sodium or Aspirin in full doses should be given internally and a hot bath employed to secure a thorough action of the skin. At a later stage Iodides in full doses should be prescribed. Subconjunctival injections of Cyanide of Mercury (1 in 5,000) have been extensively employed in the deep form, and for episcleritis a 1 to 2 per cent. Salicylate of Sodium has proved very beneficial.

SCROFULA.

This is the name given to tuberculous disease of the lymphatic glands. Under Lymphadenitis the various methods of treatment indicated for the enlargement of the glands about the jaws, in the neck and axilla have been already discussed.

Constitutional is of more importance than local treatment. The mistake is too liable to be made of regarding the enlarged glands as being always the result of some peripheral lesion through which the bacilli have gained admission. The author has shown in his Cavendish Lecture (1908) that the cervical lymphadenitis is often caused by the introduction of the bacilli through the intestinal route. It is always of the bovine type.

The constitutional measures to be pursued are those which have been

detailed in the article on Phthisis, and whilst open-air life, over-feeding, and general hygienic measures and the administration of drugs are to be persistently carried out, experience has proved that Vaccine treatment gives much better results in scrofula than have been obtained in phthisis. The remarkable tendency of the gland lesions to remain circumscribed or confined to the lymphatic system, when not interfered with by efforts at removal, is becoming more widely realised. The *routine* practice of the excision of the glandular enlargements should be abandoned. The great majority after operation die of phthisis or acute tuberculosis. Only in very special cases is the operation justifiable. These will be found in the very chronic type of case associated with great indolence and marked hardness, where the disease remains confined to a small group of glands, which remain movable and without any tendency to implicate the neighbouring lymphatic chains. Partial operations should always be avoided, and curetting condemned, save in the case of a solitary gland which has already suppurated. (See also the article on Tuberculosis.) The Vaccine used should be prepared from the human type of bacillus.

SCROFULODERMIA.

This is a true tuberculosis of the skin, and is to be treated on the lines laid down for the management of *Lupus Verrucosus*, Salicylic Acid being first employed for the destruction of the horny layer, after which X rays and surgical procedures should be employed, with a prolonged series of Tuberculin inoculations in small doses, according to opsonic determinations.

SCURVY.

The scorbutus of adults, formerly very common, is now, owing to advances in preventive medicine, very rarely seen.

Prophylaxis.—The etiology of the affection shows that though the absence of fresh vegetables is the usual cause of the condition, life may be maintained for indefinite periods without any vegetable juices if the individual is provided with a supply of fresh animal food. This has been abundantly proved by Arctic explorers, who have been able to procure fresh bear and seal flesh, whilst scurvy attacked their companions living exclusively on tinned meat and tinned vegetables. The ration of fresh Lime Juice—compulsory in the mercantile marine since 1867—and the introduction of steam, which shortens the voyages, have entirely removed the disease from the seagoing population. The best preventive is 1 oz. fresh Lime or Lemon Juice daily, or in the absence of these, any form of fresh fruit or vegetable, and when these are not available, fresh undercooked animal food. Overcrowding, mental depression and physical exhaustion are powerful predisposing causes. A bacillus is believed to be the final determining factor, and that microbic infection is inhibited by the free use of fresh vegetables, fresh milk and fresh animal food.

The treatment of the established disease will consist in rest in bed, with moderate warmth, fresh air and sunlight, and an abundant supply

of fresh vegetables, diluted lemon juice, fresh milk and raw beef juice. As the condition of the gums will often render mastication difficult or impossible, the nutrition of the patient can be maintained by a good beef or mutton broth, to which a large proportion of fresh vegetables is added at the termination of the boiling process; these should be strained out before serving up. Raw meat juice and lemon juice drinks should be given between the meals of broth or soup, and as soon as the patient is able to chew he should get raw or undercooked fresh beef. Hæmorrhagic tendency is rapidly controlled by such a dietary, and often drugs are quite unnecessary, but Calcium Chloride and Normal Serum are clearly indicated when the loss of blood is great, and Iron should be given later on to control the anæmia. The spongy, ulcerated or sloughing gums will require attention. In mild cases the use of a vegetable astringent is all that is necessary. The following is a useful combination:

℞. *Tinct. Myrrhæ* ʒiv.
Tinct. Krameriæ ʒj.
Tinct. Catechu ʒj.
Decoct. Quercus ad ʒxx. *Misce.*

When the gum tissue is ulcerated it may be painted with a 30 gr. to the oz. solution of Nitrate of Silver, and fœtor may be relieved by mouth washes of weak Chlorinated Soda, Permanganate of Potassium, or a solution (1 in 40) of Chlorate of Potassium. Alum ½ oz. and Lemon Juice 2 oz. to a pint of water make a very efficient mouth-wash under which ulcers heal rapidly.

Excessive bleeding from the gums, when not readily controlled by these applications, should be checked by Adrenalin Chloride, applied with a soft brush, and excessive salivation may be checked by small doses of Atropine.

For the cardiac weakness, which may cause syncope when the patient assumes the erect posture, prolonged rest in the horizontal position is necessary, and Strychnine hypodermically may be required. Brawny swellings, due to extravasations of blood in or around the muscles, should be let alone till the general blood condition has been improved by the dietary; afterwards their dissipation should be hastened by gentle massage, douching and passive movements of the neighbouring joints.

Dysenteric symptoms, pleuritis, pneumonia and other complications are to be dealt with on recognised therapeutic principles.

Infantile Scurvy, or Barlow's Disease, has been confused with rickets, but it differs in no respect from scurvy of the adult.

Prophylaxis.—The disease occurs in the infants of the better class of the community, at the age of about 12 months, and is invariably due to errors in dietary caused by the destruction of the antiscorbutic quality of fresh milk by prolonged boiling, Pasteurisation, desiccation or peptonisation, or to the exclusive feeding of the infant on patent foods. Preventive measures obviously consist of the administration of pure fresh milk from the cow, diluted as required, or, better still, of the services of a healthy wet-nurse.

The mere bringing of cow's milk up to the boiling-point or near to it does not destroy the antiscorbutic qualities of the fluid, but the craze against microbes tends to prolong the boiling. A little raw meat juice is a valuable prophylactic where the milk must be boiled.

The treatment of the established disease must be conducted upon the same lines, and the speediest and most satisfactory remedy is the service of a wet-nurse when procurable. Failing this, fresh cow's milk, diluted with weak beef juice, should be employed as a dietary to the exclusion at first of farinaceous foods, and a little fresh vegetable juice should be administered. It is not enough to take away the patent food on which the scorbutic infant has been living by substituting cow's milk for it, though this latter of itself is a reliable prophylactic. Cheadle and Colman's plan of boiling potatoes without removing the skin of the tubers and passing the mashed potato through a fine sieve before adding it to the milk is a most satisfactory method of treatment. Soup or broth, to which plenty of fresh vegetables have been added at the end of the boiling process, the latter being strained out before the soup is added to the milk, is a valuable addition to the food. Teaspoonful doses of fresh Orange juice, given between meals, meet every requirement.

SEA-SICKNESS.

A light meal at least 3 hours before experiencing the ship's motion and *a large warm water enema* to clear out the colon will put the patient in the best condition for struggling against this distressing malady. As soon as a susceptible patient gets aboard, he should lie down flat upon his back, or right side, with his knees up, with his head low and his eyes closed. A light abdominal binder or pressure applied to the epigastrium is useful in many cases. The advice given, to keep walking about upon deck, is very good for travellers not markedly susceptible, and many such escape sickness in this way, but the very sensitive are sure to succumb if they adhere to it.

Of prophylactics there are hosts recommended, but few are of use to patients susceptible to sea-sickness. The safest remedy, and one which undoubtedly often succeeds in preventing the attack, is the Bromide of Sodium, which should be given in 30-gr. doses for a day or two before embarking. Hyoscyamine Hydrobromide, in perules $\frac{1}{200}$ gr. each, appears upon the whole to be the best drug, and the patient should take one a few hours before going on board. Very susceptible travellers may be put under their influence for 2 or 3 days before starting on the voyage. McDougall injects hypodermically $\frac{1}{150}$ gr. Sulphate of Atropine and 4 times this amount of Strychnine at the very onset of the nausea or discomfort, and the results obtainable are very satisfactory. One dose of Chloral (20 grs.) with the Bromide may be tried when the voyage begins at night, and the Bromide may be combined with Antipyrine. Chloretone (10 grs.), Chloralamide (30 grs.), Chlorobrom ($\frac{1}{2}$ oz.), Brometone (5 grs.) and various patent or proprietary medicines as Bon Voyage, Yanatas, etc., containing Bromides, are much in use.

Pauly strongly recommends Veronal-Sodium, both as a prophylactic and as a remedy after the advent of the *mal-de-mer*; 8 grs. should be given before the starting of the ship, and half this quantity may be given every couple of hours for 4 or 5 times, when vomiting is threatening or present. The best form for the use of the drug is a tablet, to be crushed by the teeth before swallowing with a mouthful of water.

Nitroglycerin tablets $\frac{1}{100}$ gr. are often useful; even when they fail to prevent vomiting they usually greatly minimise the accompanying depression and feeling of apprehension. Nitrite of Amyl is too evanescent in its action to be of use. Cocaine in $\frac{1}{8}$ gr. doses frequently repeated often relieves the vomiting. Ice, or iced Champagne or this with Soda Water may be prescribed for vomiting. Schacht's Liq. Bismuthi Sed. (Bisedia) in teaspoonful doses is a valuable stomach sedative containing bismuth, morphia, hydrocyanic acid, and nux vomica.

Validol (menthol in valerianic acid) in 10 to 15 min. doses, in capsules or in wine, has proved useful, and Resorcin in 3 gr. doses has been extolled. Creosote in the form of capsule (1 to 2 mins.) may be given every hour or two, and lozenges of Eucalyptus Rostrata tide over many susceptible travellers during short voyages. Hart recommends a mixture in 1 oz. doses, each containing 2 mins. Strong Tincture of Iodine and Dilute Prussic Acid: this is given every 10 minutes for 4 to 6 doses. The list of so-called cures is so extensive and varied one is forced to believe that the main element in their value is suggestion.

Sinapisms to the stomach, rectal feeding, and even Morphia hypodermically may be needed in severe and prolonged vomiting.

The plan of preventing rolling and pitching movements by the application of mechanical contrivances in the construction of the sleeping-berths, when perfected, will probably secure complete immunity against this distressing malady.

SEBACEOUS CYSTS.

These should be removed before they become larger or suppurate. When the cyst occurs upon the scalp, the hair over it should be cut close, and the skin cleansed by washing with a weak sublimate solution. An incision made with a fine scalpel suffices to permit of the shelling out of the cyst with its wall intact, the dissection being accomplished by a few strokes of the point or by the handle of the scalpel or blunt end of the forceps.

Where these tumours are situated upon the face or forehead, a very small incision into the skin and cyst wall may be made, and by firm pressure of the thumb the sebaceous matter can be squeezed through the opening, after which the wall of the cyst should be forcibly dragged through the incision. It is more satisfactory to dissect out small cysts without rupture or extravasation of their contents, and no portion of their walls should be left behind. The lines of the incision should take the direction of any natural lines, furrows or wrinkles so as to avoid unnecessary marking.

The hæmorrhage being controlled and the wound rendered thoroughly aseptic by the free use of Carbolic Lotion, the lips are brought together, and every trace of moisture dried up by absorbent wool, when a few layers of Collodion applied over the skin keep the edges of the wound in contact, and exercise sufficient pressure after drying to prevent oozing or hæmorrhage.

The injection of Ether or irritants to produce suppuration or to act upon the sebaceous matter is an obsolete method. When suppuration has already occurred, the best procedure is to make a free incision into the abscess and destroy the cyst wall with strong Carbolic Acid, or to employ the curette when the wall is fused with the surrounding tissues.

SEBORRHŒA—see Dandriff.

SEPTICÆMIA—see under Pyæmia.

SHELL-SHOCK.

Few diseased conditions have given rise to so much earnest study and debate as this symptom-complex. The kaleidoscopic picture in which neurasthenic, hysterical and psychasthenic elements combine in bewildering complexity has only become familiar during the late world-war, though surgeons have long been acquainted with its milder analogue in the state following severe railway accidents and various types of spinal and cerebral concussion. One of the most remarkable features of shell-shock is its rarity in those individuals who have been severely wounded by shrapnel in the same explosion which caused the shock to his companions. No practitioner will probably ever see a fresh typical example of this condition during the present generation or possibly ever after; nevertheless, a short outline of the general principles of treatment is desirable.

The first duty of the physician after placing the patient in a position of absolute physical and mental rest in a ward by himself, or in company with those who have not been severely wounded, is to make an attempt to unravel the tangled skein and discover the prominent thread which dominates his mentality. In many cases a history of mental or neurotic instability may be obtained from his relations or comrades, and the powerful agent of Suggestion should be wisely and firmly exercised by the physician. The calm assurance of the absence of organic or incurable disease, coupled with the verdict that the victim will not be expected to return to trench or other form of active warfare, often produces an immediate, and sometimes a lasting benefit. In the hands of those who have given special study to the action of Hypnosis, this agent has been beneficially exercised, when followed up immediately by Re-education, continuously employed till the natural functions are regained. In acute cases the symptoms must be treated on general principles. Mott recommends prolonged immersion in the warm bath till restlessness and mental excitement or delirium is relieved.

Insomnia, if not overcome by this treatment, will require supplementing

by Simple Hypnotics. Headache should be relieved by cold to the head, sinapisms to the nucha, and analgesics like Antipyrine and Aspirin.

Where the neurasthenic element is the predominant one the treatment of this condition as detailed under its own heading should be carried out. Hysterical phenomena may be treated at a later stage by Electricity. Strong Faradic shocks or the sinusoidal current are often of considerable value.

Strict discipline by most observers is considered an important element in treatment, and, above all, such alteration in the environment as games, exercises, and a change from pre-war sedentary occupations to gardening or farming.

Those cases where the psychic or mental phenomena are persistent and prominent should be placed under the care of the specialist trained in the treatment of the various psychoses.

SHOCK (see also under Collapse).

The conditions of shock and collapse are theoretically different, the former being due to exhaustion of the vaso-motor centres with accumulation of blood in the large deep veins, and the latter to the fall in the blood-pressure from hæmorrhage, causing a temporary paralysis of the same centres. The whole subject is, however, complicated by opposing and irreconcilable theories. Nevertheless, as both conditions often exist together, as in the surgical shock and collapse following abdominal operations necessitating prolonged exposure of the peritoneum accompanied by a large loss of blood, the treatment becomes practically the same, and consists in the application of warmth to the surface and intravenous, hypodermic or rectal injection of large quantities of hot Normal Saline solution. In grave cases the limbs should be bandaged and the head depressed and Adrenalin added to the normal saline for injection into the veins. Strychnine, though theoretically contra-indicated in pure shock, may nevertheless be indicated in some cases where the heart is seriously depressed. Artificial respiration with the injection of Morphine and $\frac{1}{100}$ gr. Atropine is preferable. For the prevention of surgical shock and other details of treatment, see article on Collapse (p. 166). The treatment of Cerebral Shock is identical with that of Cerebral Concussion, and consists mainly in absolute rest, with elevation of the head and ice to the scalp after reaction occurs.

SLEEPING-SICKNESS, OR TRYPANOSOMIASIS.

Every known antiseptic or antiparasitic drug has been tried, though, as stated by D. Bruce, there is no absolute proof that a single case of recovery has ever occurred. In the second review published in the reports of the Wellcome Research Laboratories at Khartoum (1911), reference is made to the cure of Kerandel, as reported by himself, after taking a series of intravenous injections of Antim. Tart.

Atoxyl (Arsamin, Soda Arsanilate, Soamin) has been extensively tried, and appears to possess a specific lethal action on the trypanosomes

of mice. In man the parasites are at first killed in numbers by the arsenical salt, but some survive in the bone marrow, and these ultimately develop a marked tolerance of the drug after they enter the circulation again, and though the injections (10 grs.) be pushed till total blindness results and other symptoms of poisoning occur, the disease progresses to its final issue in death.

Many observers recommend the simultaneous injection of other antiparasitic drugs to which the trypanosomes do not become immune; hence the combined Atoxyl and Mercury treatment has been advocated. This has been carried out in its simplest form by deep injections of Mercury Atoxylate 1 gr. in suspension in water, which have proved curative in syphilis.

Antimony has been combined with the atoxyl treatment, and more hopeful results have been obtained, though the deep injections of Tartar Emetic cause sloughing of the tissues. Hence the arsenic is given by deep injection every 3 or 5 days, and the tartarated antimony is administered by the veins once or twice a week. Antimony Thioglycollate and Trioxide have been also employed.

Trypan Red has been administered alone or in combination with mercurials and antimony and with Trypan Blue, Parafuschin and other dyes as recommended by Ehrlich. Salvarsan and many other arsenical salts have likewise proved useless.

SNAKE BITES.

A ligature or tourniquet should instantly be applied to the limb on the proximal side of the wound, and very firm pressure applied by inserting a small stick under the cord, which, on rotation, powerfully compresses the vessels and retards absorption of the venom, whilst the tissues around the bite are freely excised and bleeding encouraged. By the application of a rubber bandage close to the trunk and extending down to the spot where the temporary ligature is to be applied the efficacy of the latter is greatly augmented.

There is little danger in immediately sucking the wound whilst the ligature is being rapidly adjusted if the patient or assistant washes the mouth promptly with strong alcohol. The prompt injection of Adrenalin solution would probably delay absorption.

After *excision* of the site of the bite, Permanganate of Potassium in crystals or powder should be freely rubbed in. Solution of Chlorinated Soda or Calcium, Carbolic Acid, Chloride of Gold, Chromic Acid or Peroxide of Hydrogen may be employed to irrigate the wound in the absence of the permanganate, but there is little use in recommending injecting these agents into the surrounding tissues unless excision is first performed. The ligature should not be removed for at least half an hour. Any hope of success depends upon the rapidity with which these measures can be carried out, owing to the swiftness of the action of the venom of the most poisonous serpents. In the case of the cobra and the highly poisonous serpents these measures nearly always fail, so terribly active is the venom

and so rapid is its absorption. The writer was informed by a friend long resident in the East that he could obtain no evidence of recovery from cobra bite (outside the circle of snake-charmers) save in one solitary instance, and this was in the case of a man who, whilst chopping wood, was struck in the finger by the snake. Recognising his danger, he amputated the finger by instantly bringing down his uplifted axe.

In rattlesnake bites the prospects are brighter, as the action of the venom is not so terribly rapid as that of the cobra.

Constitutional measures for combating the depressing action of the poison on the heart and nerve centres should be promptly employed. These consist in the intravenous injection of Ammonia and Strychnine or Digitalis, and Alcohol should be liberally administered to combat severe collapse.

Fraser and Calmette have demonstrated the efficacy of Serum Therapy in the case of cobra wounds. The serum is prepared by immunising the horse with gradually increasing doses of the venom obtained from living cobras, till the animal is able to withstand a single dose corresponding to the amount of poison extracted from a score of these serpents. The serum is prepared and standardised after the manner of the antidiphtheritic sera. It is only specific for the venom of all snakes of the same genus, but the dose originally proposed has been found useless, and 300 c.c. should be injected at the earliest possible moment into the veins, a much larger amount being necessary if the hypodermic route is selected. The use of the serum should be preceded by ligaturing the limb and excision of the bite in all cases.

SPERMATORRHŒA.

Though the above unsavoury title is only to be met with in the nomenclature adopted by quacks and the class of unqualified or irregular practitioners who prey upon the fears of sexual hypochondriacs, nevertheless, in a volume on treatment this heading should have a place, since it is almost invariably omitted in medical and surgical textbooks, because no such affection as a paralytic flow or discharge of the spermatic fluid can be said to exist. Moreover, some justification for the retention of the term will be found in the fact that the physician is often called to treat the mental state which has arisen from the dread of this visionary condition.

Many of the individuals seeking advice for this supposed ailment are those who suffer from involuntary seminal emissions during sleep; they are for the most part chaste and nearly always unmarried, and have been perusing some advertising pamphlet or other form of quack literature. The calm assurance from the physician that the symptoms are purely physiological and not due to disease caused by some early self-abuse is generally all that is required. Health laws should be enunciated which have a bearing upon sexual excitement; free muscular exercises in the open air should be recommended to the extent of producing fatigue, overeating and especially late suppers must be forbidden, and the amount

of animal food curtailed. Literature, conversation and companionship which tend to excite sexual desires should be warned against. Sources of peripheral irritation as balanitis, elongated and narrow prepuce, thread-worms, piles, or rectal fissure should be corrected.

Bromide of Sodium in one dose of 30 grs. may be prescribed at bed-hour, and when the emissions have been found to occur when the patient lies upon his back during sleep the method of preventing this posture, described in the article on Masturbation, may be tried by fastening an empty cotton-reel over the middle of the spine.

In those individuals who suffer from chronic prostatitis with the discharge of a clear viscid fluid from the urethra, usually after defecation, the dread of so-called spermatorrhœa may become a very serious mental condition. The physician should fully explain the nature of the discharge and the cause, which is generally due to the remains of an old gonorrhœal attack or to some form of sexual abuse. The surgical management of this condition is dealt with in the article on Prostatic Inflammation, and moral or suggestive treatment will also be often necessary to combat the hypochondria which may be present.

The injection of Spermin or other seminal gland preparations, electricity, blistering over the spine and the administration of various drugs to depress the activity of the centres in the cord are as a rule to be condemned not only because of their futility, but they also intensify the introspection indulged in by the patient, which is the only serious element in the condition.

SPINA BIFIDA.

Tapping and the injection of Morton's Iodine Fluid are now abandoned. Unless when the tumour is ruptured during delivery of the child or shows signs of spontaneous rupture or causes paralysis, no attempt should be made to deal with it by operation until the infant has lived for a few years. The presence of hydrocephalus is a distinct contra-indication to operation in all cases. The tumour should be protected by a layer of cotton-wool or collodion, and a large shield of gutta-percha moulded to the part. Skilful nursing and feeding having tided the patient over the early period of life, the operation of excision may be undertaken with a fair hope of success by the age of 4 or 5 years. The operation should be performed with the child lying on its face over a pillow, so as to elevate the spine and prevent loss of spinal fluid. The neck of the sac should be exposed by an elliptical incision, which will provide skin flaps. When the type of tumour known as a "spinal meningocele" is present, the sac is to be excised and the opening sutured or ligatured before closing the skin wound.

In operating on a meningo-myelocele, after opening the sac the nerves must be carefully separated from its walls and gently pushed back into the spinal canal before proceeding with the excision, after which the pedicle is to be ligatured or sutured. In some cases it may be found possible to strengthen the opening by procuring periosteal flaps from the surrounding bone. Bayer uses two lateral periosteal flaps dissected from the canal

of the sacrum to make a bony roof over the sewed sac. The wounds in the dura mater, muscles and skin should be each separately sutured.

Where the surface of a rapidly increasing tumour has already broken down and there is, therefore, no healthy material for the manufacture of the flaps, some surgeons still think that the sac should be tapped and about 30 mins. Morton's Fluid (Iodine 10 gr., Iodide of Potassium 30 grs. in 1 oz. Glycerin) injected.

Hey Groves points out that the mortality is so great that operation should never be undertaken unless enlargement and ulceration of the tumour threaten rupture.

SPINE, Concussion and Injuries of.

Injuries of the spinal cord and spinal column must not be confounded with each other. The weight of pathological evidence is decidedly against the assumption that the functions of the spinal marrow can be arrested without some structural change—contusion, laceration, hæmorrhage, or the secondary formation of cylindrical cavities, having taken place in the nerve tissue.

The treatment will consist in immediate resort to bed in the horizontal position till the symptoms pass off. The same measure is clearly indicated in gross lesions of the cord and in sprains and injuries of the spinal column. Pain may be so severe as to demand injections of Morphine or Cocaine, and when painful spasms occur a lumbar puncture should be performed and Eucaine, Stovaine or Novocain-Suprarenin injected into the spinal canal. The fluid obtained by lumbar puncture is a valuable diagnostic element; the fluid extracted relieves tension, and in addition one or other of the drugs mentioned may be introduced.

Ice to the spine may be employed for the relief of pain, or hot fomentations and cataplasms if these give better results. Owing to the danger of hæmorrhage having occurred, the application of heat is, however, a doubtful agent to employ. Where there is evidence of hæmorrhage, if spinal puncture does not afford relief, a resort to laminectomy will be necessary when compression symptoms are severe, but this procedure is generally useless in intra-medullary bleeding (hæmatomyelia). In the chronic stage of cord and column lesions, counter-irritation, blistering and the application of the actual cautery may be resorted to. The bladder in most cases will require scrupulously aseptic catheterisation, and where asepsis cannot be guaranteed, suprapubic drainage may be employed or the method of applying abdominal pressure, practised by some American surgeons in the last year of the war. Failure to keep the bladder empty will ultimately lead to ureteral dilatation, and if infective cystitis coexist, to suppurative pyelo-nephritis and death.

RAILWAY OR RAILROAD SPINE.

If the presence of any gross lesion of the spinal cord or column can be detected, the case is at once lifted out of the category of so-called "railway spine," which latter must be regarded mainly, if not entirely, as a purely

functional affection, and treated as such. The symptoms being altogether subjective and for the greater part referable to the cerebrum, the only rational line to be pursued in treatment is that clearly indicated in neurasthenia and shell-shock.

The greatest difficulty lies in the interpretation of the spinal pain or irritability which often tempts the physician to suspect malingering. This should be regarded as of the same nature as the pain in neuralgic, hysterical or neurasthenic conditions, and should be treated upon the principles which experience has proved to be valuable in these states. Though the spinal pain may be due, in the first instance, to some element of sprain in the muscles or fascia of the column, which has probably resolved itself, it is rendered permanent and real to the patient by his morbid introspection, caused by the memory of the fright experienced in the accident, his dread of becoming paralysed, and the worry of protracted legal proceedings. Long-continued rest may only increase the hyperæsthesia and pain, hence, after the lapse of a rest cure period amply sufficient to meet the requirements of sprain, careful massage of the lumbar muscles and counter-irritation by blisters or the actual cautery applied to a few spots on both sides of the spinal column may be safely commenced. When the affection persists, it should be firmly treated as a case of traumatic neurasthenia by isolation, over-feeding and massage as carried out in the routine of the Weir Mitchell method. Unfortunately, in cases where legal proceedings are hanging over the patient's head, little improvement will follow any line of treatment till these are settled, after which, however, often without any treatment, the symptoms speedily vanish.

INJURIES OF SPINAL COLUMN.

Gunshot wounds, fractures and dislocations of the spinal segments or fracture-dislocations must be treated on general surgical principles. Where no paralysis exists the union of the fragments may be effected by absolute rest in the horizontal position on a firm mattress (with suitable extension appliances in compression fractures), and finally by the application of a plaster or poroplastic jacket till firm bony union has taken place.

Dislocations may be reduced under a general anæsthetic by skilfully applied extension and manipulation; as dislocation without fracture only occurs in the cervical region, it can be reduced when extension fails by cutting down on the vertebræ and excising the articular process of the vertebra below the displaced one. The presence of a moderate degree of paralysis in spinal fractures is an indication for laminectomy, in order to relieve the pressure of the fragments on the cord. As regards the advisability of operation and the time to operate, Horsley advises that the surgeon should wait if the lesion is acute and in the cervical region, but that there is no necessity for delay in lumbar cases. In injuries to the cauda equina an exploratory operation should certainly be undertaken as soon as symptoms of shock have been combated. Where the cord has

been severely crushed, operative procedures are useless; the only resource in these grave cases is to place the patient on a water-bed, which, with the aid of skilful nursing, will prevent the formation of bedsores. Aseptic catheterisation, or the methods mentioned in the last paragraph on spinal concussion, will always be required to avoid the cystitis which is so liable to supervene.

SPINE, Curvature of.

The angular curvature produced by tuberculous disease of the bodies of the vertebræ is to be treated on the lines laid down in the article on Caries of the Spine or Pott's Disease.

Scoliosis or lateral curvature of long standing is always associated with some rotation of the vertebræ round a vertical axis. Amongst the numerous causes of this deformity none are so important as long continued faulty attitudes and obliquity of the pelvis, which produce an unequal compression of the intervertebral discs, and this is more likely to occur in feeble, toneless individuals soon after the advent of puberty.

If the case is detected in its earliest stages when only lateral deviation exists, before the rotation has set in, correction of the faulty position promptly removes the deformity. Every deviation from the normal standard of health must be corrected; good food, open-air life, breathing exercises, tonics like Iron, Strychnine, Quinine and Cod-Liver Oil should be administered, adenoids and enlarged tonsils should be removed so as to provide for an unobstructed air-way, and the fatigue of standing must be avoided. Myopia and errors of refraction will require suitable glasses to prevent undue flexion of the neck. The child should be taught to avoid the faulty attitude and to maintain the correct position when the body is placed with the spine straightened.

In reading and writing the desk should be so adjusted—about an angle of 45 degrees—as to prevent stooping forwards, and in sitting, a deep chair, whose seat slopes slightly downwards from front to back, should be used; the back of the chair should slope backwards beyond a right angle with the seat, and with a slight forward curve opposite the child's lumbar region. Obliquity of the pelvis in hip-joint cases should be corrected by wearing a thick-soled or high-heeled boot.

Gymnastic exercises must be assiduously carried out for 1 or 2 hours daily with slowness and precision, stopping as soon as fatigue is experienced. Innumerable exercises have been planned, the rationale being to strengthen the muscles whose actions straighten out the curves of the spine, and to educate the patient to understand what the normal position of the spine should be and to maintain this position by a voluntary action of the muscles for as long a period as possible at each séance. One of the best routine exercises for simple lateral deviation is that so efficient for the treatment of rounded shoulders—viz., to swing from a horizontal bar by the arms. By sloping the bar from the horizontal a better result is obtainable; thus in the treatment of lateral curvature with the convexity to the right, the left end of the bar may be raised 3 or 4 inches higher than

the right. When rings attached to vertical ropes are used for swinging a similar alteration of level can be adjusted.

Dumb-bell exercises are useful. Ridlon's method consists in placing the patient upon a table lying on his back and exercising the muscles by alternately raising above the level of his head and lowering an iron bar (10 to 20 lbs. in weight) whilst the elbows are kept rigidly extended, together with various flexion and extension exercises of the spine, swimming and rotating movements and breathing exercises. The chief point in the working out of all gymnastic exercises should be by manipulation of the arms and of the spine to find out the "keynote" position—viz., that in which the deformity becomes reduced to a minimum. With the spine maintained in this position as far as possible, the patient should be placed on the back on a table or couch with the body projecting well beyond the end of it, falling being prevented by an assistant forcibly holding down the legs, after which the body is alternately lowered and raised by flexion and extension at the hip-joints.

Klapp's method of treating lateral curvature consists in the practice of gymnastics carried out with the patient in the crawling position, after the manner of a quadruped, the keynote position being produced when crawling round a circle with the head inclined at each step towards the side on which the hand and knee are brought together in progression. Roth, after finding out the keynote position in each particular case, places the patient before a mirror or between two mirrors, so that he may thoroughly recognise and understand the normal posture when standing, lying and sitting. By this simple means in cases of lateral deviation the perverted muscular sense is soon restored; as the patient endeavours and succeeds in keeping the spine in the normal position by voluntary effort he soon finds that the easiest posture is the old abnormal one which he learns to avoid, and a speedy and complete cure often results.

Douching, massage and electricity should form a portion of all treatment in order to improve the tone and strength of the involved muscles.

Many cases of spinal curvature due to muscular weakness, if recognised early, can be rectified by the great principle which is adopted in cases of Infantile Paralysis—viz., the prevention of over-stretching of paretic muscles. This can best be accomplished by the application of a well-fitting plaster of Paris jacket, with a large window cut out over the lower ribs on the side of the concavity. This allows the chest to bulge out on this side, and thus the patient's respiratory movements contribute to the cure of his deformity.

Extension of the spine has been employed in various ways, including forcible traction under general anæsthesia and the Sayre's tripod. Jones in some cases advocates the application of a plaster jacket to the spine, whilst extension is made in the horizontal or recumbent position, and various devices and forms of apparatus have been employed to effect a pull upon the spine. Spinal supports should not be depended upon for curing lateral curvature. In the early stages, when a cure by suitable gymnastic exercises can be obtained with certainty, their use causes a

positive injury. Only in the hopeless cases with much rotation and rigidity are steel supports ever warranted, and even then they should be removed daily whilst massage and exercises are being employed to prevent further deformity and wasting of the muscles.

The scoliosis of rickets is to be treated by the recognised remedies mentioned under Rickets and by absolute rest in the horizontal position. The condition is usually the result of carrying the rachitic child about on the arm of the nurse. If not comfortably stretched upon a padded board, when it can be conveyed into the open air, it should be placed in the horizontal position on a firm mattress in a perambulator sufficiently roomy for the recumbent posture. Massage and douching may be utilised during recovery from the rickety condition to strengthen the muscles. Kyphosis, or deformity of the spine caused by a backward convexity, resembles the displacement due to Pott's disease. It is usually the result of rickets or of faulty positions, in which latter case the deformity shows itself in an aggravation of the "round-shouldered" condition frequently seen in studious myopic subjects.

The treatment is obvious—rickets must be dealt with by suitable antirachitic agents and rest maintained in the horizontal position with a pillow opposite the convexity and the head kept low. In older children myopia must be corrected, and the faulty attitude prevented by a strict, attention to the normal posture and to suitable gymnastic exercises, the best routine exercise being that of swinging on the horizontal bar or on rings attached to two vertical ropes, or the judicious use of crawling as already mentioned.

Lordosis seldom calls for special treatment; the condition disappears when the primary cause—hip-joint disease—can be removed; the deformity, being a compensatory one, is, in the majority of instances, best left alone.

Spondylitis Deformans is nearly always part of a general chronic rheumatoid arthritis resulting in rigid fixation of the entire spinal column, which is beyond the reach of treatment, medical or surgical.

SPLEEN, Affections of.

Displacements of the Spleen are to be treated upon the lines laid down for the management of Glénard's Disease. The operations of splenopexy (fixing the organ in its normal position) and of splenectomy (removal of the spleen) have been frequently performed with success for floating spleen.

Abscess of the spleen, when the result of a necessarily fatal condition as pyæmia or advanced malignant endocarditis, is as a rule beyond the reach of treatment. Splenic abscess, the outcome of hydatid cyst suppuration, should be dealt with promptly by cutting down upon the site of the abscess, reaching it either through the pleural or abdominal route, and after evacuation of the pus establishing free drainage.

Hydatid cysts when detected are a clear indication for the removal of the organ, and splenectomy has likewise been successfully employed for a spleen the site of a *sarcomatous growth*.

Injuries of the spleen causing hæmorrhage from rupture should be promptly dealt with by opening the abdomen; the best subsequent procedure is to remove the entire organ, but if the laceration is found to be trivial the splenic wound may be carefully sealed up by suturing.

Infarction of the organ may be treated by rest and ice with Morphia hypodermically, but for a very great hæmorrhage the spleen should be removed.

Enlargement of the spleen such as occurs in Leukæmia, Malaria, Anthrax, Cirrhosis of the Liver, Typhoid Fever, Valvular Diseases, Amyloid Degeneration, Hodgkin's Disease, Kala-Azar, Gall-Stones, etc., is a secondary event, and must be dealt with by the treatment suitable for the primary disease as detailed under the heading of each affection. The chronic enlarged spleen of malaria has been successfully removed in some cases, but splenectomy for the leukæmic spleen is nearly always fatal.

The *primary* splenic enlargements as Simple or Primary Splenomegaly, Splenomegaly with Anæmia, Banti's Disease, Splenic Anæmia and Infantile Splenomegaly usually pursue a slowly progressive course in spite of all treatment. Removal of the organ in the early stages of the disease has proved successful in Banti's, Hanot's, von Jaksch's and Gaucher's Diseases, and in some instances X rays have given good results even in congenital splenomegaly.

SPRAINS.

When surgical aid is *immediately* available the best procedure is to apply a rubber bandage with a moderate degree of pressure commencing at the distal end of the limb in which the sprained joint is located and extending well above the articulation. The bandaged joint may then be placed underneath a cold-water tap and held there as long as the patient can tolerate the cold application.

Another *immediate* treatment is to surround the limb with cotton-wool and firmly bandage it over this with an ordinary woven or elastic bandage, after which the extremity is to be elevated in order to minimise any tendency to venous congestion.

Whichever method is employed, it must be supplemented by rest for a few days, but should pain and tension supervene, the swollen sprain must be treated as if the case had come under notice some hours after the accident. The bandage should be removed, and cold applications, as Ice, Leiter's tubes or evaporating lotions applied in order to check further effusion or hæmorrhage, the entire limb being steadied on a splint or rendered immobile by the use of sand-bags.

Swelling following injury, and occurring within 24 hours with distension of the joint, may be taken as evidence of hæmorrhage into it, and is a clear indication for prolongation of the application of cold and pressure. Seldom will it be necessary to tap the joint; this should always be avoided as long as possible.

When the pain is severe, and there are no indications of hæmarthrosis, hot applications or fomentations are soothing. A good routine is to

surround the joint with lint soaked in the following lotion, and apply oiled silk under a bandage:

℞. *Liquor. Plumbi Fort.* ℥iv.
Acid. Acet. Dil. ℥j.
Spt. Vini Rect. ℥ij.
Aquæ Destill. ad ℥xvj. *Misce.*

This application will act like a poultice when covered with an impervious dressing; if the latter is dispensed with it will serve as an evaporating lotion. Laudanum may be substituted for the spirit.

Formerly a sprained joint was subjected to prolonged rest and fixation with the view of favouring union of lacerated fibroid tissue; the resulting stiffness, rheumatism and rheumatoid arthritis were attributed to the effect of the sprain, and not to the irrational treatment. Now massage and passive or active joint movements are started immediately after the accident, and the patient is directed to commence the use of his limb within a few days. This is the usual example of the swing of the pendulum; the safe plan is to strike a mean and abstain from massage till the danger of hæmorrhage and synovitis has passed away, but massage should be practised in all cases before the end of a week. As the patient is permitted to move the joint, the elastic bandage should be left *in situ* or strapping applied when there is reason to believe that a ligament has been torn.

Douching alternately with hot and cold water should be combined with the massage, and where pain continues a local hot-air or radiant-heat bath should be employed.

Sir Robert Jones has pointed out that the object of treatment in sprain of a joint is to obtain a reformation of a sound ligament. He therefore advocates such application of strapping as will prevent stretching of the ligament during the process of repair. He allows only such movements of the joint as will entail no strain upon the injured band. In the case of the ankle, for example, he places two straps crossing over the seat of the injury and thickens the heel and sole of the boot by ¼ inch under the corresponding side of the limb.

SPRUE, OR PSILOSIS.

In this obstinate catarrhal condition, which affects the entire intestinal tract of Europeans residing in hot climates, drugs are of little value.

The best routine treatment, as determined by experience, is a pure milk diet, the fluid being administered in wineglassful doses every hour, as in the treatment of gastric and intestinal ulceration, care being taken that the patient at first never gets the opportunity of drinking as large an amount as will satisfy his hunger by filling the stomach with the liquid.

Another method of treatment sometimes successful is a diet of raw or slightly-cooked meat pulp, beef juice, beef jelly, and calves'-foot jelly.

By alternating the milk and beef dietaries every 14 to 21 days better results may be obtained than by either method separately.

Fresh fruit treatment has many advocates, and when fresh strawberries are procurable all authorities recommend their administration in full amounts. Grapes and ripe pears or even bananas or gooseberries may likewise be given.

Constipation must be avoided after the diarrhœa has been checked, and for this purpose nothing is so safe and satisfactory as small doses of Castor Oil after the operation of a simple warm-water enema. The Castor Oil often relieves the diarrhœa without a preliminary increase of purgation.

The ulceration of the mouth should be met by frequently smearing the tongue with Glycerin of Borax, to which a little Carbolic Acid or Cocaine has been added, or tabloids containing Borax, Cocaine, and Chlorate of Potash may be slowly sucked in the mouth.

The pathology of the affection still awaits solution. Ashford believes it is due to a monilia ingested in the bread; those who believe in a parasitic origin administer Ipecacuanha as in the treatment of dysentery or give Yellow Santonin in 3-gr. doses in Castor Oil. Intestinal antiseptics, as Salol and β-Naphthol, are extolled; the best of these, according to the reports of Hartigan, is Cyllin—a phenol derivative—which may be given in 3 to 5 min. capsules several times a day. Ordinary vegetable astringents and opium are of little value; perhaps the best routine remedy for controlling excessive diarrhœa is Gelatin made into a stiff jelly, which may be taken *ad lib.*

SQUINT.

The cause of the strabismus should be first ascertained—viz., whether this is due to paralysis or to over-action of an ocular muscle after the surgeon has satisfied himself about which of the eyes is at fault.

Convergent, non-paralytic or concomitant strabismus in young people is usually the result of hypermetropia or hypermetropic astigmatism, and in some cases it may be cured, for a time at least, by keeping the eyes under the influence of weak Atropine solution, and so paralysing the ciliary muscle and preventing attempts at accommodation and its accompanying convergence. In all cases, however, the vision should be carefully examined, and correcting glasses ordered. In young children these glasses should correct the *total* hypermetropia and should be worn constantly, while a drop of Atropine (1 gr. to the ounce) should be instilled every morning in both eyes. In a large number of cases, and specially in those of recent origin, this effects a complete cure. This treatment should be persisted in for several months, and then, when the atropine is stopped, weaker glasses will be necessary. The squinting eye should be exercised for half an hour daily by covering the good eye. Javal's orthoptic treatment is often successful; it consists in producing diplopia by exercises with a prism whose base is directed downwards, after which fusion of the double images is remedied by assiduous exercises with the

stereoscope. This instrument is also very useful to train the patient to fuse the images after operation.

Tenotomy of the internal rectus in one or both eyes must be resorted to where these measures fail. This should not, as a rule, be done till about the eighth year. It may be necessary to operate sooner if there are signs of the vision becoming affected, though by closing the good eye several times daily and exercising the weak one this generally may be prevented and operation put off till the age specified.

As it is often impossible to predict the exact amount of correction resulting from the operation, a second operation may be required, but it is wiser not to divide both recti at one time. The full effect of the operation is often not seen for several months, and if too much is done divergent strabismus may result. If vision is very poor in the squinting eye an operation is not likely to do permanent good, though for a few months it may seem to be improved. In such cases it is better to try to improve vision by exercising the squinting eye before operation.

The tendon may be easily divided without giving any pain, after thoroughly rendering the conjunctiva insensible by Cocaine. The first step after the introduction of the speculum is to nip up a portion of the conjunctiva by forceps, and with the scissors produce an opening through which the hook and the blades of a pair of fine scissors may be passed, and as the tendon is caught up by the hook it is divided by the scissors close to the sclerotic.

Convergent strabismus, the result of myopia, is generally remedied by suitable glasses, but where these fail, tenotomy should be performed. Divergent, non-paralytic squint is more difficult to remedy; very mild cases, however, may sometimes be successfully treated by suitable concave glasses, which correct the myopia upon which the strabismus often depends. When the constant wearing of the glasses fails to remove the squint, advancement of one or both internal muscles, with tenotomy of the external, when necessary, should be performed.

It must always be remembered that after operations the squinting eye must be constantly exercised, otherwise sharpness of vision will be lost.

Strabismus the result of paralysis must be treated by remedying the underlying mischief, which may be syphilitic or rheumatic. Mercury and Iodides should be freely administered, and massage and Galvanism tried. It is a good plan to act on the paralysed muscle by seizing the conjunctiva near its corneal insertion so as to move the eyeball in the direction in which the affected muscle should act, but to a greater extent than the normal. The double vision caused by the strabismus may be remedied by wearing a ground glass over the affected eye, and at several times during the day the affected organ should be exercised with the view of preventing wasting of the weakened muscles.

When the above measures fail after several months' trial, operation will be indicated; this should consist in advancement of the paralysed internal or external rectus with tenotomy of its antagonist when necessary.

STAMMERING.

The first step should be a careful investigation of the nasal passages, pharynx and naso-pharynx in order to discover a cause for the reflex spasm of the articulatory muscles which produces the difficulties in speaking. Adenoids, enlarged tonsils and every obstruction to the freest passage of air through the nostrils must be effectually remedied.

The individual must be taught to inspire through his nose with the mouth closed and to exercise his diaphragm to the fullest extent possible, expelling the air forcibly through the open mouth. He must learn never to attempt to phonate during inspiration; he should speak in a loud resonant voice, with his chest filled to the fullest extent before speaking, and in order to secure this full repletion, costal as well as diaphragmatic breathing exercises must be steadily practised.

The usual chest-expanding exercises with dumb-bells and the swinging back of the arms in a horizontal plane with the palms held forwards should be performed for half an hour at a time 2 or 3 times a day, the movements being executed in combination or rhythm with deep breathing through the nose, and expiration through the open mouth.

The physician should always place the stutterer under the training of an experienced voice instructor, taking care to avoid the advertising quack.

Swimming exercises in deep, fresh water are also a very valuable means of increasing the vital capacity and of improving the general muscular tone, and increasing the self-reliance of neurotic subjects, who are more prone to fall into the habit of stammering than robust, healthy individuals.

Educative treatment must be pursued with the greatest patience till the stutterer gradually learns to establish a voluntary control over the centres which regulate the entire speech mechanism. He should read aloud slowly with a good teacher, practising over and over again the combinations of sounds which give the greatest difficulty, with patience and deliberation. In very bad cases a beginning may be made by singing or intoning, after which, by repeated exercises in loud, slow reading, improvement will gradually show itself. The rhythmical cadence of smooth verse is more easily mastered than prose, and hence the exercise of reading poetry is always better at the commencement of educative treatment. By teaching the patient to direct his attention to the position and movements of his tongue and lips and to the working of his thoracic mechanism much help will be afforded to him, and often by practising before a mirror he may learn much. He must be warned and taught to abstain from all attempts at phonation or articulation when under the influence of nervousness, excitement or passion. Some stammerers have been cured by a judicious and skilful application of hypnotic treatment.

STARVATION.

The most cautious and discreet exhibition of aliment is essential in all cases where the victim of starvation has been long deprived of food. Death often rapidly supervenes where the sufferer is permitted to suddenly

satisfy cravings of hunger following a forced abstinence from food. The most easily digestible substances should be sparingly administered at very short intervals, and milk, beef tea or meat juices afford the safest means of supplying these. Rectal alimentation may always be resorted to in order to supplement stomach feeding. Solids must be sparingly administered for some time or entirely withheld until the digestive organs recover sufficient tone. White fish, boiled, is the best form in which to commence the exhibition of solids. Children and infants, upon being rescued from a state of acute or chronic starvation, do best upon diluted warm peptonised milk, with a limited amount of beef juice.

The state of the body temperature should receive attention. In starvation this falls so low as to cause death, and life may be saved in some cases by a prompt application of dry heat to the body of the victim rescued from starvation. In some cases heat is more urgently demanded than food. It is advisable to apply hot-water bottles and warm flannels and cotton-wool rather than at first to attempt friction or massage, which might possibly, under such circumstances, extinguish life. The hypodermic injection of hot Saline solution will always prove useful.

In the voluntary starvation of lunatics the gag and the rubber tube of a stomach-pump may be employed to convey liquid food into the stomach, and where there is difficulty in introducing the tube through the mouth, it must be passed into the pharynx through the nose.

STATUS LYMPHATICUS—see under Lymphatism.

STERILITY.

This condition must not be confounded with impotence, though both conditions may exist together. Where impotence is absent and the sexual act is performed in the normal manner, but where there is absence of spermatozoa from the seminal fluid, little need be expected from any methods of treatment unless in those rare cases where the azoöspermia is caused by some temporary obstruction of the efferent ducts of the testicles, as from recent epididymitis, when appropriate remedies may be of use. Should this condition depend upon exhaustion from recent venereal excesses, without impotence, abstinence will generally correct it in a short time; but, where prolonged abuse of the sexual instinct has led to marked atrophy of the testicles, no medication will be of the least use in cases where spermatozoa are absent from the seminal discharge or in cases where both testicles are retained in the canal or abdomen. Exposure for a long time to the X rays necessitated by prolonged lupus or other treatment may cause azoöspermia, which, however, may pass off.

In Aspermia there is absence of the seminal emission at the time of sexual intercourse, if this depends upon any mechanical impediment as hypospadias, disease or concretions in the prostate, stricture of the urethra, etc., it may be remedied effectually by removal of the urethral obstruction. The sterility following epididymitis through closure of the duct has been successfully dealt with by effecting an anastomosis between the vas deferens and a healthy portion of the epididymis.

When from psychical causes the discharge of seminal fluid is delayed or absent, though the sexual act may be otherwise successfully performed, treatment generally is of little avail, though in such comparatively rare cases the remedies mentioned under Impotence (p. 455) as Phosphorus, Strychnine, Electricity, may have a trial. Curling and M'Carthy recommend the application of blisters and irritants to the glans and penis in those cases characterised by deficient sensibility of this portion of the genital apparatus.

Sterility caused by the habitual use of alcohol, opium or cocaine may entirely disappear after the cure of the drug habit; such cases are, however, usually examples of impotence.

In the female, sterility is more frequent than in males. When due to excessive obesity and syphilis, constitutional treatment should be instituted. In most instances the causes are local and often remediable, but it must be borne in mind that not unusually more than one cause may be present at the same time, and the mistake should not be made of stopping short of correcting all abnormal conditions of the various parts of the genital tract. Details of treatment here are unnecessary, as they are supplied under the different headings of the abnormal or diseased conditions interfering with conception, as Uterine Displacements, Metritis, Leucorrhœa, Ovarian Disease, Gonorrhœa, Vaginismus, Dysmenorrhœa, Tumours, Salpingitis, Endometritis, etc.

STINGS.

The pain caused by wasp and bee stings may be effectually and promptly relieved by the application of liquid Ammonia, if applied immediately after the sting has been received. Sal Volatile answers the same purpose, but acts less rapidly. Where the sting is left in it should be extracted by forceps, and to the coarse skin of the palms of the hands or soles of the feet the strong Liquor may be applied. Alkaline Carbonates may be employed in the absence of Ammonia. Thus a strong solution of Carbonate or Bicarbonate of Soda or Potash may be tried. Chloroform or strong Oil of Peppermint gives relief, and a little pure Carbolic Acid may be applied on the end of a match to the puncture. In the absence of Ammonia, an excellent remedy is Indigo used in the form of the domestic "Blue Bag."

Ammonia may increase the irritation if erythema and swelling have already appeared. In such cases a poultice with some Alkaline solution as Lime Water, sprinkled over its surface, should be applied.

Peppermint Oil relieves the pain and irritation of mosquito bites, and Pennyroyal Oil or Tincture of Pyrethrum is used both as a remedy and preventive. Camphor, Oil of Cloves, Oil of Cinnamon, and Oils of Rosemary, Eucalyptus or Cajuput act in the same way as preventives. Poultices of Ipecacuanha and Mint Leaves relieve mosquito bites. Scorpion stings are also successfully treated by Ammonia and Chloroform, Alum and Carbolic Acid.

Where sudden collapse follows the stings of bees, wasps or scorpions,

Ammonia and Brandy or Whiskey internally may be urgently required. Spider bites are best treated by Carbolic Acid and sometimes a small incision to permit the entrance of the Acid into the immediate region of infection. A ligature round the limb if applied at once in the absence of remedies will give time for the destruction of the poison by sucking, washing, or cauterising the spot in cases where a severe or dangerous result might be anticipated. Müller's method of injecting Strychnine hypodermically in tarantula and venomous bites gives good results; $\frac{1}{10}$ gr. may be injected every hour for 3 times. (See also Snake Bites.)

STOMACH, Diseases of—see under Gastric.

STOMATITIS.

In all cases of stomatitis solid food must be stopped and a liberal dietary of milk, soups, and pulpy farinaceous aliments administered.

Catarrhal Stomatitis.—The primary cause should be searched for and removed, after which as a rule the inflammatory condition of the mucous membrane will rapidly subside without further treatment. Thus carious teeth, delayed dentition, errors in diet, dyspeptic troubles, the specific fevers, indulgence in tobacco either by chewing or smoking and the action of various drugs as mercury, iodides and bromides will all require attention. The best routine local application will be a solution of Boric Acid to cleanse the mouth every few hours in order to hasten natural resolution after the removal of the exciting cause. Chlorate of Potash (1 in 80) makes a good cleansing mouth-wash. In infants, smearing the tongue and gums frequently with Glycerin. Boracis or Borax and Honey acts rapidly. Adults may be directed to suck slowly a tablet of Chlorate of Potash, or one containing Borax and a little Cocaine, in addition to the Chlorate. *Mercurial* stomatitis sometimes takes on a severe form when the administration of the drug has been unwisely pushed, and the treatment of this variety of catarrhal stomatitis is detailed at further length in the article on Ptyalism.

Aphthous, Vesicular, Follicular or Herpetic Stomatitis arises from causes similar to those which produce the catarrhal or simple type of stomatitis; it is commonly met with in infants and children suffering from gastric and intestinal disturbances, and is probably due to the presence of a micro-organism. In the early stage local treatment properly carried out will cut short the disease and prevent or minimise ulceration. The best means of local treatment will consist in frequent painting of the tongue and gums with Glycerin of Borax, which by the movements of the tongue is applied to the entire buccal surface. Three or four times a day the mouth should be syringed out with a warm solution (1 in 50) of Chlorate of Potash and a few grains of the salt may be advantageously administered every 4 or 6 hours in weak solution. When the ulcerative stage arrives a fine camel's-hair pencil, moistened with liquefied Carbolic Acid or a (1 in 8) solution of Nitrate of Silver may be lightly applied to each minute ulcer. The solid caustic point is very efficacious but painful.

Bednar's Aphthæ is a similar affection arising in the mucosa over the hard palate, caused by the local pressure of the rubber teat of the feeding-bottle; it is to be treated on exactly similar lines.

Ulcerative Stomatitis, also known as *Phagedænic Gingivitis, Putrid Sore Mouth* or *Fœtid Stomatitis,* practically never occurs in infants, but often is met with in school-children living under bad hygienic conditions with insufficient food and imperfect ventilation, especially amongst those having carious teeth. It was common amongst the troops in the late war. The obvious treatment is to set right the unsanitary cause and take immediate steps to improve the general nutrition of the body by the liberal administration of strong soups, broths and fresh milk.

Local treatment should be thorough and employed assiduously, as the affection is very liable to end in shedding of the teeth and exfoliation of the alveolar processes. The mouth must be constantly cleansed with solution of Permanganate of Potassium (½ gr. to 1 oz.), saturated warm Boric Acid solution, weak Chlorinated Soda solution or Euchlorine gargle. This latter disinfectant is a powerful deodoriser of the fœtid saliva. It is made by mixing 10 grs. Chlorate of Sodium with 30 mins. strong HCl in a pint bottle, and gradually adding distilled water with constant agitation till the bottle is full. Between the times of using any of the above solutions, Peroxide of Hydrogen (10 vols.) or solution of Perchloride of Mercury (1 in 3,000) should be occasionally employed as sterilisers.

As soon as the buccal cavity has been thoroughly cleansed, a mouth-wash of 1 in 40 Chlorate of Potassium should constitute the main local treatment, though ulcerated patches may be touched with strong Liq. Ferri Perchlor., Weak Iodine, Carbolic Acid, Nitrate of Silver (1 in 8) or Perchloride of Mercury (1 in 1,000).

Internally, Chlorate of Potassium is held to possess specific power over this variety of stomatitis, and in absence of renal disease its administration should be pushed; Perchloride of Iron appears to intensify its curative action. A child of 8 years may get the following mixture:

℞ *Potassæ Chloratis gr.* lxxx.
Tinct. Ferri Perchlor. ℥iiss.
Glycerini ℥iss.
Aquæ Destillatæ ad ℥viij. *Misce.*

Ft. mistura. Capt. coch. med. quater in die.

Parasitic Stomatitis, or Thrush.—This form of stomatitis is constantly met with in weak bottle-fed infants, the fungus being conveyed to the mouth by unclean feeding bottles. It speedily yields to absolute cleanliness, including rigid sterilisation of all parts of the feeding bottle, and the disallowance altogether of the old-fashioned feeding bottle with the long rubber tube. When evidence of gastric or intestinal invasion by the parasite is forthcoming, the milk should be sterilised and Resorcin ¼ gr., or Salol in 1 gr. doses may be administered.

Local treatment should consist in the smearing of the tongue and gums

with Glycerin of Borax or Glyco-Thymoline; the movement of the infant's tongue may be depended upon to convey the remedy to all parts of the mucous surface, and it is not advisable to pursue the plan of rubbing off the small white flecks forcibly with lint or wool or the finger-nails. When this is done by the officious or over-zealous nurse, abrasions are produced which may afford entrance to the micro-organisms which produce the more serious types of stomatitis.

When the pharynx is involved a warm 4 per cent. spray of Boric Acid may be employed, and difficulty in sucking or swallowing may be relieved by using for a few seconds a Carbolic spray (1 in 100), which produces a mild degree of anæsthesia of the mouth and pharynx. When the carbolic spray is used, the nurse should be directed to hold the infant with its mouth open and the head inclining forwards so that the condensed spray will flow out and not be swallowed, but a small quantity passing down the gullet will do good, and there is no risk of causing poisoning when due precautions are taken.

Gangrenous Stomatitis, Noma, or Cancrum Oris.—This form of stomatitis, much rarer in recent years, is usually fatal from septic absorption, and generally affects weak and underfed children whilst recovering from an attack of measles or scarlatina. Life can only be saved by immediately removing, under a general anæsthetic, the gangrenous or dead eschar by the knife or scissors till healthy tissues are exposed, after which strong Nitric Acid must be freely applied on the smooth end of a piece of soft wood or by means of a glass brush or rod. Some surgeons prefer the application of pure Carbolic Acid, as this drug penetrates more deeply and reaches the specific bacillus which is believed to produce the necrotic action.

The mouth and wound must be incessantly cleansed with Hydrogen Peroxide, Euchlorine gargle, weak Sublimate or Permanganate solution. Concentrated soups, raw beef juice and stimulants are clearly indicated, feeding by the rubber tube being often necessary owing to the state of the mouth.

STONE IN THE BLADDER.

Once a calculus has been detected in the bladder by the sound the question arises: Should medical treatment have a trial? Notwithstanding the views put forth by Roberts regarding the possibility of dissolving small uric acid stones by the administration of Bicarbonate of Potassium, all surgeons recommend immediate resort to operation. This advice is justified by the great advances made in the surgery of the bladder during recent years, though undoubtedly small uric acid stones, if they have not been dissolved, have been so reduced in size as to permit of their passage down the urethra, and the same result has been maintained in the case of oxalate of lime calculi by the free administration of the Acid Phosphate of Sodium.

The old operation of lateral lithotomy has been entirely superseded, whilst that of median lithotomy is only used for stones impacted in the

posterior urethra. In all other cases the suprapubic operation, which alone allows of free investigation of the interior of the bladder cavity, is chosen if cutting is to be done at all.

The choice of operation, therefore, in the vast majority of all cases of vesical calculi lies between Lithotrity (litholapaxy or Bigelow's crushing operation) and suprapubic Lithotomy. The crushing operation should be regarded as the routine method of dealing with vesical calculi, the exceptions to its exhibition being found in (1) *very large* and very hard stones; (2) where, owing to the stone being encysted or located in a saccule, it cannot be grasped in the lithotrite; (3) where there is marked enlargement of the prostate; (4) where a stricture of the urethra prevents that wide dilatation of the passage necessary for the large-sized instruments employed in lithotrity; and (5) where the bladder is so small and firmly contracted that the blades of the crushing instrument cannot be safely trusted to grasp the stone without injuring the coats of the bladder.

Lithotrity as now practised after Bigelow's method aims at the entire disintegration of the calculus by mechanical pressure, and the complete removal of the débris at a single prolonged séance. The anæsthetised patient being placed on his back with the pelvis slightly raised and the thighs separated, about 5 oz. Boric solution being injected into the bladder, the sterilised and lubricated lithotrite with its blades screwed home is introduced into the urethra and allowed to glide by its own weight into the bladder. On opening the blades the stone usually falls between their jaws if the lithotrite rests on the lowest part of the bladder; the male blade is then pushed home to grasp the calculus, and the handle of the instrument is to be slightly depressed so as to elevate the blades from contact with the bladder wall. The screw movement is now substituted for the sliding one, and firm, steady pressure applied to break it into large fragments. These are next individually seized by a repetition of the original manœuvre or by rotating the open blades to an angle of 45 degrees to the right and left before screwing home. After each fragment has been crushed small, the instrument is withdrawn with the blades screwed firmly in contact with each other, and the largest sized evacuating catheter is passed to which the lithotrity aspirator or evacuator is attached after being filled with warm boric solution. By alternately squeezing the rubber bulb of the instrument and allowing it to relax, the débris is gradually pumped out of the bladder and falls into the trap provided for it. When fragments cease to return the catheter should be withdrawn and a small lithotrite passed in order to sound for any remaining pieces of stone too large to pass through the evacuating catheter; if such are found they should be seized by the blade of the small instrument and crushed till the bladder is thoroughly cleared of all débris. Where any doubt of a residuum exists the cystoscope may be employed, but the use of this is handicapped by the presence of blood in the bladder cavity.

The after-treatment consists in rest for a few days in bed. When pain is severe a Morphia suppository should be inserted into the rectum, which should have been thoroughly cleared out before the crushing, and when

retention of urine occurs a sterilised catheter must be passed three times a day till the bladder regains its tone.

The lithotrity instruments require a urethral capacity of 16 to 20 (English), and often some gradual preliminary dilatation of the canal, or division of a tight external meatus, may be necessary. Where a hard stricture exists, lithotrity may be still advantageously performed by resorting to Keith's perineal operation, which may also be selected in the case of the largest stones:

Suprapubic lithotomy is the ideal operation for stone when enlargement of the prostate complicates the case, as the prostatic tumour can be then removed after the extraction of the calculus, in which cases the after-treatment is to be carried out on the lines detailed under Prostate. If the operation is undertaken simply for the removal of a large stone, after this has been delivered by the scoop or lithotomy forceps the bladder and upper part of the skin wound should be closed up with sutures, provided the urine is aseptic. In septic cases a catheter must be tied in, and this should be connected with a suction apparatus or else drainage may be employed through the perineum. Before making the abdominal incision, the bladder should be washed out with warm Boric Acid solution, and a quantity of this should be retained sufficient to distend the organ till it is felt by the hand as a distinct tumour above the pubes. In order to insure this distension during the time when the cutting operation is being carried out it will be necessary for an assistant to grasp the penis firmly, or a piece of rubber tubing may be tied round it to prevent the escape of the liquid. Most operators now dispense with the introduction of a rubber tube inserted into the bladder through the abdominal wound. Subsequent suture of the bladder is greatly facilitated by the Trendelenburg position.

Stone in the female bladder is as a rule easily removable under a general anæsthetic through the dilated urethra. If very large it may be crushed by the lithotrite, or if soft and friable it may be broken up by the blades of a stout dressing or necrosis forceps. Very large stones may be extracted through the suprapubic route; the incision of the vagina is now abandoned owing to the danger of the establishment of a permanent vesico-vaginal fistula.

STONE IN THE KIDNEY.

Treatment will depend upon the symptoms present and upon the nature of the concretion and its exact site.

Gravel or the passage of renal sand, which is usually composed of a small conglomeration of the crystals of uric acid or urates, is often unattended with pain or distress. The treatment of this condition is purely medical, and should consist in the correction of the error in metabolism, which leads to the uric acid formation. Diet is of importance; red meat and food rich in nucleins and purin bases should be prohibited, and excesses in eating foods of all kinds should be warned against. Exercise in the open air must be assiduously carried out, and alcohol in every form forbidden.

Medicinal treatment will consist in the administration of diuretics to

increase the amount of urine and diminish its concentration. Alkalies like Pot. Bicarb. given with Lemon Juice in effervescence and combined with Salicylates are valuable. A natural alkaline mineral water is the best routine, and Contrexéville has long sustained its reputation as a resort for patients suffering from gravel. The free flushing out of the renal tract with this mineral water, which is rich in lime salts, often affords marked relief to those patients who continue to pass small uric acid calculi and renal sand.

When the small concretions consist of phosphates, the above treatment will only intensify the symptoms by rendering the urine less acid. The factor of mental strain which is present in most of these cases will demand serious attention. Change of air and scene with mental rest and physical exercise and regulation of the dietary—a liberal supply of animal food being necessary—are all clearly indicated.

Of drugs, none are so valuable as the Acid Phosphate of Sodium, which should be given to the amount of 1 oz. daily dissolved in 3 pints of water. By this means the urine may be kept acid for long periods, and concretions of phosphates and even small calculi of calcium oxalate may be dissolved. Mineral Acids, especially the Nitro-hydrochloric with Strychnine, are also always valuable. See the article on Phosphaturia.

Renal Colic is the name applied to the painful spasmodic seizure which accompanies the passage of small stones along the ureter. The best routine treatment consists in the administration of a very hot bath as soon as the first symptoms of the attack show themselves. The patient should be kept in the bath under the surveillance of a discreet attendant till full antispasmodic action is produced, hot water being from time to time added to keep the temperature of the bath up to 104° or 105°. The effect may be heightened by the administration of a large hot-water enema when in the bath or whilst this is being got ready.

As soon as a feeling of faintness is produced the spasm of the ureter often relaxes and permits the stone to pass down into the bladder. When the pain continues violent a full dose of Whiskey made into punch should be swallowed, and this can be followed by a hypodermic of $\frac{1}{3}$ to $\frac{1}{2}$ gr. Morphia combined with 1 min. B.P. Solution of Atropine; the latter assists markedly the action of the narcotic. When the agony is unbearable Chloroform may be administered, and under the anæsthesia some surgeons have satisfied themselves that pressure manipulation over the ureter has facilitated the passage of calculi which had become fixed. In the absence of the hot bath, a hot pack, hot fomentations, stupes and dry cupping over the loin may be resorted to.

The treatment of a stone which has become firmly impacted in the ureter will depend upon its exact location, which should be determined by X-ray photography, an opaque ureteral bougie having been placed in the ureter before the photograph is taken. Calculi which have become fixed at the entrance of the ureter into the bladder may be felt by the finger placed in the rectum, and by suitably applied pressure sometimes they may be driven into the bladder. This manœuvre failing, suprapubic

cystotomy should be resorted to rather than an attempt at removal through the perineum or vagina. For impacted calculi higher up, but within the pelvic zone of the ureter an extra-peritoneal operation should be performed through an incision which will permit the reflection of the peritoneum from off the iliac fossa till the ureter is reached behind the membrane. Calculi in this situation have also been removed by opening the ureter through an incision giving free access to the peritoneum as in other abdominal operations. The tube having been located, the posterior layer of the peritoneum will also require division so as to reach the ureter lying behind it.

The removal of most impacted calculi, however, is usually accomplished through the extra-peritoneal loin incision made for nephro-lithotomy. By prolonging the lumbar incision downwards and forwards the entire ureter can be exposed without dividing the peritoneum. A calculus in the pelvic portion of the ureter may then be removed by opening the tube over the stone or by squeezing this backwards into the abdominal part and opening the ureter there.

A calculus impacted at any spot between the renal pelvis and the bony pelvis should be reached and removed through the lumbar incision by dividing the ureter in its long axis, and after extraction of the stone closing the ureteral incision by fine catgut sutures.

Calculous Anuria occurs with the bladder empty when a calculus blocks the renal pelvis or ureter, the opposite kidney having been formerly blocked in a similar manner, and long rendered functionless, or from suppression in one kidney, the other ureter being blocked by a calculus. The condition is always an exceedingly grave one demanding immediate treatment.

Expectant treatment such as is indicated for acute uræmia as hot packs, saline purgatives and Pilocarpine hypodermically with Normal Saline by the veins has in some instances proved effectual, but obviously these measures can only delay the certainly fatal issue unless, during the time in which they are being employed, the recently impacted calculus chances to travel onwards into the bladder. The diagnosis once established, no time should be lost in carrying out an operation for the removal of the stone; this should be done even in the absence of all uræmic symptoms within 48 hours, and when this rule has been followed the mortality has been found to fall to well under 50 per cent. If time has been lost by expectant treatment the chance of saving life fades with each day of delay. Watson has advocated the necessity of not merely removing the most recent block in the ureter, but also of performing at the same time a nephrotomy or nephro-lithotomy operation on the opposite kidney with the view of saving every vestige of secreting structure. In this case the kidney is exposed, the pelvis is opened, either directly or through the cortex, and a tube inserted and brought out through the wound in the loin.

The anuria which sometimes supervenes as the result of shock following a severe operation upon one kidney when the opposite organ is already

diseased or contains calculi must be treated upon the expectant method when the condition of the patient does not warrant exploratory or operative measures being undertaken upon the kidney which has not been exposed.

Stone lodged in the kidney or its pelvis and causing pain, albuminuria or hæmaturia calls for prompt treatment, and the question at once arises, Should this be medical or surgical? As regards medicinal agents the great difficulty presents itself of determining the nature of the calculus, since the reaction of the urine cannot always be depended upon to supply reliable evidence of its chemical composition. Should there, however, be good reason for believing that the stone is a uric acid one, Robert's alkaline treatment may have a trial, and the Bicarbonate or Citrate of Potash may be administered for many weeks at a time to keep the urine constantly alkaline. A small stone of recent formation in one of the calyces may undoubtedly be so reduced in size as to fall into the renal pelvis and pass on to the bladder by persevering with the alkali.

The experience of Contrexéville treatment proves that often small stones are passed into the bladder and through the urethra after a six-weeks drinking of the waters at this resort.

Oxalate of lime calculi have, in a similar manner, been got rid of by a course of the Wildungen waters, or by the steady administration of the Acid Phosphate of Sodium, as already mentioned. Urotropine is always indicated where the presence of the stone has produced suppuration or pyelitis, and this drug may be advantageously combined with the acid sodium phosphate. Piperazin is much less reliable, though formerly much extolled as a lithontriptic, and Piperidine Acid Tartrate in 15-gr. doses is recommended as a powerful uric acid solvent.

Rest in the treatment of renal calculi has received much less attention than formerly owing to the frequency with which operative treatment has been carried out. Absolute rest in bed has in many instances been followed by a complete disappearance of all the symptoms, probably by securing the stone in some fixed or encysted position in one of the renal calyces. It must always be resorted to when hæmaturia has been severe.

When, however, the stone continues to produce severe wearing pain or hæmaturia, and where its irritation of the renal pelvic membrane keeps up a suppurative pyelitis, operative procedures should not be delayed. These consist of Nephro-lithotomy, Nephrotomy, or Nephrectomy. The kidney should be exposed by an incision in the loin from the external border of the erector spinæ below the last rib, extending downwards and forwards in front of the anterior superior iliac spine. The organ is brought out through the wound and carefully palpated, and an incision is made through its convex margin or a stone, if detected by touch, is directly cut down upon and removed. The renal substance is next closed by catgut sutures after washing the cut surfaces with hot Boric solution. Where suppurative conditions exist the kidney itself may require drainage and drainage must in any case be provided for in the loin wound.

If, on exposure of the kidney, the calculus is found to be lodged in the upper part of the ureter it may be pushed back into the renal pelvis and removed by incising this part of the organ (pyelotomy).

Should the kidney be found to be the seat of several stones which have caused widespread suppuration or hopeless disorganisation of the entire gland, the major operation of nephrectomy or removal of the whole kidney should be carried out, but only if the other kidney has previously been found to be functioning in a normal manner. Whether the surgeon starts with the intention of performing a total removal of one kidney or not, he should previously make a determination of the renal adequacy by Kümmel's or Wright's method, or the ureters should be catheterised from the bladder.

After the removal of a calculus either from the kidney, ureter, bladder or urethra the probability of a second formation occurring should not be lost sight of. The composition or reaction of the urine should be periodically altered for some weeks at a time by the administration of alkalies when the stone is found to be made up of uric acid or urates, and if of oxalate of lime the acid phosphate of sodium should be given.

STONE IN THE URETHRA.

The pain may be intense owing to the spasm of the muscular fibres, and no attempt should be made at the mechanical removal of the stone till the urgency of the symptoms has been somewhat relieved by a very hot bath and a hypodermic dose of Morphia. The spasm is immediately overcome by the administration of Chloroform, but this should be reserved for cases where operative interference is necessary, and it is well to induce the patient to wait for the subsidence of the spasm, when by a powerful expulsive effort he may be able to drive the stone through the meatus.

When the obstruction is in the anterior portion of the urethra, the patient should be directed when attempting to urinate to squeeze the glans and suddenly let go, reinforcing at the same time the contraction of the bladder by that of the urethral muscles, by which manœuvre the stone may be squirted through the meatus. By a gentle kneading of the penis the stone may be assisted in its progress to the outlet. If the block is just within the narrow part of the urethra immediately behind the meatus or in the navicular fossa it should be delivered by slitting the meatus under a local anæsthetic, and forcing it out by a gentle squeezing of the penis or by the introduction of a fine scoop.

When located farther back in the penile part of the canal, a fine urethral forceps may be tried, but the attempt by this method is so liable to cause laceration and subsequent stricture that as a rule it will be better to cut down on the stone and remove it by a clean and free incision made into the floor of the urethra. A stone in the membranous urethra should be extracted through a median perineal incision, and often it will be best to push back a jagged stone in the penile urethra and deliver it through a perineal wound, as then a permanent fistula is less likely to follow. After extraction of the calculus, the lips of the urethral wound should be

sutured, but the skin wound should not be tightly closed, and a soft catheter tied in for a few days.

Before resorting to perineal section an attempt may be made when the stone is situated far back in the membranous or prostatic urethra to push it backwards into the bladder by passing a large-sized blunt-ended bougie down the canal. It may then be seized in the bladder by a small lithotrite and crushed, or dealt with by suprapubic cystotomy.

STRANGURY.

The cause of the painful spasm at the neck of the bladder should be sought for and removed when possible. Stone in the bladder, ureter or urethra or inflammation of these parts may exist, and their proper treatment will be found detailed under their separate headings. (See Stone, Cystitis, Gonorrhœa, etc.)

Strangury caused by the external or internal use of Cantharidin or by the administration of Copaiba, Sandal Wood or Turpentine should be met by the instant withdrawal of the drug and the removal of the blistering application, if this has not been already done.

A hot bath or hot sitz bath, warm diluent drinks or iced water, a Morphia suppository in the rectum, followed by continuous hot fomentations applied to the perineum, and, in very painful cases, a hypodermic injection of Morphia and leeching may be tried. Blisters should be used with great caution on patients the subjects of Bright's disease or bladder affections and in young or debilitated folk. When necessary in these cases they should not be kept on for more than 2 or 3 hours, and after their removal a poultice should be applied. In the presence of strangury after the local application of cantharides, the bleb should be incised and the blistered surface covered with oil and a warm but not hot poultice applied.

A useful method for the relief of strangury in cases of painful conditions in the posterior urethra is to inject 2 drachms of a 5 per cent. solution of cocaine into the urethra, and massage it backwards through the compressor urethræ. This manœuvre is also applicable before catheterisation or passage of a cystoscope.

STRICTURE OF THE GULLET.

Under Cancer of the Gullet (p. 124) the treatment of malignant stricture is described. Under Œsophagus, Stricture of, upon p. 615, the treatment of simple stricture is detailed.

STRICTURE OF THE INTESTINES—see under Intestinal Obstruction (p. 466, and also on p. 125).

STRICTURE OF THE URETHRA.

Spasmodic stricture of the urethra occurs at some period in nearly all cases of neglected organic narrowing, the element of superadded spasm suddenly showing itself by the production of retention of urine. Simple

spasmodic stricture is caused by some reflex contraction of the constrictor urethræ muscle, usually the result of an inflammatory state of the lining membrane about the prostatic part, though the seat of the spasm is the compressor urethræ muscle lying between the layers of the triangular ligament.

The immediate treatment resolves itself into that of the resulting retention and the routine should be the administration of a hot bath; when this fails a large, soft rubber or well-lubricated gum elastic catheter, about No. 10 (English), should be passed and the bladder emptied. In very sensitive patients the preliminary injection of a few drops of a 5 to 10 per cent. Cocaine solution may be employed; a ½ gr. Morphia suppository may be administered if the retention symptoms are not urgent, and often this will dispense with the use of the catheter. After the relief of the bladder distension, the cause of the spasm—gonorrhœal urethritis, fissure of the anus, urethral calculus, etc.—will require attention.

Congestive stricture is closely allied to the above, and is usually the result of a gonorrhœal inflammation of the posterior urethra. The treatment is to be carried out on the same lines, by long immersion in a hot bath, the injection of Cocaine with Adrenalin solution, Morphia by the rectum, and when a large soft rubber catheter fails to pass, the bladder may be aspirated above the pubes.

Organic or *cicatricial stricture* in the great majority of cases can be best treated by the method of—

Intermittent or Slow Dilatation.—Various instruments are used, and it need hardly be insisted upon that, in the absence of retention of urine, catheters should not be employed. Differences of opinion exist as to the preference to be given to soft or to solid metal bougies, some surgeons insisting upon the routine employment of one kind to the exclusion of the other. It will be safe to adopt, under ordinary circumstances, the following practice, especially if the operator has not much experience—*i.e.*, to begin with soft gum-elastic bougies from the filiform size up to No. 6 E., and always to use metal ones for wider strictures.

There is a considerable danger in passing small metal instruments except by the most experienced. Heavy, solid bougies for all sizes of stricture are better in skilled hands than gum-elastic instruments for interrupted dilatation, though it will be safer to begin with the latter in narrow strictures.

Any of the modern short-curved, conical metal bougies may be employed, but the old-fashioned, highly polished bellied sounds of Sir Henry Thompson are the best. The actual dilatation should be produced by the shaft and *not* by the point of the instrument. The point should be of such a size that it will readily enter the stricture, the thicker part following and causing the dilatation. Tortuous strictures cannot be safely treated with rigid instruments till after partial dilatation by pliable ones.

Having placed the patient in the best possible condition of health, and having his bowels cleared out (and a warm bath given in some cases), he is sent to bed a few hours earlier than usual, and the treatment may be

inaugurated. This latter precaution is a wise one if the operator has not had any previous experience of the patient's power of tolerating urethral interference. It will be well to begin the treatment after he has got warmed in bed, and where he can remain till next morning. In this way rigors, etc., may be prevented till the patient gets accustomed to the use of instruments. (See under Urethral Fever.) At subsequent dilatations this will be unnecessary. It will, however, be always necessary to caution the patient against walking or other exercise, and against exposure to chills for some hours after the passage of instruments.

It will be well to put the patient upon a urinary antiseptic, such as 5 grs. Urotropine twice daily, though the most rigid sterilisation of all instruments must be invariably seen to. The patient should pass water a few minutes before the introduction of the dilating instrument.

The surgeon's first step is to locate the site of the stricture by passing a large sound down to the constricted part; he then tries one size of bougie after another till he finds an instrument which will just pass through the stricture with slight difficulty. This should be withdrawn before its presence excites spasm and the dilatation postponed for 4 or 5 days. Upon the second and subsequent séances the same and the next larger size of bougie are introduced, till at twice a week intervals the dilatation is effected so as to admit the largest solid sound, say No. 16 E. Some surgeons insist upon the importance of leaving the last instrument used on each occasion *in situ* for several minutes. Force, in the ordinary sense of the term, is never justifiable, and the young surgeon is very liable to be dissatisfied with the slow progress which always gives the best results in the long-run.

The best lubricant in the writer's experience is the K.Y. Jelly or the B.P. Glycerin. Boracis, which is a strong, unirritating antiseptic, and does not injure the coating of soft instruments. Sterilised Vaseline, Olive or Castor Oil, to which 5 per cent. Carbolic Acid or 2 per cent. Oil of Eucalyptus has been added, is usually employed.

The length of the intervals between the sittings is to be regulated by the amount of dilatation accomplished without bleeding, and by the tolerance of the urethra. Every third day till headway is made, then every seventh day is a safe rule, but whenever bleeding is provoked the next dilatation must be postponed. In the case of a stricture which contracts rapidly, it may be safely attacked twice a week.

The sittings should be continued till a No. 16 English instrument can be easily passed. To stop at a No. 12 is a mistake, as inevitable shrinkage soon follows. It is the non-observance of this rule which leads to failure in the hands of most men. Though the stricture cannot be regarded as cured in the great majority of cases, nevertheless, by dilating the urethra up to its fullest capacity, the very best results are obtainable, and in some cases no narrowing may be detected for years.

The patient should be taught to pass at least a No. 12 English gum-elastic bougie every month for 3 or 4 months, then every 3 or 6 months, returning once a year to have the largest (No. 16) size introduced by the surgeon.

In very narrow strictures there may be great difficulty in passing any instrument at first, and in such cases a rigid metal or a whalebone bougie should never be employed owing to the danger of making a false passage, especially in the neighbourhood of the triangular ligament. When an ordinary fine bougie cannot be coaxed through the constriction, one or two manœuvres may be resorted to. Thus the patient may be made to pass water and whilst the urine is flowing a very fine instrument may be slipped through the stricture. When this fails the urethra may be injected with sterilised oil, and one filiform bougie after another should be passed as far down the canal as possible till every pouch or false passage has been blocked, after which sometimes a very fine instrument may be slipped through the stricture. It will be necessary in such a case to tie the bougie *in situ*, and have the patient put to bed. Micturition in such cases will take place alongside the bougie, and in 24 hours a larger instrument may be introduced. After the first opening up of the narrow passage by either of these means the method of interrupted dilatation may be resumed.

These narrow strictures are very liable to contract speedily, and in many instances, when the treatment by the slow or interrupted method of dilatation has appeared to be progressing satisfactorily, the superadded element of spasm appears on the scene and taxes the surgeon's patience severely. The routine practice of the writer when dealing with such cases was to start dilatation by the continuous method about to be described, and as soon as the stricture had been opened up to admit readily a No. 6 bougie, then to resort to the interrupted plan; this line of procedure gives very satisfactory results.

Continuous Dilatation.—This method is suitable for narrow and irritable strictures, and consists in passing a small gum-elastic catheter through the constriction into the bladder, and tying it in for 24 to 36 hours, after which it is to be withdrawn and the next sized catheter, which readily passes through, is likewise to be maintained *in situ* for a similar period, and so on till the urethra is dilated to a moderate degree, when the intermittent method may be resorted to. The danger of sepsis is always a real one in carrying out this method, and hence it will not be enough to trust alone to the most scrupulous sterilisation of the instruments employed, since micro-organisms may find their way into the bladder from without. Urinary antiseptics by the mouth must therefore be administered, as 5 to 10 grs. Urotropine or 3 mins. Creosote in capsule *ter in die*, and the urethra should be flushed out by a stream of weak Permanganate solution (½ gr. to 1 oz.) or of concentrated Boric Acid solution before the fresh catheter is tied in each time. The chief objection to the continuous method is that it keeps the patient in bed, but it produces excellent results where the intermittent method for one reason or another cannot be utilised.

As already mentioned, the continuous dilatation may be suspended after the stricture has been fairly opened up and the interrupted method commenced. The steady pressure of the catheter against the face of the cicatricial tissue of the stricture introduces a new element into the treatment which hastens resolution, acting as hypodermic injections of

Fibrolysin are believed to do in all organic strictures, though this plan of treating urethral strictures is seldom resorted to.

Rapid dilatation was formerly much employed: it was carried out by passing, under general anæsthesia, a series of graduated metal sounds (Thompson's or Lister's) till at a single séance the urethra was dilated to its fullest normal capacity. Relapses were the rule, and very often dangerous extravasation of urine, permanent fistulæ and serious complications resulted from rupture of the urethra, and this method, like that of *Divulsion*, which consisted in a rapid stretching or tearing of the cicatricial tissue by a double-bladed instrument has been abandoned for safer though less expeditious methods.

Internal Urethrotomy.—This has been successfully resorted to in the treatment of resilient and bridle strictures in the penile portion of the urethra, as this type of narrowing has a marked tendency to contract as soon as dilatation has been suspended. It is the most suitable method of treating very irritable and bleeding strictures, and those in which the passage of a bougie is always followed by rigors and in narrow strictures where the presence of a tied-in catheter cannot be tolerated by an irritable bladder.

The rationale of the method consists in a free division of the cicatricial tissue in the long axis of the stricture, which is then kept open during the healing process by the regular passage of a solid bougie.

A number of ingenious instruments are in use, each operator selecting one which carries out some requirement that he considers essential to success. These may be divided into two classes—*i.e.*, those designed to sever the stricture from before backwards, and those which are first passed through the stricture, which is then divided from behind forwards as the instrument is withdrawn.

For very narrow strictures of cartilaginous hardness the former kind of instrument is employed. A filiform guide-bougie is first passed through the stricture into the bladder. Upon this the urethrotome is introduced down to the narrowed part, and by means of a spring the concealed blade of the instrument is protruded and the constricted part is divided to the required depth as the blade is pushed against the stricture towards the bladder, cutting from before backwards. Hill's instrument can be used when the stricture only admits a No. 2, but Maisonneuve's and Tevan's instruments are more commonly used.

Where the stricture can be dilated to the size of a No. 5 (English) instrument the urethrotome of Civiale or Otis is passed through it, and as the instrument is withdrawn the concealed blade is caused to incise the narrowed part for its entire length, the depth of the incision and the "tautness" of the parts being regulated by various mechanical contrivances designed for the purpose. The stricture must be divided on the floor of the urethra and through its entire depth, but care must be taken to leave intact the healthy vascular or erectile tissue lying external to it. In using Otis's urethrotome the operator gets great assistance by feeling the resistance of the tissues and the progress of the blade, on grasping the penis from the outside with the fingers of the left hand.

After either form of cutting operation a large solid metal sound (No. 14 English) is introduced into the urethra, and permitted to find its own way into the bladder by gravitation. This gives a practical proof of the completeness with which the stricture has been divided, and should the sound fail to enter the bladder without pressure a second incision of the parts, in a plane different to the first, may be considered advisable. Upon withdrawal of the sound the largest-sized metal catheter is inserted, and the bladder very thoroughly emptied of all urine. It is a mistake to attempt to tie in a catheter unless hæmorrhage has been severe. The patient is placed in bed, gets a Morphia suppository and abstains from drinking liquids, and is kept very warm so as to encourage the action of the skin, whilst a few bits of Ice are used to relieve thirst. In 6, 8 or 10 hours, when he can hold his urine no longer, he is placed in a hot bath and permitted to micturate. Rigors are to be anticipated by a full Opiate, Whiskey and Quinine, and the bowels, which should have been purged before operation, are allowed to remain unrelieved for a few days.

The following combination may be used to prevent rigors and septic fever:

℞. *Urotropin.* *gr.* vj.
Quininæ Sulphatis *gr.* vj.
Pulveris Doveri *gr.* xii. *Misce.*

Fiat pulvis. Mitte tales vi. *Signa.*—"*One to be given immediately after the operation, in a tablespoonful of whiskey, and repeated in three hours, and again in six hours if necessary.*"

For hæmorrhage from the deep portion of the urethra, firm pressure and an Ice-bag or the crutch of Otis may be used. If very severe, external urethrotomy should at once be performed, and the wound tightly packed with gauze around a catheter, and Adrenalin may be locally employed. If from the penile portion of the canal, a firm catheter may be passed, and a bandage placed around the penis so as to compress the bleeding surface against the instrument.

Extravasation of urine, urethral or septic fever, pyæmia, cystitis, epididymitis, urethritis or kidney trouble must be dealt with promptly if they show themselves.

About the seventh day the patient should have a well-lubricated bougie (No. 12 English) passed through the urethra, and he should be confined to bed till this period. About every 3 days for the next fortnight will suffice for the passage of the bougie, larger instruments up to No. 16 E. being used, and at the conclusion of the treatment the patient is taught to do this himself, the after-management being exactly the same as if the operation of intermittent dilatation had been carried out.

Urotropine or other urinary disinfectant should be administered for several days before the operation, especially in all cases where the urine is foul, and in bad septic cases the bladder should be drained through a perineal wound.

External Urethrotomy.—This operation is indicated in cases of impermeable stricture, in those in which urinary fistulæ exist, and where all other methods have failed, and in traumatic strictures with extravasation of urine.

Syme's operation is the most suitable when an instrument, No. 5 E., can be passed through the narrow stricture into the bladder.

A staff, grooved upon the convexity of its curve, which is about the size of a No. 5 English catheter, is passed through the stricture into the bladder. The groove is in the middle of the curve, and this ends abruptly in a broad shoulder which marks the beginning of the anterior portion of the staff, which is about the size of a No. 12 English from the shoulder to the handle. With the anæsthetised patient in the lithotomy position and the narrow grooved part of the staff through the stricture, the broad shoulder being held against its face, the operator cuts down on it from without by a median incision, enters the groove with his knife, and divides the stricture in its whole extent from behind forwards, after which a catheter is passed upon a probe acting as a guide into the bladder. A fine gorget may be used to incise the urethra in the direction of the bladder. A catheter is tied in through the perineum for the first 3 or 4 days, and a bougie or sound passed every second or third day till the perineal wound heals. By Syme's method a Syme's catheter fitted with a stopcock was tied in through the external meatus, but this part of the method is not much used nowadays.

Wheelhouse's operation is the one generally selected when it is found impossible to get any guide or instrument into the bladder through the stricture. With the patient in the usual lithotomy position, a staff is passed down to the stricture and held there, the button-like point of the staff bearing down against the face of the narrowed tunnel. A median incision is made down to the staff, and the urethra fully divided for ½ inch in front of the stricture. The edges of the wound in the urethra are held apart by sutures or forceps, and after careful sponging a search is made for the opening of the mouth of the stricture. When this is obtained, a grooved director is passed through it into the bladder, and upon this instrument the tortuous, narrow stricture is divided for its whole extent by a narrow knife from before backwards. A large bougie is then passed down the urethra, guided into the incised part, and pushed gently into the bladder. The bladder is drained through the perineum for a few days, and afterwards regular passage of large bougies is resorted to.

Cock's perineal operation is performed when the urethra is distended behind the stricture, no guide-staff being employed, though the stricture is impermeable.

In the lithotomy position, the operator places his finger in the rectum upon the tip of the prostate. A sharp-pointed, thick-bladed bistoury is plunged into the middle line of the perineum, ½ inch in front of the anus with its back towards the bowel, so as to open the distended urethra in its membranous portion, just at the tip of the prostate. When this has been accomplished, a grooved probe is passed through the wound into the

bladder, and upon this a tapering gorget is guided. This was Cock's operation, but usually an attempt is made to deal with the stricture at the same time as follows: After opening the bladder, a grooved probe should be passed into the wound and made to enter the stricture from behind, upon which the cicatricial tissue may be divided from behind forwards or an instrument may be inserted down the urethra and its point cut upon till it appears in the wound. When this has been achieved, a large catheter should be passed down the urethra, and guided into the bladder, and the most patient dilatations by the passage of sounds must be kept up long after the healing has been established, as such strictures are very prone to contract.

It may be only possible to effect an entrance into the bladder from behind the stricture, without being able to deal with the latter, and it is astonishing to find afterwards how easily a narrowing, which had foiled all attempts at catheterisation, can be made to yield after a few days' rest following perineal section. Hence, often the operation is divided into two stages, the dilatation or incision of the urethra being postponed for some days after the perineal section.

Excision or Resection of the strictured portion of the urethra has been tried, but very generally with indifferent results. Wolfler found that the mucous membrane was reproduced upon a urethra from which he had excised a nodular stricture. He uses the mucous membrane obtained from the "stomach of the frog, the bladder of the rabbit, or from the œsophagus of the pigeon, which are all easily separable from the muscular layer of the animal, and which all adhere in the human subject, and when properly placed retain their vitality." A graft taken from the mucous membrane of the lip answers equally well.

Recently Adams has demonstrated a method of restoring damaged urethra by the introduction of a tube of Baer's membrane. The author lays stress on being able to supply plenty of tissue so as to be free of tension, on the provision of suprapubic drainage, and on the retention of a catheter within the newly-formed urethra as important elements in a heterogeneous urethral graft.

The method of Electrolysis has been practised; this may be carried out by using a current of 3 to 5 milliamperes in the following way: The negative electrode—a metal-tipped gum-elastic bougie—is passed down to the face of the stricture, against which it is held for 15 to 30 minutes, the large moist positive electrode being in contact with the lumbar spines. The current softens and causes decomposition of the cicatricial tissue, and permits the negative electrode to pass into the bladder, often in 20 minutes, without pain.

STROPHULUS—see under Miliaria.

STUMPS, AMPUTATION, Diseases of.

Some stumps are painful and unsatisfactory, even when the operation is performed in the ideal manner—*e.g.*, Lesfranc and Chopart amputations are seldom completely satisfactory. They are difficult to fit with an

artificial limb, and sooner or later require conversion into a Syme—the ideal amputation stump.

Any of the tissues of which a stump is composed may give trouble and require treatment.

Skin.—(*a*) *Scars* may be painful, either in parts from nerve filament involvement or generally. Relief of pressure by suitable padding of the limb or excision of the scar or affected nerve will be required.

(*b*) *Ulceration* is due to unequal pressure of the artificial limb, and can frequently be relieved by hollowing out the socket at the point of pressure.

(*c*) *Ischæmia*, if unrelieved, will lead to ulceration. It is due to the soft tissues being too short. This can be remedied by drawing down the skin with straps of sticking-plaster to a splint, or in the case of the leg to a walking calliper, or by causing œdema of the soft tissues by Thomas s passive congestion. If these methods fail, reamputation will be required.

(*d*) *Eczema Intertrigo* is due to depressed scars, the opposing skin surfaces perspiring and eczema resulting. Lead lotion on lint placed between the surfaces relieves, but cure can only be effected by excision of the scar and the eczematous surfaces.

Soft Tissues.—Bulky stumps may be reduced by pressure of an elastic bandage or by the wearing of a laced bucket or a plaster of Paris pylon. If these methods fail, removal of a wedge of œdematous tissue is indicated.

Nerves.—Painful bulbous nerve ends may be relieved by hollowing out the socket of the artificial limb, or by operation. This entails the removal of the nerve bulb, or, better still, the removal of two inches from the continuity of the nerve trunk. This avoids any interference with the stump.

Bone.—Caries or sequestra may require removal, but before doing so X-ray examination of the stump must be undertaken.

Sinuses may be due to (*a*) caries or necrosis of bone, (*b*) fragments of metal, (*c*) silk ligatures, (*d*) presence of Bipp, or (*e*) to an infected tortuous track. All such cases should be X rayed, then injected with Bismuth paste and X rayed again, unless the first picture reveals clearly the cause of the trouble. The second picture should be stereoscopic, and will therefore reveal the track of the sinus and its relation to the bone.

Joints.—Deformities of joints and painful joints may be remedied by splinting, tenotomy, but often call for reamputation of the limb at a higher level.

STYE.

This condition is often produced by infection from the scales of seborrhœa falling down upon the eyelashes from a scurfy scalp, hence preventive measures in all recurring cases should be directed to the treatment of the primary affection.

In the early stages epilation will generally at once remove the trouble. By plucking out the eyelash, any matter that may have already formed is thus left free to discharge itself through the minute opening. If matter has not formed, this method may prevent it. A needle dipped in pure Carbolic Acid may be applied to the spot after the removal of the hair.

Poultices in the neighbourhood of the eye are very unsatisfactory. A warm saturated Boric compress is the least objectionable method of applying moist heat, though it is not advisable to cover this in with oiled silk. The relationship of the stye to boils gives the indications for general and local remedies, and poultices or any other applications, especially if moist and warm, have a tendency to multiply the local gatherings of pus if the retained vapour arising from such applications is not speedily permitted to evaporate. Puncture (after cocaine) with the point of a fine narrow-bladed tenotomy knife or cataract needle generally gives immediate relief when matter has formed.

Styes, like boils, have a tendency to occur in crops. This, when established, is a clear indication for the employment of an autogenous vaccine, and hence the advisability of obtaining and preserving a culture of the infecting micro-organism from the first stye.

Ointment of Yellow Oxide of Mercury (6 grs. to 1 oz.) is the best after-treatment in all cases, and it appears to prevent further formations if properly used; or the following may be prescribed:

℞. *Hydrargyri Oxidi Rub.* *gr.* iij.
Cocainæ Purif. *gr.* iij.
Vaselini Alb. ʒvj. *Misce.*

Tere bene et fiat unguentum. Signa.—"*To be smeared over the margin of the affected lid three times a day.*"

SUBPHRENIC ABSCESS—see under Peritonitis.

SUDAMINA—see under Miliaria.

SUNSTROKE, OR INSOLATION.

For both the mild type of this affection known as *Heat-exhaustion* and for the grave form recognised as *Thermic Fever* preventive measures are obvious. These include attention to clothing, which should be always as light and cool as possible, open-textured *woollen* garments next to the skin being essential. It is always necessary that the spine and cranium should be well protected from the direct solar rays. Excesses in eating and drinking, indulgence in alcohol, violent exercises and constrictions about the throat must all be guarded against, and in the close, hot nights free ventilation is of great importance.

When an attack of heat-exhaustion has already occurred, immediate transference to the shade in the open air, with removal of outer clothing and all constrictions about the neck, throat and chest is the first step. The patient should be placed in the horizontal position as in the treatment of syncope, with the head lowered and the vapour of Ammonia or Acetic Acid applied to the nostrils. The face should be sprinkled with cold water and the hands sponged, and if efforts at breathing do not at once appear artificial respiration should be resorted to.

A severe attack of thermic fever or typical sunstroke will necessitate similar preliminary measures, but life can only be saved in such cases by a

free use of cold water. This may be dashed over the patient's naked body or the cold pack or cold affusion should be freely employed. If ice is available the entire body should be rubbed with large pieces of it, after which iced water may be allowed to trickle over a wet sheet loosely applied to the patient's body till the rectal temperature has been reduced to about 102°. Further general applications of cold water or ice should not be persisted in owing to the liability of collapse supervening, but the ice-cap may safely be kept to the head all through the attack.

If there be evidence of cardiac failure, stimulants may be required, but they should be used with great caution, and the horizontal position rigidly maintained. If removal in such cases is necessary before the urgent symptoms have subsided, it should be accomplished upon a stretcher.

Where the symptoms continue and repeated affusion is necessary to keep the temperature from rising, the thermometer should be kept in the rectum, so as to enable the physician to keep the body heat a little above the normal. Copious enemata of iced water have been found useful, and they may be resorted to in conjunction with cold affusion or the cold bath.

Artificial respiration must be kept up when the breathing stops during the hyperpyrexia; this affords also the best aid to the enfeebled cardiac muscle. Though Strychnine may be injected in desperate cases, it is safer to rely upon artificial respiratory movements, as some authorities maintain that coagulation of the cardiac myosin occurs. Convulsions should be met by Chloroform, and this has been recommended during the early stage independent of the presence of convulsions. Though venesection as a routine is to be condemned, when symptoms of asphyxia show themselves there should be no hesitation in freely opening a vein. After the hyperpyrexia has been combated, symptoms are to be treated as they arise. Headache may be relieved by the ice-cap, by sinapisms or blisters behind the ears or over the occipital region or neck, and constipation by smart Saline purgatives.

In the after-treatment no animal food should be given for days and absolute rest in bed must be maintained.

Meningitis and other troubles, should they follow, are to be met by appropriate remedies. As recovery is often imperfect, and followed by an irritable condition of the cerebral centres, Bromides will be indicated, and in some cases, owing to the increased susceptibility to heat, removal to a cold or temperate climate may be imperative, with avoidance of mental work and all sources of worry for a considerable period. Prolonged muscular exercise is also to be guarded against, and the use of alcohol strictly forbidden.

SUPPRESSION OF URINE.

Anuria, when the result of degenerative changes in the kidney, is usually beyond the reach of art, but the form which sometimes occurs in acute Bright's disease may be combated successfully by the use of the agents detailed in the article on that disease.

Anuria coming on soon after exposure of the overheated body to

intense cold is due to acute congestion of the kidneys, and its treatment is identical with that of acute Bright's disease, and the same remark applies to the suppression which sometimes follows poisoning by cantharides, chlorates and digitalis. Calculous anuria is discussed under Stone in the Kidney. The form of suppression which sometimes follows surgical operations on any portion of the genito-urinary tract, as after the dilatation of narrow strictures of the urethra, and in catheterisation of a greatly distended bladder in prostatic disease when the surgeon draws off all the residual urine, requires prompt treatment in order to save life.

In such cases the best routine procedure is that which follows upon the lines suitable for the prevention and treatment of uræmia. This may be advantageously carried out in all cases of urinary suppression when the diagnosis is uncertain. The renal organs having "struck work," any attempt to directly stimulate them will only increase the active congestion which is likely to be present, and the chances of saving life will be seriously diminished. Hence the administration of irritating or stimulating diuretics should be avoided in all cases.

The physician should endeavour to act powerfully upon the skin and bowels to effect vicarious elimination of the retained toxins. This should be accomplished by the hot pack, hot mustard, hot water, hot air, or vapour bath. Pilocarpine hypodermically is the most potent of all diaphoretics, but if its action is concentrated upon the kidneys or on the bronchial surface death may follow the administration of $\frac{1}{4}$ gr. If, however, the injection be not administered till the action of the skin has been stimulated by external warmth, then all the force of the drug will be directed to the sweat glands, and further diaphoresis will be safely accomplished. Whilst the patient is thus sweating profusely in the hot pack a large dose (1 oz.) Sulphate of Magnesium may be administered, and repeated in half this amount to keep up a continuous drain from the bowel.

Cupping of the loins and hot poultices applied over these regions will act beneficially, not, however, by stimulating the kidneys, but by relieving their congestion. Decapsulation of the kidney has been recommended in desperate cases of eclampsia. Nitrites will also prove useful, as 1-dr. doses of Spt. Ether. Nit.

A second indication is always present in this condition—*i.e.*, to dilute the amount of the toxic substances in the blood and thereby to minimise the intensity of their action on the heart and on the nerve centres. To accomplish this object Normal Saline solution should be injected hypodermically, by the bowel or by the veins. As the amount introduced by the skin has its limits, and as the bowel is being acted upon by the Mag. Sulph., the venous route should be selected. The action of the saline as a diluent is enormously increased if blood-letting is first performed; 20 oz. of blood may therefore be permitted to flow from the median basilic before very slowly injecting double this amount of serum or more.

By diluting the poisoned blood flowing through the kidneys the saline solution often acts as a powerful but harmless diuretic, and sometimes

the urinary secretion is almost immediately re-established. Where rigors and severe septic symptoms with high fever heat are present, as in post-operative cases, it is obvious that the hot bath or pack has its limitations, and in such cases till the temperature falls the surgeon must rely upon saline purgatives, hot fomentations to the loins, and the intravenous injection of saline solution. Blood-letting will here again minimise the effect of toxins produced by the microbes which have gained admission by the employment of unsterilised catheters or other instruments introduced into the urethra or bladder. Cardiac depression should be met by Strychnine hypodermically, or by Alcohol by the mouth when urgently required, but Digitalis is to be avoided.

SWEATING—see Perspiration, Excessive.

SYCOSIS—see under Tinea.

SYMBLEPHARON.

Adhesion of the eyelid to the eyeball exists in so many degrees and in so many forms as to prevent any definite line of operation being applicable as a routine treatment. In minor degress the condition can be easily dealt with by severing the adhesion or band by scissors. In severer forms, where the adhesive surfaces cover a large extent of the lid, they must be carefully dissected from each other and a transplantation effected of a small piece of mucous membrane from the lips or labia. The conjunctiva of the rabbit has been grafted successfully. Subsequent adhesion of the dissected surfaces may sometimes be prevented by turning the conjunctival flap upon itself and retaining it in this position by sutures.

Harlan's operation aims at providing a flap of skin dissected from below the eyelid, which is turned up under the margin of the lid and sutured to the raw surface on the internal aspect of the lid.

SYNCOPE.

The patient must be placed in the horizontal position, with his head low—a little lower than the level of his body. All constrictions about his neck should be removed without delay, and a current of pure cold air should be allowed to blow over him when possible. As swallowing is for the time impossible, a dash of cold water in the face is a powerful reflex stimulant to the heart, and may be safely resorted to. Ammonia, Smelling Salts, or Strong Acetic Acid to the nostrils, with flipping the hands by, a wet cloth, may be tried. Where the attack withstands this, and the patient is still unable to swallow, Ether or Ammonia (Sal Volatile, 1 part: water, 5) may be injected hypodermically, or Whiskey and water, Brandy, Wine, or any available stimulant may be injected into the rectum. As soon as the power of swallowing returns, stimulants may be given by the mouth.

Ammonia, Ether, or Strychnine, may be in desperate cases injected directly into a vein, and Electricity—the interrupted current—applied to the phrenic nerve or heart. Nitrite of Amyl inhalation may be tried.

Where hæmorrhage has been the cause of the fainting, success may

follow the rapid elevation of the lower extremities and the application of a rubber bandage to drive the blood which is contained in them towards the heart. Where these measures fail, transfusion or intravenous injection of Saline solution should be resorted to without delay. Artificial respiration, frictions, electric shocks through the arms, and the application of hot sinapisms may be tried whilst the more serious operation of transfusion or intravenous injection of warm, weak Saline solution, Pituitary or Adrenalin is being proceeded with. (See under Collapse, p. 166.) The Laborde or Konig-Maas methods, described under Poisoning by Chloroform, should always be tried.

SYNOVITIS.

Simple acute inflammation of the synovial membrane due to sprain or other form of trauma should be met by absolute rest of the affected joint. This may be carried out in various ways, as by the use of splints, sandbags, etc., and the joint should be fixed in the most useful position should ankylosis unfortunately follow—*e.g.*, the elbow should be placed beyond a right angle, with the hand well supinated, the knee fully extended. Such appliances, however, are not to interfere with the application of the remedies about to be mentioned.

Cold, either in the form of evaporating lotions, or, what is much better, Ice applied freely round the joint, or Leiter's tubes is the most successful of all treatments. Leeching may be resorted to when the pain and high tension do not rapidly yield to ice-bags applied round the joint. Upon an inflamed knee-joint a dozen or more leeches may be placed, and bleeding from the bites may be encouraged by the application of warm poultices or fomentations. When the pain does not yield to cold applications, warmth should be tried and hot Boric compresses covered in by oiled silk are the best means of carrying out this form of treatment.

Green Extract of Belladonna rubbed up with twice its weight of glycerin is a favourite local application for the relief of pain; the stronger B.P. belladonna preparations should not be employed owing to the risk of absorption. The method of producing venous congestion is sometimes followed by excellent results.

Opium for the relief of pain may be necessary, 15 grs. Dover's Powder with 2 grs. Antimonial powder every 8 hours may be given.

Purgation by Sulphate of Magnesia, followed by a diaphoretic containing small doses ($\frac{1}{16}$ gr.) of Tartar Emetic, at short intervals, is the best constitutional treatment in sthenic and traumatic cases occurring in the robust.

The following mixture may be administered:

℞ *Magnesii Sulphatis* ℥ij.
Antimonii Tartarati gr. j.
Tincturæ Aconiti ℥ss.
Syrupi Aurantii ℥j.
Aquæ Menthæ Piperitæ ad ℥xvj. *Misce.*

Fiat mistura. Capiat cochlearia duo magna secundis horis.

Aspiration should be resorted to when the joint is distended with fluid, strict antiseptic precautions being followed. If the fluid is found to be purulent, the best plan is free incision and drainage, the drainage extending down to, but not into, the synovial cavity; the joint should be thoroughly flushed with an antiseptic solution, and in apparently hopeless cases the method of continuous irrigation with warm Saline or Boric solution, and the occasional injection of Hydrogen Peroxide may restore the integrity of the articulation. A vaccine prepared from the pus should be employed to hasten resolution, and when septic inflammation extends to the osseous tissue excision or resection will be necessary, and in some cases an amputation may be the only means of saving life.

In rheumatic cases large doses of Salicylate of Soda should be given, and where gout figures in the causation Colchicum may be safely prescribed, with a padding of absorbent wool round the joint, which should then be enveloped in oiled silk. In synovitis in syphilitic patients treatment should be inaugurated by two or three full doses of Salvarsan or its substitutes, and when the immediate effects of these have passed off a course of mercury or, better still, mercury and iodide should be prescribed.

The acute symptoms having subsided in an ordinary simple synovitis, the question of commencing passive movements arises. The mistake is likely to be made of prolonging the rest treatment unduly. Massage, friction and douches with radiant heat baths should be cautiously commenced and persisted in till the function of the articulation has been restored.

In *chronic* synovitis the treatment is to be carried out on similar lines, and if fluid remain in the joint after the subsidence of pain and local heat, elastic pressure, by layers of cotton-wool, beneath a calico bandage firmly applied or by a perforated rubber bandage, will be found very effective, and in addition counter-irritants are to be employed. Small blisters may be applied in 3 or 4 places over a large joint like the knee, or the actual cautery may be lightly pressed against the skin in a few places. Counter-irritation by means of strong Iodine preparations is a valuable routine, and massage, douches and passive movements may be carried out whilst the iodine is being daily applied.

Hydrops articuli, which fails to yield to pressure and the above measures, should be aspirated and the elastic bandage reapplied. In other cases strapping by adhesive plaster spread upon some strong fabric serves the same purpose, provided the plaster be removed and reapplied at short intervals as the swelling diminishes. Scott's dressing or a mild Mercurial preparation spread upon lint may be applied to the joint under the strapping. By these means much fluid and even thickening of the synovial membrane may be got rid of, by the assistance of passive motion and gentle exercise of the joint and the internal administration of Iodide of Potassium in full doses.

Hydrops articuli is frequently of tuberculous origin. It must then be treated as tubercle elsewhere by rest, pressure, tuberculin, and on general

hygienic principles. In the case of the knee it will often be advisable to apply a Thomas's splint and accept at once the disability of a stiff joint.

In neglected cases or when the rest cure has been through undue caution kept up too long, ankylosis results; should an attempt under general anæsthesia fail to break down adhesions, operative procedures may be necessary to restore the mobility of the articulation. When the synovitis is due to the presence of a loose cartilage in the joint, it should be removed; when due to imperfect repair of ligaments after a sprain, a thickened sole or steel may be used to prevent further stretching of the injured ligament; failing this, it must be removed by opening the articulation.

SYPHILIS.

Prophylaxis.—As regards the preventive treatment of syphilis, the subject is in the main a question of morals, and may be summed up in the single word—*purity*. Prophylaxis becomes a practically professional problem in those cases where the marriage of an individual who has suffered from syphilis is contemplated. There is still much difference of opinion regarding the interval which should elapse between the time of contracting the disease and that at which marriage is permissible. The trend of opinion is against the shorter period of *two years* laid down by Hutchinson, even when the most energetic treatment has been carried out, and gradually the interval of three to *four* years has come to be regarded as a safe practical rule for the majority of cases. The presence of the Wassermann reaction affords some guide, but cannot be said to be conclusive; though the reaction may be absent in some cases, still the disease can be propagated by these individuals, whilst it has been found that patients showing a marked reaction may not be able to infect their wives and may be capable of producing healthy issue. Nevertheless, it will be wise in all cases where a positive reaction is found to submit the patient to further energetic treatment till a negative is substituted for a positive reaction. In all doubtful cases the other tests should be employed also, as the colloid gold, and luetin reagents.

In all cases of old syphilitic infection, the mother during pregnancy should have several short mercurial courses to make assurance doubly sure. The new-born infant, if syphilis exists in its blood or tissues, will give a positive reaction as soon as tested, and such an infant should not be put to the breast of a healthy wet nurse. It is claimed for Salvarsan that it has specific action, when administered during pregnancy, in preventing abortion and curing the disease in the fœtus.

The importance of prophylaxis is seen in those cases where the surgeon or accoucheur receives a finger wound in operating on a syphilitic patient. The experiments of Metchnikoff have demonstrated the fact that a 30 per cent. Calomel Ointment, when rubbed into the site of the inoculation, will effectually prevent infection when the application is made within an hour after receiving the wound. Hence any suspicious accidental wound or abrasion should be promptly treated by a thorough local inunction.

Calomel Cream, 33 per cent., has been employed in the Navy, and Power reports that the incidence of syphilis is thereby reduced.

Abortive Treatment.—This problem is intimately associated with the treatment of the primary sore. There is no evidence that syphilis has ever been aborted by excision of the chancre alone. The successful instances where operation has been carried out were always treated by active mercurialisation at the same time, hence it is impossible to say that the satisfactory result was not due to the drugs employed.

It is therefore advisable for the surgeon to content himself with such local treatment of the primary sore as past experience has shown to promote early healing and resolution of the induration. The best routine application is Black Wash applied on lint which should be frequently changed. When much moisture is present, as in sores on the female genitals, the chancre may be dusted over with Calomel.

Iodoform is a favourite routine application, and but for its tell-tale odour it would be universally employed. When the sore is situated inside an elongated prepuce it may be advantageously selected, as the prepuce prevents its volatilisation.

Should healing be slow, a sluggish chancre may be lightly touched with strong Liq. Hyd. Pernit., and any tendency to spreading may be checked by an application of fuming Nitric Acid. Mixed sores are best treated by Iodoform powder. Dry chancres on the skin of the penis can be most conveniently dressed by the application of a piece of Emplastrum Hydrargyri.

Constitutional treatment with the intention of producing abortion of the disease has attracted much attention, since the possibility of effecting this was stoutly maintained by Hutchinson. When a single intravenous injection of Salvarsan is administered during the early primary stage, the spirochætes often entirely disappear from the secretion of the chancre within 24 hours and the induration begins to melt away. The most remarkable proof of the abortifacient efficacy of the drug is afforded by the experiments on apes. When one of these animals was infected locally by the syphilitic virus and injected with Salvarsan the spirochætes were so entirely destroyed that it was found possible to establish a fresh attack of syphilis 4 weeks afterwards by inoculating with the virus again.

(A number of allied and possibly identical compounds have been introduced during the war period owing to the difficulty in procuring the original salvarsan or neosalvarsan; these are known as Novarsenobenzol, Galyl, Luargol, Kharsivan, Neokharsivan.)

The permanency of the cure in human syphilis by Salvarsan can only be demonstrated by time, and even its most enthusiastic advocates recommend that it should be in most cases supplemented by Mercurial treatment. It seems almost certain that primary syphilis can be aborted by a few injections of salvarsan, but no surgeon would venture to recommend that any case should be so dealt with finally. There is always the great risk of those spirochætes in the non-vascular areas escaping the lethal action of the drug. Hence, even where abortion of the disease

in the primary stage has apparently occurred, a six-months or longer period of mercurial treatment should invariably be instituted.

The routine methods of using Mercury in syphilis will be first described.

The abortive treatment by mercury has been placed upon an unassailable footing, and advances in pathology and diagnosis have simplified the therapeutic problem. The great objection to starting an active mercurial treatment of syphilis in its primary stage was the question of uncertainty of diagnosis. At this early period it was impossible to be confident that the local lesion was truly syphilitic, and the idea of commencing with full doses of the metal, which would have to be continued for a long period in the blind belief that the patient had become infected, was rejected by most practitioners.

By a careful examination of the secretion from the sore, the spirochæte may be at once recognised by employing dark-ground illumination or by mixing Chinese ink with the discharge before examining it under the microscope. As soon as the parasite has been detected, abortive treatment by mercury can be confidently commenced and persisted in till the patient can be safely assured that the disease has been cured. Hutchinson stated "that if treatment be faithfully carried out, syphilis may be wholly suppressed, and the patient may never know anything about his malady beyond its primary symptoms. In many cases he may come to doubt the diagnosis on account of the completeness of his cure." Of the truth of this statement the writer is perfectly satisfied by clinical observation, and he accepts the principles of the abortive plan, by aid of mercurials, without any reservation as one of the most certain and brilliant advances in therapeutics.

As soon, then, as a patient presents himself with an indurated chancre, he should be placed under small doses of mercury, as 5 grs. Plummer's Pill, morning and evening, 2 grs. Grey Powder in pill three or four times a day, or 2 grs. Blue Pill, or $\frac{1}{20}$ gr. Perchloride, or $\frac{3}{4}$ gr. Green Iodide thrice daily.

The following combination has many advantages:

℞. *Hydrargyri cum Creta* gr. iss.
Quininæ Sulphatis gr. i.
Pulv. Opii gr. $\frac{1}{6}$. *Misce.*

Fiat pilula. Mitte c. Sumat unam quater in die post cibos.

In a fortnight or three weeks the chancre is markedly changed for the better, and the induration is greatly reduced and rapidly disappears as the system gets under the influence of the antidote. The treatment should be steadily persisted in for about 1 year, the gums being watched closely, and the dose diminished upon any marked sponginess or ptyalism. In Aix, where the closest attention is given to every detail that facilitates the admission of the largest amount of the drug into the system without affecting the gums, great care is exercised by the use of tooth-powders and astringent mouth-washes to keep the gums in a healthy condition.

The following is used extensively at Aix-la-Chapelle:

℞ *Liq. Aluminii Acet. (P.G.)* ℥ij.
Aquæ Flor. Aurantii ad ℥viij. *Misce.*

Fiat lotio pro ore, sæpe utenda.

A 1 per cent. solution of Alsol (Aceto-tartrate of Aluminium) acts in the same manner.

Where the writer has witnessed failures from mercurial treatment he has been generally able to trace these to the nervousness of the physician, who was afraid to continue the drug for a sufficiently long period in sufficient doses, or to the carelessness of the patient, who ceased to take it. Seldom, if ever, has he chanced to see injury done by overdoses, unless in the hands of quacks or irresponsible persons. He is therefore led to conclude that much greater injury is done by withholding the drug than by giving it too generously.

As long as the patient continues to gain in weight or steadily keeps to his normal standard of weight there is little danger to be feared from the action of the drug upon the system. Accurate weighings should be accomplished once a week or once in a fortnight in the physician's study after the patient has been taking the drug for several months. Under this abortive treatment the rash may not appear at all, or if it appears it is so much modified as not to be easily recognisable. The same may be said of the sore throat and other phenomena. It is therefore advisable, if not imperative, that mercury should be given as soon as an indurated chancre comes under notice, without waiting for the appearance of the rash or sore throat. Should mercury be given before induration appears in the sore? In other words, given a sore, which *may* not be syphilitic, are we justified in waiting for changes to take place in it to settle our diagnosis before exhibiting mercury? Hutchinson thought it possible to cause abortion of the primary stage itself. Whether this is correct or not need not deter the physician from beginning small doses of mercury when he considers that such treatment cannot possibly do the patient any harm.

The detection of spirochætes in the secretion of the sore at once places the diagnosis of the nature of the chancre beyond doubt, in which case there never should be a hesitation about instituting mercurial treatment after one or more injections of Salvarsan.

Duhot has published his results of the abortive method by injections of Grey Oil; these show that when active mercurial treatment was instituted before the twelfth day after the appearance of the chancre, there were no further symptoms in 95 per cent. of the cases and the serum reaction was proportionally negative.

Wassermann Reaction.—The bearing of the result of this test on treatment is a very important matter, and in its discussion it must be recognised that during the entire primary stage of syphilis a positive reaction is not obtainable in more than 40 or at the most 50 per cent. of cases, and in early chancres as a rule there is no reaction. Therefore, as regards early abortive treatment, the test must be regarded as practically useless, probably because the spirochætes are localised in the sore and neigh-

bouring lymphatic glands. In the secondary stage, before mercury or salvarsan has been employed, a positive reaction may be obtained in 95 per cent. of the cases; this result is, however, of little practical importance, as by this time the signs of the disease are obvious and unmistakable.

The presence of a positive reaction is regarded as indication for active mercurial or salvarsan treatment, even when these drugs had been previously exhibited, though McDonagh affirms that the presence of the reaction only signifies that the patient probably has had syphilis, and that it does not indicate active disease requiring treatment. During active mercurial treatment, when carried out for several months, the positive is usually replaced by a negative reaction, but this must not be regarded as evidence of a cure, since a short time after the suspension of the drug the reaction is liable to become again positive. Therefore, before the final cessation of mercurial treatment, the blood should be again examined after a 6 or 8 weeks' suspension of the metal, during which iodides should be freely administered in order to secure elimination of any mercury retained in the system, when, if a positive reaction occurs, the mercurial treatment is to be resumed. The patient should only be regarded as cured when a negative reaction is obtained after the lapse of 6 or 9 months from the cessation of treatment. Even in these cases by "reactivation"—that is, by a few mercurial or colloidal mercury with sulphur injections—the reaction can often be made positive again.

Treatment of the Secondary Stage.—When the case presents itself in the first instance in the secondary stage, the exhibition of mercury in full doses continuously is clearly indicated for a period of 9 months at least, commencing after an injection of salvarsan. Any mercurial preparation may be employed, as Hydrag. cum Creta in doses of about 10 grs. daily, which may be safely pushed as long as the gums show no signs of swelling or ulceration, or $\frac{1}{16}$ gr. Perchloride may be given three times a day.

It will generally be found necessary after a month or 6 weeks to diminish the dose slightly for a short temporary period to insure that salivation may not suddenly supervene, but when possible the mercurial treatment should not be entirely suspended. The aim of the surgeon should be to introduce *continuously* as much of the drug into the system as can safely be accomplished without affecting the gums markedly, and if a short rest be compulsory Iodides may be advantageously administered. These should also be combined with the mercury after the lapse of 3 or 4 months from the appearance of the primary sore, and it is a good plan to suspend the iodides for each alternate month of the treatment during the later stages of the secondary period whilst mercury alone is being given. At the end of 9 months, if all goes on satisfactorily, a 3-months' course of iodides in full doses may be substituted for the mercury, which should afterwards be prescribed in short courses from time to time till the end of the second year according to the indications obtained by resorting to the Wassermann reaction. By this time in ordinary cases the cure may be considered as accomplished, but it will often be necessary to resort to

mercurial courses for short periods for another 12 to 24 months, and sometimes for even a longer time.

The entire period may be passed without the patient taking to bed or giving up business, and exposures to variations of weather, if met by ordinary precautions, are harmless, and need not interfere with the treatment.

It is hardly necessary to point out that the patient should be placed under the most favourable hygienic conditions as regards food, fresh air, most moderate exercise, and abstinence from alcohol in every form, and the avoidance of all mental and physical overwork. Sexual indulgence obviously must be strictly forbidden. If tobacco be permitted at all it must be sparing in amount, and only when the mouth remains in a healthy state.

Some surgeons believe that the system soon becomes accustomed to the *continuous* use of the drug, and they recommend its suspension for weeks or months, after which it is to be resumed in full doses. This is known as the *interrupted* method of treatment. The writer does not hesitate to advise the continuous plan, chiefly because he is satisfied that relapses and tertiary manifestations are less frequent when it is employed.

Inunction unquestionably is preferable to administration of mercury by the mouth, and the results are more uniform and lasting when this plan is scientifically carried out, but there is considerable difficulty in pursuing inunction treatment at the patient's home or even in the best English health resorts. Inunction is much in vogue as a routine treatment on the Continent, especially at Aix, where the usual dose is about 75 grs. of Ointment (1 in 3) rubbed in once a day for 20 minutes over the sides of the chest and abdomen and inner aspects of the arms and thighs. These doses would appear to be better borne there than at home. Oleate of Mercury or the Calomel Bath may be substituted. Where the Ointment is employed it must be rubbed into different parts of the body in succession, otherwise local irritation may supervene. Where the patient is compelled to remain at his business, inunction is not easily carried out, but where he can devote his full time to the cure of his disease, this method is preferable to all others. Where a rapid effect is desired, as in cases of neglected syphilis, or where pressing brain symptoms arise in the later forms of the disease, this method may be imperative, or wherever we wish to obtain the full physiological action of the drug 120 grs. may be then rubbed in twice daily.

An ordinary inunction course usually extends for about 6 weeks, but this will always require repetition later on. Afterwards the administration of mercury by the mouth in moderate doses should be kept up at intervals, in which case a further resort to inunction treatment may be avoided.

Welander's method of causing the patient to wear a mercurial shirt is based upon the erroneous idea that in inunction by the ointment the drug finds its way into the blood by inhalation of the evaporated metal. It may, however, prove a handy plan of treating the disease in some cases

where inunction and secrecy are both necessary. Mercuriol, which is an amalgam of mercury, magnesium, and aluminium, is a very suitable drug for Welander's method, as it decomposes under the heat of the body, leaving the mercurial vapour free for inhalation; it may be worn as a sachet.

Injection Treatment.—The practice of most specialists now is in favour of abandoning oral administration, and trusting entirely to deep muscular injections, as a much smaller amount of the metal is necessary, the dose can be scientifically gauged, and no stomach or intestinal disturbance is produced. The best site is a point in the gluteal region midway between the anterior spinous process of the iliac crest and the cleft of the buttock, and the liquid should be lodged deeply in the mass of the muscle. The most scrupulous antiseptic precautions must be maintained at each injection. As regards the selection of the mercurial preparation to be employed there is a considerable diversity of opinion.

Soluble salts as the Bromide, Cyanide, Oxycyanide, Lactate, Sozoiodolate, Succinimide, Asparaginate and Formamide have been employed, but the Sal Alembroth compound is the safest and most manageable of the soluble salts. It may be formed by dissolving 16 grs. Perchloride of Mercury and 8 grs. Ammonium Chloride in 1 oz. water. The dose of this solution of the double chloride of mercury and ammonium is 10 mins., which represent about ⅓ gr. perchloride. Bloxam found that after two such doses the physiological action of the drug manifested itself, and the effect could be kept up by one injection every seventh day. His practice, however, was to inject once a fortnight after decided mercurialism had once become established, and to inject only once a month after the disappearance of the throat and glandular symptoms, and this was continued for 18 to 24 months, only 8 grs. perchloride being employed during the entire period of treatment.

Ragazzoni injects 5 mins. of a solution of Red Iodide of Mercury made by dissolving 1 gr. with sufficient amount of Sodium Iodide in 1 dr. water.

Theoretically it would seem that if any of these soluble salts be injected they should be employed in very much smaller doses and more frequently —at least every second day, though in practice the above-mentioned intervals are said to be quite satisfactory.

Insoluble salts are, however, much more frequently employed, as, owing to their slow absorption from the muscular tissue, a more uniform effect is continuously being exerted upon the spirochætes. The favourite injection is Grey Oil prepared accordng to Lambkin's formula by rubbing up ½ oz. pure mercury with 2 oz. anhydrous lanoline, and adding carbolised (2 per cent.) liquid paraffin to 5 fluid oz. The maximum dose of this compound is 10 mins., which contain 1 gr. Hg, and the injection should not be repeated at shorter intervals than every seventh or eighth day. Little if any pain follows the injection. Lambkin's Mercurial Cream is of the same strength (10 per cent.), and contains a specially prepared fatty basis derived from palm oil.

Calomel in suspension in sterilised olive oil is also much used; it always causes considerable pain; $\frac{3}{4}$ gr. in 17 mins. is the usual weekly dose. By adding Creosote and Camphor to the injection pain may be prevented. It is claimed for this injection that it is much more active or speedy in its effects, and Lambkin's routine is to start the treatment with a calomel injection every week for a month, and then to resort to the mercurial cream.

Intravenous injections are recommended in malignant or very grave cases of nerve syphilis. The best salt for this purpose is the soluble Cyanide, which has been injected into a vein at the elbow in doses of $\frac{1}{5}$ gr. —*i.e.*, 20 mins. 1 per cent. solution. This salt is very poisonous, and may cause purging and albuminuria.

As a rule the injection method of treating syphilis by mercury (and by salvarsan) is contra-indicated in Bright's disease, in structural heart and liver affections, and in alcoholic subjects.

Summary.—As already stated, the universal practice in treating syphilis in its primary and secondary stages consists in a combination of the salvarsan and mercurial methods, though the details of the routine vary greatly in the hands of different experts. Some prefer salvarsan, the majority use neosalvarsan, the intravenous route being always preferred owing to the pain following intramuscular injections.

Lloyd Jones and Gibson describe the method carried out in the British Army. Two injections of 0·3 grm. salvarsan are given during the first week and one of mercurial cream; second week, one of salvarsan and one of cream; third week, one of cream; fourth week, one of salvarsan 0·4 grm. and one of cream; fifth and sixth weeks, one of salvarsan 0·5 grm. and one of cream; seventh week, one of salvarsan 0·5 grm. and two of cream. By the eighth week the disease has practically disappeared, but if a positive Wassermann exists Iodide of Potassium 30 grs. daily are given for a fortnight, and if still positive, three injections of cream and three or four of salvarsan (a total of 1·2 grms.) are administered during the eleventh, twelfth and thirteenth weeks. The treatment of syphilis affecting the nervous centres will be referred to later on.

Serum treatment has proved a failure, but the writer has seen unmistakably good results from the injection of dog's serum in tertiary ulcerations many years ago carried out in Fournier's wards as suggested by Professor Richet in Paris.

Complications and local manifestations rarely require special treatment, as these usually steadily disappear under the action of mercury when skilfully employed by any of the methods already detailed.

Skin eruptions on the face may be hastened in their disappearance by the local application of a mild mercurial ointment as Calomel or White Precipitate, 20 grs. to 1 oz. Lanoline. Where the skin eruption is very formidable the calomel bath may be resorted to, the patient sitting upon a cane-bottomed chair, or with his body in a chamber devised for the purpose. As he receives a vapour bath, calomel is sublimed by the heat of the lamp which boils the water, and it is deposited in fine dust over the

surface of his skin, after which he lies down in dry blankets. The Turkish bath during the mercurial course is also believed to hasten the disappearance of the rash.

Mucous patches on the throat and mouth and about the vulva and anus, though they yield in time to the steady use of the internal mercurial, have their disappearance hastened by a light touch of the solution of the Pernitrate of Mercury, and the writer has often applied this to the tonsils. Warts upon the tongue may be similarly treated; in these cases any form of local irritation, as that induced by tobacco, will greatly aggravate matters. Where the ulcers are deep a little of the powdered Iodoform may be blown into them with the insufflator. This substance may be dusted over condylomata, but a mixture of Calomel and Oxide of Zinc answers very well.

Throughout the mercurial course diarrhœa is to be avoided, and for this reason a small quantity of Dover's Powder or Laudanum is to be combined with the mercury when any tendency in this direction is observed. When rapid action is desired, the patient should be advised to give himself up to the treatment, and either to remain in bed or in a warm room, as free exposure to the air retards the action of the drug, probably by hastening elimination.

In the treatment of the secondary stage with mercury it may be necessary to push iodides in large doses, especially when the temperature runs high, when the bone pains are marked, or where the mucous membranes are extensively involved in the ulcerative process.

In the later months of treatment tonics are valuable, and they should always be employed during the suspension of the mercurial. They are sometimes used in the early stages too freely, to the detriment of the patient. Cod-Liver Oil often comes in well in the late stages in thin subjects.

Potassium Chlorate is a drug of much use for its local action upon the mucous membrane of the mouth and throat, and when ptyalism occurs it may be resorted to at once as a mouth-wash and gargle (1 in 40). It has no action in the blood upon the disease, as some have thought. The following may be used:

℞. *Potassii Chloratis* ℥iv.
Glycerini Boracis ℥i.
Aquæ Rosæ ℥xv. *Misce.*

Fiat Gargarisma. Signa.—"*To be used as a gargle frequently, and one tablespoonful to be swallowed after meals, three times a day.*"

Treatment of the Tertiary Stage.—The tertiary manifestations of the disease will require another drug for their destruction. Iodide of Sodium or Potassium has been already referred to; seldom is it so clearly indicated in the secondary period, but occasionally it will be found necessary to give it where the early periostitis of bones causes much pain, and where the ulceration of the throat does not readily yield to mercury, and it certainly has a marked influence over the high temperature often met with during

the secondary stage. As mercury is clearly indicated in the secondary, so Iodides are to be regarded as possessing almost specific action in the tertiary stage.

Mercury, if administered continuously for a long time, very materially diminishes the chance of tertiary symptoms. It has its influence upon the treatment of the sequelæ in this way—that, given marked tertiary symptoms in a patient who has had little mercury administered to him in his secondary period, this drug will be found to act very rapidly in removing them.

Iodide of sodium or of potassium is given for every tertiary symptom. Under its use large gummatous tumours melt away, and nodes, which had withstood all other agents, disappear as if by magic. Many affirm that its effects are transitory, and that relapses always occur, and that in no sense is it curative. This is quite true, if its use be not continued long after the apparent removal of the local affection; but there is sufficient clinical evidence to show that in many cases without the use of any other remedy the iodide has effected a removal which had become permanent. In dealing with tertiary manifestations and the effect of iodides upon them one can be quite satisfied that when they disappear it is not spontaneously, but by the result of the action of the drug, as these affections, if let alone, seldom show any tendency whatever to resolve.

It will be a safe rule for the physician to make for his own practice, notwithstanding these considerations, that in no case should the action of the iodide be depended upon unless followed immediately before or after, or used in conjunction with, salvarsan and mercury in some form or other.

For the group of symptoms known as "intermediate" the best treatment will be a combination of the iodide with the usual salvarsan and mercurial dose. Under this plan choroiditis, testicular sarcocele, and various early cerebral affections disappear, and the specific action of the iodide seems to increase as the affections become more and more separated from the primary stages.

In a case of real and unmistakable tertiary nature the question will arise—Should the iodide be commenced at once without waiting for the action of mercury? This will depend upon various points in the history of the treatment of the case, and also upon the exact locality and gravity of the lesion. Where mercurial treatment had not been patiently carried out in the secondary stage, the best results are to be expected from it. It is in these cases that Mercury injections do so well, even after the failure of the drug by the mouth.

If, then, the tertiary lesion resists mercury, or if it appears, say, in the form of a cerebral tumour, the iodide should be commenced at once. As a rule it is useless to begin with small doses.

The writer's plan is to begin with 5 grs. three times a day, and gradually increase till 20 grs. are taken in each dose. It is not an uncommon experience to find a patient who has taken fair doses of the iodide for many months for nodes without the least result. If the dose be suddenly increased, say to 20 or 30 grs., the nodes begin to disappear as if by magic.

1 dr. in the day meets the requirements of the great majority of cases, and it is remarkable how soon all coryza and other unpleasant symptoms disappear when full doses are given.

Wood laid down the law that where very large doses of iodides are tolerated it amounts to a proof that the disease under treatment is syphilitic, so satisfied was he of the great toleration of the drug which this disease establishes. This law is at variance with all clinical experience; one sees very large doses constantly tolerated even for long periods in the treatment of many diseases as psoriasis, diabetes, etc., where there is no reason to suspect that the patient had ever contracted syphilis. But if his remark had applied to mercury the truth of the statement could not be challenged. Syphilis, as pointed out by Hutchinson, is a vital antidote to mercury, and in this fact lies the keynote to all successful treatment of the disease by mercury. The dosage of the metal must be arranged according to the severity of the attack, and as long as the syphilitic toxin is present the patient can take doses which would be highly injurious to a healthy subject.

The law may be laid down that in tertiary syphilis the local action of mercury and iodides is greater than in the secondary lesions, and just in proportion to the remoteness of the tertiary affection from the secondary, so does the importance of local treatment increase. This is demonstrated in cases of rupia, serpiginous ulcerations, lupoid growths and ozæna, where iodoform or mercurial applications act speedily after failure of internal treatment with both iodides and mercury.

Acid Nitrate of Mercury solution very lightly and cautiously employed and Iodoform applied in powder freely or as a strong ointment are the best agents for local treatment. The internal administration of iodides and mercury must be persevered with at the same time, but oftener mercury is found to disagree with tertiary patients than with those suffering from the primary or secondary stages of the disease. It is in such cases that the Calomel bath, injections or inunction do so well when the drug by the mouth appears to fail.

Various formulæ for administering mercury and iodine together in tertiary syphilis are used. The Biniodide of Mercury in the form of pills, each containing $\frac{1}{32}$ to $\frac{1}{16}$ gr., is very effective. Donovan's solution has long maintained its reputation, and the B.P. formula (containing 1 in 100) may be given for long periods in doses of 20 mins. Perhaps the best of all combinations is Corrosive Sublimate, prescribed in Iodide of Potassium solution. Its great advantage lies in the facility with which the iodide or the mercury can be increased or diminished at pleasure according to the effects required:

℞. *Hydrarg. Perchloridi* gr. j.
Potassii Iodidi ʒv.
Aquæ Destill. ʒxij. *Misce.*

Fiat mistura. Capiat coch. mag. ter in die ex aqua post cibos.

This mixture may be given for a month at a time, when the mercury may be stopped, the iodide being administered without it. At the end of the second month the mercury can be added, and so on each alternate month. Tannate of Mercury is recommended in tertiary syphilis in doses of 1 gr. twice or three times a day, but it has no advantages over other preparations.

Iodide of Sodium should be selected where large doses of the iodide are to be continued for long periods, as it has a less depressing effect. Some authorities advise the use of a combination of the Iodides of Sodium, Potassium and Ammonium. For tertiary brain, cord, and vascular lesions the combination of iodides with Nitrites is considered advantageous, and some authorities advise short courses of Thyroid feeding in the intervals of suspension of iodine treatment.

The new iodine compounds, as Iodipin or Iodinal (60 mins. 25 per cent.), Sajodin (25 grs.), Iodalbacid (20 grs.), Iodival (15 grs.), etc., are much praised.

Where iodides cannot be tolerated by the mouth, Iodipin may be employed by inunction or by hypodermic injection, and by the latter route Tiodine may be administered in 3-gr. doses, and the older salts have been used for their local action by the method of Cataphoresis.

When *very large* doses of the iodides are considered necessary, it is well to stop the administration of mercurials for a time, and it appears probable that a small proportion of arsenic diminishes the tendency to skin eruptions.

The following combination may be used:

℞. *Sodii Iodidi* ʒiv.
Potassii Iodidi ʒiss.
Ammonii Iodidi ʒiss.
Liquoris Fowleri ʒij.
Spirit. Ammon. Aromat. ℥iss.
Liquor. Sarsæ Co. Conc. ad ℥xx. *Misce.*

Fiat mistura. Capiat cochleare magnum post cibos ter in die cum cochleare magno aquæ.

The iodide treatment may require in some cases a longer period than the original mercurial course. Some patients may be kept upon it, with occasional breaks, for 2 years. It must be persisted in till every trace of the local affection has long disappeared. Gowers lays great stress upon the dangers of iodides when administered for longer periods than a few weeks at a time. The writer has seen large doses administered for 1 to 2 years without a break, and no ill-effects whatever were observable. It is well, however, to give a rest of 14 days every 2 or 3 months when the symptoms are not urgent.

It is hardly necessary to emphasise the necessity for close attention to the state of the general health in tertiary syphilis. Change of air to the seaside and a long sea voyage may be necessary in tedious cases.

The treatment of tertiary syphilis has undergone considerable change since the discovery of spirochætes in the seat of the lesion long after these were supposed to have been destroyed in the system. Hence the advocacy of a few salvarsan injections followed up by more active mercurial treatment. In this connection the following paragraph has special significance:

Syphilis of the Nervous System.—A complete change in the treatment of syphilitic nervous phenomena has taken place since the discovery that mercury and salvarsan reach the cerebro-spinal system in infinitesimal amounts when administered by the mouth, skin, muscles, or veins. This has given rise to the treatment of these lesions by injection of the drugs into the spinal canal by means of Salvarsanised or Mercurialised Serum. The procedure is described under the headings of Paralysis, General, of the Insane and Locomotor Ataxia.

Congenital Syphilis.—It is in this form of the disease that the most marvellous effects of Salvarsan have been demonstrated, though death has followed in infants suckled by the mother after receiving an injection of the new drug. Even when all goes well with the infant, the salvarsan cannot be relied upon to prevent relapses, and Mercury will always be necessary. 0·075 to 0·150 grm. is injected into the veins of infants by Veeder and Jeans, who follow two such doses up by courses of grey powder.

By the judicious use of mercurials, as in ordinary syphilis, success is likely to crown the efforts of the physician in the most unpromising cases. Failure is too often caused by timidity in pushing mercury. It must be borne in mind that children bear large doses of the drug safely, and the writer elsewhere ("Pharmacy, Materia Medica, and Therapeutics," 10th Edition) has pointed out that it is almost impossible to do harm with Grey Powder to infants poisoned by syphilis as long as their tissues are saturated with the syphilitic virus, as this latter acts as a vital antidote to the mercury. Salivation is almost impossible, and it may be laid down as a safe rule that it may be pushed as long as the child continues to thrive.

½ to ¾ gr. of Grey Powder may be given three times a day for several days to a 3-months' old infant. Then the same dose once a day may be continued for many weeks. If the physician have doubts about pushing it further, he should make careful weighings of the patient, and any steady diminution of weight will be a strong indication that the treatment should be suspended. The writer is satisfied of the truth of the following statement which he made many years ago: "Weak, emaciated infants bear larger doses when poisoned with syphilis than they can when afterwards apparently cured and fattened; but if, after a period of neglect, syphilitic symptoms come on markedly, then they bear very large doses again."

Weak Mercurial Ointment may be smeared upon a flannel roller wound round the abdomen. The movements of the body rub in the drug as in the ordinary operation of inunction, but the physician has no guide to the amount absorbed. The writer has had excellent results by using a roller

saturated with Cod-Liver Oil, to which a small quantity of the ointment has been added. Over this a broad binder of mackintosh is applied, and the oil renewed every morning or evening without changing the roller. Marked increase of weight always follows this simple but invaluable plan.

Mercurial treatment may be suspended from time to time, but should not be discontinued for at least 1 year. Cod-Liver Oil and Syrup of Iodide of Iron, to which a small quantity of Iodide of Potassium has been added, should be given at various opportunities during the course.

The mother may be permitted to suckle the child in most instances, but she should be always placed on a mercurial course, and in mild examples of congenital syphilis the mercurial treatment of the mother may meet all the necessities of the case, but it is much safer always to supplement this by an independent mild course administered directly to the infant.

It is, of course, out of the question to put the child to the breasts of a healthy wet-nurse, owing to the danger of infecting her through the nipples. If hand-feeding must be adopted, unusual care will have to be taken during the first 6 or 9 months, and beef juice should be given at least once a day.

When syphilis is known to exist in either parent, the treatment of the mother during pregnancy is of vital importance, and the writer has never seen a case of death from congenital syphilis where this was skilfully carried out.

Hereditary Syphilis.—Many recent reports prove that children first coming under the notice of the physician at any age from late infancy up to puberty suffering from the effects of neglected syphilis, as shown by the various stigmata, epileptic convulsions and mental deficiency, may improve markedly under Salvarsan and Mercurial treatment. If the mental condition is beyond the degree of feeble-mindedness, treatment is of no avail. With the family history and a positive Wassermann, Gordon advises Mercury and Iodides under the age of five years, and after this age the same treatment preceded by Neosalvarsan. Salvarsanised Serum was injected intraspinally in those feeble-minded who had reached the ages of fifteen and sixteen.

SYRINGOMYELIA.

Though this progressive disease, caused by the existence of cavities in the spinal cord due to developmental anomalies must be considered beyond the reach of curative treatment, much may be done by relieving symptoms and by preventing trauma and sepsis. Radio-therapy has proved of unexpected value in increasing the power of the weakened muscles and even restoring tactile sensibility, promoting the healing of ulcers, and abolishing pain. Marquès gave sittings of 10 minutes' duration with a hard tube, each portion of the spine being acted upon till a very light dermatitis was produced, after which it was protected by sheet lead, whilst the neighbouring region of the spine was next irradiated.

Radium has also proved of value employed in a similar manner.

TABES MESENTERICA—see under Mesenteric Gland Disease.

TALIPES—see under Club Foot.

TAPEWORM.

Male Fern maintains its supremacy as the best of all remedies for the various species of tapeworm found in the human intestines. The B.P. Liquid Extract is the only reliable preparation of the drug. By care in its administration, and by a knowledge of the way in which it acts, the physician will very seldom have to resort to any other agent. Its only drawback is its very nauseous taste and its liability to upset the stomach, but these objections can be overcome by improved pharmacy.

The dose of this preparation should not be less than 60 mins., and never greater than 90 mins. A very serious discrepancy in the dosage may be observed in the literature of the drug, one authority giving the average dose as 6 drs. or 360 mins. This dose would be fatal if the extract had been skilfully prepared from an active rhizome. The male fern is of varying activity, according to the soil and climate in which it has been grown, and the only way to reconcile the above statement of dosage is by assuming that an inferior preparation or a totally different rhizome was employed. Potain has pointed out that certain parts of Normandy, for example, produce male fern which has no effect. The writer thinks that the various discrepancies regarding dosage may also to a large extent be explained by the difficulty in distinguishing the fronds and rhizomes of *Aspidium Filix-mas, Asplenium Filix-fœmina,* and others; the *Filix-mas* exhibits eight fibro-vascular bundles on a transverse section of the petiole-base. The identity of the fern should be carefully made out before the extract is prepared, and the physician should be very particular about the pharmacist to whom the dispensing of this drug is entrusted. Of an active liquid extract 4 drs. have several times caused death. This preparation is now standardised in the last B.P.

In order to obtain the best effects of an anthelmintic several precautions are necessary. Thus, the alimentary canal must be as empty as possible, so as to permit the drug to exercise its undiluted effect upon the parasite. For this reason these drugs should be given after a long fast, or, better still, after a brisk saline cathartic. It is also advisable to recommend the patient to maintain the recumbent posture for a few hours, as vertigo, and even syncope, may follow the action of a full anthelmintic dose of most of the agents employed in tapeworm disease. Then, as many of these agents simply act by killing the worm, a purgative should be given soon after or along with the vermicide.

The fragments of the worm must be very closely examined after expulsion. Very often only a large number of the so-called "joints" are passed, and the head is left behind. Failure then, of course, results, as the neck goes on growing, and treatment should be repeated in such a case after an interval of rest. There may be more than one worm—an event more frequent than is usually supposed—and only a scrutiny of the detached portions will enable the physician to be sure of this.

For the successful treatment of a patient suffering from tapeworm it is advisable to insist upon a liquid diet for 48 hours before administering the anthelmintic. The plan of administering alkalies with the view of dissolving mucous secretions in the bowel is probably a useless one, as these drugs are absorbed rapidly from the stomach or neutralised soon after being swallowed. It is a wise precaution to confine the patient to his bed for the forenoon of the day in which treatment is being employed, but there is no necessity for a preliminary sojourn of several days in bed as is sometimes insisted upon.

Very early in the morning a dose of 4 to 6 drs. Sulphate of Magnesia dissolved in a tumblerful of effervescing Lemonade should be administered to the fasting patient to cause smart purging. In a couple of hours afterwards 1 to 1½ drs. of the extract should be given whilst the patient remains in bed.

As regards the form in which the liquid extract of male fern is to be administered, there is much diversity of opinion. It may be emulsified by 1 dr. powdered Acacia or by Mucilage of Tragacanth, or the following formula may be used:

℞. *Ext. Filicis Liq.* ℥. lxxv.
Ovi Vitellum j.
Aquæ Chloroformi et
Syr. Simp. q.s. ad ℥ij. *Misce.*

Fiat haustus, mane sumendus.

The freshly prepared extract can now be obtained in soft gelatin capsules, each containing 15 mins.: 4 to 6 of these may be swallowed, and as the stomach is quite empty they may glide directly through the pylorus into the intestines before the gelatinous envelope is dissolved, and in a concentrated condition the remedy is brought into direct contact with the parasite. Some authorities recommend that the dose should be divided into two, the second half being given after an interval of 2 hours. Manson and others advise that one-quarter of the full dose should be given every 15 minutes.

The writer's experience is against these minutiæ, and he believes that the best effects of the drug are to be obtained by a single large dose whereby the full lethal action of the vermicide is secured.

If purgation does not follow in 4 or 5 hours after the administration of the extract (which is seldom the case when 90 mins. have been swallowed in a single dose), 6 drs. of Castor Oil may be prescribed. Some physicians add 1 dr. of Oil of Turpentine to the castor oil, but the writer has seldom found it necessary to give any purgative after the dose of male fern when the drug was obtained from a reliable source. Jalap, Scammony, Calomel and other purgatives are also recommended for following up the action of the male fern.

Some authorities recommend that other anthelmintics should be mixed with the drug before swallowing; if any such plan is adopted in order to

dislodge an obstinately fixed *Tænia solium* the only drug to be selected is Turpentine Oil in 100-min. dose. Duchesne advises the following made into a firm jelly, which can be easily taken by children: Ext. Filicis Liq., 3j.; Hydrg. Subchlor., gr. vj.; Sacch. Alb., 3ij.; Gelatin q.s. ut fiat electuarium. This quantity would certainly be too much for a very young child. A boy 5 or 6 years old might take the half of it. Rothe recommends that Chloral Hydrate should be combined with the male fern in combination with a smart cathartic in the form of a capsule, the whole given together, thus avoiding subsequent pain and the administration of a purgative. His formula is—Chloral, 18 grs.; Extract of Male Fern, 30 grs.: Croton Oil, 1 or 2 drops. This is a severe dose, though he says it prevents pain and griping, and acts inside 3 hours. Chloroform and Ether have been often added to the anthelmintic draught to prevent griping; 5 grs. Thymol would meet such a purpose more effectually, but the simpler the prescription the better, and the capsules of pure extract of male fern meet every requirement.

If a case comes before the physician with the history of previous unsuccessful attempts at treatment with male fern, the following modification of the above plan should be instituted: After 48 hours on liquid diet and a 10 hours' fast, the draught of Mag. Sulph. is administered; when the bowel has been cleared out by this means, four capsules of male fern extract (60 mins.) are then administered, and in 1 hour this dose is to be repeated. Should purging not follow, 6 drs. Castor Oil may be given after waiting for at most 4 hours.

When the head of the tapeworm is not found in the motions, it is usually recommended that in a few hours another dose of male fern should be administered. The writer believes that the wiser course in such an event is to wait. If the minute head has escaped observation in the mass of bowel evacuation nothing more will be heard of the trouble; if, however, it has not been detached from its hold on the bowel the patient will find proglottides in the motions after the elapse of about 100 days, when the treatment should be again resorted to, a larger dose being employed. A severe or even fatal gastro-enteritis may be set up by repeated continuous attempts to expel the head of the worm, and a more satisfactory result is to be expected by waiting till the proglottides have developed, whereby a greater traction is exercised on the parasite.

When male fern has failed after a couple of trials, any of the following anthelmintic drugs may be employed.

Oil of Turpentine has long enjoyed the reputation of being a valuable agent in killing tapeworm, but to be of any use it must be given in doses of at least 4 fluid drs. (This quantity may excite strangury and serious symptoms.) Moreover, it is most objectionable as to taste and smell, and now it is seldom employed for these reasons. If selected after the failure of male fern, it should always be given with about 1 fluid oz. of Castor Oil after fasting. The parasite is expelled dead.

Thymol, found so effectual in the destruction of ankylostoma, has recently been extolled in the treatment of *Tænia solium*. The drug, to be

of any use, must be administered in doses far beyond the usual limit—20 grs. should be administered every 2 hours for four times, after which a strong dose of a saline cathartic as 2 oz. Black Draught must be given; Castor Oil might act as a solvent for the drug and cause poisoning by allowing the thymol to be absorbed; for the same reason all oleaginous substances should be avoided, and Oil of Turpentine should never be combined with the drug.

Kousso may be given in doses of 4 drs. infused in boiling water, which is swallowed without straining as soon as the infusion is cold. This dose generally not only kills the worm, but causes its expulsion in fragments without any further purgative; 40 grs. Koussin may be given.

Kamala acts in the same manner as kousso; 2 drs. kill and generally expel the worm when given suspended in syrup, mucilage or gruel. Anderson's Tincture is made by macerating 9 oz. of Kamala in 21 oz. strong Alcohol, the dose of which is a large teaspoonful. Large doses may purge very severely.

Punica Granatum is one of the most certain vermicides, and is used in preference to male fern in the East. It may be administered in the ordinary decoction (4 to 20 oz.). Of this 1 to 2 oz. may be swallowed every hour for three doses after fasting. As the crude drug deteriorates by keeping, the following preparation is now generally employed:

Pelletierine—the alkaloid in the form of Sulphate or Tannate—is given in doses of 5 to 8 grs., followed inside a couple of hours by a large dose of Castor Oil. Manson points out that the alkaloid should never be administered to children under 10 years of age. Schröder has demonstrated that the one ten-thousandth part of this subtance, when added to the fluid in which a living tapeworm is placed outside the body, causes its death in a few minutes.

The dried fruit of Embelia Ribes in doses of 1 to 4 drs. is a favourite remedy in India and the East Indies. The seeds of the common yellow pumpkin, Pepo, are employed in similar doses and are safe for children.

Areca has been long prized in veterinary practice. The alkaloid Arecoline in the form of the Hydrobromide is given in a dose of $\frac{1}{10\,0}$ gr., followed by a brisk purge.

Ether, Chloroform and Chloral Hydrate have been administered with the intention of killing the worm before its expulsion by a purgative, but in the doses capable of accomplishing this effect these agents are dangerous and should not be employed.

Papain in 10 to 15 gr. doses has been given with the view of causing digestion or disintegration of the parasite, but this result is very doubtful, if, indeed, it is desirable.

Myrtol in doses of 5 to 15 mins. in capsules appears to act like Thymol, but it is not reliable.

Naphthaline in 15-gr. cachets has sometimes proved efficacious, and is practically free from danger.

Prophylaxis of Tapeworm.—The measures to be employed for the prevention of tænia are obvious from a knowledge of the etiology and

life-history of the parasites. The pork tapeworm is the variety most commonly to be met with; the introduction of this parasite will be effectually prevented by a thorough cooking (p. 980) of all food supplied by the flesh of this animal—pork, bacon, hams, etc. The mere "curing" or smoking of bacon and ham is not sufficient to destroy the bladder-worms or cysticercus cellulosæ which constitute the disease known as "measles" in the pig. The close inspection of all pork before curing should be carried out by every municipal authority; the cysticercus is easily detected in the dead animal by its visible presence in the tissues under the tongue. Rigid personal cleanliness in every individual infested with these parasites is essential for the prevention of cysticercus in the human tissues. When this latter form of infection has been detected by brain or eye symptoms, Renzi has shown that it also may be combated by the administration of Male Fern by the mouth.

Similar precautions regarding the thorough cooking of beef and fish are essential in the prophylaxis against the beef and fish parasites.

TELANGIECTASIS.

The treatment of capillary or plexiform angioma as ordinarily met with in the cutaneous nævus has been dealt with under the heading of Nævus. The comparatively rare form of Multiple Hereditary Telangiectasis is associated with severe hæmorrhages from the mucous membranes which are involved along with the skin. Hanes has shown that the coagulability of the blood is very considerably retarded in these cases. This may be taken as a clear indication for the administration of Calcium Salts to arrest the epistaxis or other bleeding. It is needless to remark that the local condition, when visible and capable of being dealt with, should be met by the surgical measures already mentioned as suitable for nævi. Iron, Arsenic and open-air life are regarded as the most reliable of all constitutional agents by Hanes.

TEETH, Diseases of—see under Toothache, and Dental Caries.

TENESMUS.

This painful symptom is usually the result of proctitis or of some irritation about the anal sphincter, and must be relieved by the use of remedies directed against the primary cause. (An exploration of the rectum by the finger should never be omitted, as the tenesmus may be the result of the presence of scybalæ). Till this can be dealt with, relief may be temporarily obtained by local anodynes, the best of which is a ½-gr. Morphia suppository or a small enema of 40 mins. Tincture of Opium in 2 to 3 oz. Starch mucilage. An injection of Ice Water or the introduction above the sphincter of a smooth piece of ice or a large enema of hot water often gives ease. Cocaine should be avoided. The Unguentum Conii is a safe and efficacious local sedative.

When the tenesmus is caused by inflamed or enlarged prostate or fissures, a suppository consisting of 10 grs. Ichthyol with Conium Ointment and cacao butter is invaluable.

(See under Proctitis, Hæmorrhoids, Anus, Fissure of, etc.)

Tenesmus of the bladder will be relieved by the agents mentioned under Bladder Affections, Stone in the Bladder, Strangury, etc.

TESTICLE, Diseases of—see under Hæmatocele, Varicocele, Hydrocele, Cancer, Orchitis, etc.

TETANUS.

The mortality of tetanus has been reduced during the progress of the late war to a remarkable extent. The incidence of the disease amongst the wounded has fallen according, to Bruce, from 16 per 1,000 in 1914 to under 2 in 1917, and the mortality in those affected has been still more markedly influenced. All authorities agree that these results are due to the prophylactic injections of the Antitetanus Serum. The War Office Committee ruled that as soon as possible after the reception of a wound one-third of the ordinary phial should be injected subcutaneously or intramuscularly; this corresponds to 500 U.S.A. units. Absorption being twice as rapid by the latter route, this should be selected when any delay has occurred. With this dose there is practically no danger of anaphylaxis; the immunity lasts for about 10 days. In extensive septic wounds the injections were repeated every week for four times. When a secondary operation is necessary, a prophylactic injection should be given 48 hours previously. When tetanus developed in spite of the injections, it was very often localised, in which case by treatment with larger doses of the serum its mortality was nil; when generalised tetanus developed, the mortality was reduced to 34·4 per cent. After the supervention of symptoms the daily dose should not be less than 10,000 units, but three times this amount is usually employed.

There is still divergency of opinion about the best route. Dean recommends the intra-venous method and minimises the danger of anaphylaxis by the following plan: 5 c.c. of the serum are mixed with 50 c.c. normal saline, of which 1 c.c. is injected into the veins, after four minutes 3 c.c., two minutes later 10 c.c., and after another two minutes 25 c.c. The desired full dose is administered half an hour later, supplemented by further doses by the spinal and muscular routes. The Tetanus Committee ruled against the intravenous route, and Leishman and others condemn the spinal route. The intramuscular and next the subcutaneous have the greatest amount of support, the intracerebral and intraneural being by common consent reserved for the most desperate cases.

Once the symptoms of tetanus have appeared after injury 30,000 units should be injected, and the patient should be put to bed upon a good mattress, in a dark, quiet room, to which only the physician, nurses and one or two of his most intimate friends are allowed access. Cotton-wool is placed in his ears to keep out sounds, a thick carpet being spread upon the floor. The importance of absolute stillness and protection from cold draughts is doubtless very great, and the patient should only be permitted to speak when absolute necessity dictates.

Alimentation is of vital importance. Liquid nutritious foods are to be poured into the mouth. Stimulants are indicated in full doses in the majority of cases, and where swallowing is impossible or very difficult, rectal feeding by strong, peptonised broths may be resorted to. As this often proves unsatisfactory, Rose's method of giving Chloroform twice a day may be resorted to, and when complete anæsthesia has been obtained the stomach may be filled through a rubber tube with nutritious liquid food. Hypodermic injections of Olive Oil and of solution of Glucose have been employed to supplement others forms of feeding.

Upon the second and succeeding days, till all symptoms disappear, 10,000 units should be given daily, and in desperate cases twice this amount, the routes being varied from time to time.

Constipation may be left alone, as purgatives do a great deal more harm than good. Some authorities condemn hot baths, whilst others extol their usefulness. Diaphoretics and diuretics are called for to hasten the elimination of the poison.

Sterilisation by local antiseptics and excision, thorough and radical, of the tissues around the wound have replaced the former practice of amputating the limb in which the wound was located. It is also essential that all peripheral irritation should be met by soothing or anodyne dressings, to which antiseptics should be added. Some authorities speak highly of the plan of dressing the wound with dry pulverised Antitetanic Serum.

Of drugs there is practically no end, every known sedative having been at some time or other tried, and supposed to have turned the tide against the microbe. They may be used to keep the patient alive till the poison exhausts itself by elimination, and in the very worst cases relief of suffering may be obtained.

Carbolic Acid injected hypodermically in 1 per cent. solution was first tried by Baccelli. As much as 15 grs. pure acid have been injected during the entire 24 hours without any symptoms of poisoning having appeared, even when the treatment has been prolonged over a week or more. Thus 30 mins. 3 per cent. solution may be given every hour for 16 hours of the waking day. The toxæmia which causes the disease appears to prevent any toxic effects of the acid. The use of carbolic acid was discountenanced by the war authorities. Bromides and Chloral may be employed by the mouth at the same time.

Magnesium Sulphate solution (1 in 4) has been frequently employed as an injection into the spinal canal; 3 c.c. produce spinal anæsthesia and prevent the spasms for many hours at a time. This remedy is (notwithstanding some favourable results) passing into disuse.

Eucaine alone or with Morphia has similarly been employed, and sometimes with benefit. Cocaine is more toxic and should not be used.

Bromide of Potassium in full doses generally somewhat diminishes the spasms, and a few mild chronic cases have been reported as cured under its influence, but it need not be relied upon where the symptoms are severe, unless it be given in combination with the next drug.

Chloretone and Chloral Hydrate have been used in many cases which have recovered, and there are some grounds for believing that they may save life occasionally. Whichever drug is selected must be pushed till the full physiological effects are observed, 30-gr. doses being given every 3 hours, or 15 grs. every hour or every second hour till some impression is made upon the symptoms.

Opium by mouth or Morphia hypodermically may be pushed with less danger than chloral, whose depressing influence upon the heart may make itself felt before drowsiness appears. These drugs should be given in proportion to the spasms and pain, no attention being paid to the amount of the dose. In prescribing narcotics in this disease, it must be borne in mind that enormous doses may be given. Some physicians combine chloral and opium. Cannabis Indica may be pushed like opium; it is often given with chloral, but it is less reliable than morphia.

Alcohol in *very large* doses, Tobacco in nauseating doses, Nicotine and Tartar Emetic have been pushed till sickness comes on. Apomorphine, Lobelia and other depressants have been tried, and in a limited number of cases appear to have done some good. Of the series, Alcohol is the safest; most of them are useless as well as dangerous.

Chloroform or Ether affords the only relief in very acute cases coming on soon after the wound has been inflicted. In this group of cases anæsthesia may be kept up for many hours at a time, and it may be pushed even when death is evidently approaching, as the only way of relieving suffering.

Curara, after a fair trial, has likewise lost ground, and though now and then cases are reported which seem to show that it has done good, just as often are those set aside by complete failures.

Extract of Physostigma has been pushed to the extent of ½ gr. every hour till paralysis of the voluntary muscles has been produced, and good results have been reported in several cases.

Cholesterin has been stated to possess such an affinity for the tetanus toxin that if injected it will fix the poison before this attacks the nerve substance; 2-dr. doses of a 1 per cent. solution have been injected hypodermically every 2 or 3 hours, but the results have been disappointing.

Pilocarpine, ¼ gr. hypodermically, may be tried when other agents have failed. It probably acts as a diaphoretic by hastening the elimination of the poison.

Atropine injected into the muscles, or Belladonna and Hyoscyamus, Gelsemium and Conium by the mouth, in doses sufficient to produce toxic symptoms, have been recommended.

Nitrite of Amyl possesses the power of minimising or checking spasm of the glottis, and Nitroglycerin occasionally appears to give some relief according to several reports; and the former drug should be resorted to the moment that a spasm threatens.

Trismus Neonatorum may be regarded as the same affection as tetanus in the adult, and must be met by the same remedies. Westcott has

drawn attention to the danger of tetanus being conveyed by the use of Fuller's Earth and other mineral dusting powders which are applied to the stump of the umbilical vein and to sores on the nates of infants. In addition to serum-therapy, which has been successful in a few cases, Chloral is the only drug to be depended upon, and the writer has satisfied himself about the great value of it when steadily pushed in the case of infants. 1 gr. may be given by the mouth or by the bowel every hour. The utmost cleanliness in the dressing of the stump of the umbilical cord must be attended to, as this affection is liable to spread amongst new-born infants. Soltman recommends ½ gr. of Musk every 3 hours when hourly doses of Chloral for 24 times have failed.

TETANY.

Little is to be expected from purely symptomatic treatment till the underlying cause has been discovered and removed.

Thus, when tetany is the result of thyroid removal or disease, feeding by tabloids of dried gland gives satisfactory results. Where the symptoms supervene during pregnancy, they often cease after delivery, and when they first appear during lactation there is a fair hope that they may be removed by weaning the infant. In some of these cases thyroid feeding has also proved beneficial. When tetany shows itself during rickets, the dietetic measures indicated in this disease may be fairly expected to prove satisfactory, especially when combined with free Phosphorus and Cod-Liver Oil.

Gastric Tetany.—The most formidable cases are those associated with dilatation of the stomach, especially when this is caused by the cicatrisation of a pyloric or duodenal ulcer. Here the spasms are not rarely fatal, and though the attack is often excited by the passage of the stomach-tube, lavage must be resorted to. The theory that some poison is generated in the fermenting bag which has to do duty for a stomach is probably correct, hence washing out by a weak antiseptic solution or the free administration of emetics is valuable.

In many cases the introduction of the stomach-tube may be dispensed with and its dangers avoided by making the patient drink copious draughts of lukewarm water till emesis occurs. This plan should always be employed before resorting to ordinary lavage. Though by either of these means a fatal issue may be prevented for the time, the symptoms are certain to recur and end fatally. Gastro-enterostomy should therefore be invariably resorted to as soon as the condition of the patient warrants an abdominal operation, and many lives have of late years been saved by the surgeon. This is the only rational treatment of gastric tetany. (See Gastric Dilatation.)

Where the intestinal canal lower down is at fault, the colon should be flushed with warm Saline solution used freely and followed by the administration of intestinal antiseptics like Salol, Calomel or Naphthol. The presence of tape- and round-worms must be met by anthelmintics. Search should be made for any toxic agent upon whose presence the

symptoms may be supposed to depend, and where this cannot be found or remedied the rational indication is for such stimulation of the excretory organs—skin, urine and bowels—as will hasten elimination.

In one typical case in a lady of 25 years of age, where the mouth and gums were covered with small intractable ulcers, the writer had a Vaccine prepared by Dr. T. Houston from the secretion of the sores, and complete recovery followed injections administered for several weeks; the spasms had been present for six months.

Symptomatic Treatment.—For the relief of the spasms a warm bath (90° F.) is often valuable, and the cautious administration of Chloroform or the use of a hypodermic injection of Pilocarpine (¼ gr.). In rachitic tetany a dash of cold water on the face whilst the child lies in the warm bath often stops the spasm. A hot sponge may be applied over the larynx, and a whiff of Nitrite of Amyl may be tried alone or in conjunction with ice to the spine or cold affusion. Hauber employed Massage successfully whilst the patient was fully under the anæsthetic.

In the chronic form often met with, in which no obvious cause can be detected, the best routine is the administration of Bromides in large doses as in epilepsy, combined with Chloral and Valerianates. Thyroid feeding should have a short trial in all such cases.

Belladonna, Eserine, Asafœtida, Hyoscine, Cannabis Indica, and nearly every known general antispasmodic have been tried, and Gowers advocated Digitalis in the nocturnal form. Protection from cold and all depressing causes, as overwork, etc., must be insisted upon, whilst the patient lives an open-air life.

THREADWORM.

Once these parasites have gained admission to the intestinal canal their ova, which are invisible, get under the finger-nails in scratching, and are conveyed to the patient's mouth again, so that reinfection is constantly occurring. Absolute cleanliness is, therefore, an essential, and children should be made to sleep in garments which render this method of infection impossible. It is also probable that as the worms wander about the anus and vagina they may be communicated from one person to another sleeping in the same bed. Their origin in the human subject arises from eating uncooked vegetables and fruits, and from drinking water containing their ova. They chiefly infest the lower end of the great intestine, but Cobbold insists that their presence here is accidental, their real locality being as high up as the cæcum. The males and young embryos are found in the lower part of the small intestine, whilst the impregnated females are found in the cæcum, and descend to the rectum to lay their eggs there, after which they pass out of the body in the fæces.

The worms can be reached by enemata, and the addition of 1 oz. Chloride of Sodium to each pint of water effectually destroys the parasite. The injections should be repeated every second night for at least a month or until the worms and their ova disappear from the motions. Infusion of Quassia (1 in 40) is also very efficient, the B.P. infusion (1 in 100) is

too weak, and the 1 in 20 infusion often recommended is not free from danger; the best result probably follows a combination of the salt and infusion in one enema. Lime Water, solutions of Alum, of Aloes, of Ether (in water), of Eucalyptus Oil, of Tincture of Iron, of weak Carbolic Acid, of Turpentine, of Vinegar, of Tansy, of Olive Oil, of Chloride of Ammonium, and many other substances, are useful, and, in the case of children, are generally successful after a few repetitions of the enema.

A little weak Mercurial or White Precipitate Ointment just placed within the sphincter keeps them from migrating at night.

Cobbold attaches most importance to internal remedies, and he advises Iron in tonic doses, with Aloes and Asafœtida occasionally, followed by repeated Saline cathartics, as the Friedrichshall and Hunyadi waters. Others recommend large draughts of Quassia or Gentian in infusion, swallowed fasting, and followed by a Saline; 2-gr. pills of Extract of Quassia coated with Keratin and administered 3 times a day after a smart aloetic purge have been extolled in chronic intractable cases.

Two Sulphur Lozenges thrice daily or a teaspoonful of the Confection at bed-time may be tried. Naphthaline has been given by the mouth. A child two years old may get 3 grs., and a child of ten may get 5 to 6 grs. with sugar four times a day for two days between meals.

Santonin is not be to relied upon, as the drug is absorbed before reaching the cæcum.

The salt injections have never failed in the hands of the writer when persistently employed.

THROAT, Sore—see under Tonsils and Pharyngitis.

THROMBOSIS—see Phlebitis.

THRUSH—see under Stomatitis.

THYROID GLAND DISEASES—see Goitre (p. 339); Goitre, Exophthalmic (p. 341), and Myxœdema (p. 579).

TIC DOULOUREUX—see under Neuralgia (p. 583).

TINEA, OR RINGWORM.

Tinea Circinata is the name applied to ringworm of the glabrous skin of the body. Whether due to the small or large spored *trichophyton* this type of the disease is easily and speedily cured by almost any antiparasitic application. The best routine application in mild cases is a mixture of equal parts of the Strong and Weak Tinctures of Iodine brushed over the diseased area. When the affection is due to the large-spored fungus received directly from the skin of cows, as is often observed amongst rural inhabitants and those in suburban districts who are employed in byres, the parasite is more resistant and tends to spread over large areas of the skin. Such cases require more active treatment, and the writer has found that the best application is the late B.P. Ungt. Sulph. Iod. This ointment should, however, be very carefully triturated; when applied after being freshly made it is liable to produce considerable

irritation, whilst if it is kept for some time after preparation, the particles of iodide of sulphur are partially dissolved in the fatty base, and though less irritating to the skin the preparation is more destructive to the spores.

The thick skin of the agricultural labourer, exposed to the various vicissitudes of an outdoor life, will bear an ointment of 1 in 8, but the city clerk or school-girl may suffer from the application of even quarter this strength.

The Ointments of Iodine, Hydrarg. Nit., White Precipitate, Phenol, Creosote, Chrysarobin and Salicylic Acid are all efficacious when rubbed into the affected patches. When for any reason a greasy application is objectionable, and when the soluble Iodine application already mentioned is unsightly for exposed patches, a solution consisting of Corrosive Sublimate 1, Salicylic Acid 10, Carbolic Acid 10, with Glycerin 80, may be painted over the rings. These agents, it must be remembered, are all capable of producing eczema or dermatitis, which will persist as long as the applications are continued, and the irritation which they cause must not be mistaken for the specific inflammation caused by the parasite. Dr. J. H. Clark successfully treats all cases, including T. Sycosis, by applying Sodium Carb. crystals liquefied over a spirit-lamp and covering the part with lint.

Tinea Tonsurans, or Ringworm of the Scalp.—The treatment of this hitherto often intractable disease has been reduced almost to the simplicity of that of ringworm of the body, since the introduction of the X rays. The main difficulty existed in epilation, because antiparasitic remedies are useless till they are introduced into the hair follicles. Formerly epilation by means of forceps was employed, each hair being pulled out separately, but as the diseased hairs are rendered brittle epilation by mechanical means failed on account of the stumps being often left behind.

By exposing the scalp to the X rays after the hair has been cropped with scissors, the entire area can be safely and effectually epilated after half a dozen exposures. Adamson's plan of dividing the scalp into five areas, by marking these with an aniline pencil, insures that no portion is over-acted upon, and the entire scalp can be treated in about 1½ hours, allowing an exposure of 20 minutes to each area. By the use of the pastille of platinocyanide of barium, which changes by the action of the rays from a bright green to an orange colour, the proper dose of the agent can be gauged without the necessity of protecting any part of the surface with lead foil. When the rays are applied through a special tube designed for this purpose, the trained expert can effect complete epilation of the entire scalp within 21 days without any danger whatever to the brain. The overlying tissues, fibrous and osseous, effectively prevent the penetration of the agent when the fontanelles have closed; subsequent baldness is not to be feared. Where only one or two isolated patches exist in the earlier stages of the disease, it will be quite sufficient to limit the application of the rays to the vicinity of the diseased area for about 20 minutes. After the hairs drop out, the old treatment by the thorough application of antiseptic agents should be commenced, since it must be distinctly under-

stood that the X rays exert no lethal action on the fungus, but the orifices of the follicles, being freed from diseased stumps, are left patent for the introduction of the remedy, which must be well rubbed in by the fingers.

It will be advisable to freely swab the affected area or the whole scalp in all cases with Weak Tincture of Iodine in order to wash away any lingering stumps which may remain *in situ*.

After the spirituous solvent has dried by evaporation, Ungt. Sulph. Iod. should be well rubbed into the affected areas. When the ointment has been previously prepared for a month its irritating properties, as already mentioned, are much lessened, and it may be applied vigorously to large areas of the scalp with safety. Any irritation which it produces will do good by further loosening and extruding any remaining stumps. By a couple or three months, in most cases, the fungus may be entirely eradicated, a result which often could only be accomplished after as many years before the use of the rays.

A rapid method introduced by Sutton consists in washing the epilated scalp with Weak Tincture of Iodine, wiping it dry and applying a 1 in 50 Perchloride of Mercury in aqueous solution, the resulting nascent iodide of mercury being a most powerful parasiticide. The theoretical objection to this method lies in the difficulty of getting aqueous or spirituous solutions to penetrate into the recesses of the hair follicles. His alternative plan consists in rubbing in an ointment containing 7 parts Iodine, 5 Iodide of Potassium in 100 of Goose Grease.

Sabouraud's routine consists of washing the scalp every morning, and after drying it he paints with Tincture of Iodine, which is allowed to evaporate, and each night Oil of Cade (Juniper Tar Oil) mixed with two and a half times its weight of Lanoline is well rubbed into the skin.

Unna's Compound Chrysarobin Ointment is a good routine application, but care must be taken to prevent any reaching the eyelids. It consists of Chrysarobin 5, Salicylic Acid 2, Ichthyol 5, Vaseline 88 parts.

Dr. W. Calwell employs a mixture of equal parts of the Ointments of Chrysarobin, White Precipitate and Sulphur.

Hutchinson's method consists in washing the scalp with a weak solution of Liq. Carb. Detergens twice a week, and rubbing in once or twice daily the following ointment:

℞ *Chrysarobini* ʒij.
Hydrarg. Ammon. Chlor. *gr.* xl.
Lanolin. Purif. ʒij.
Adip. Benzoati ℥iss.
Liq. Carb. Deterg. m. xx. *Misce.*

Any antiseptic ointment may be used, and each practitioner has usually his favourite; thus the ointments of Resorcin, Iodine, Carbolic and Salicylic Acids, Creosote, Eucalyptus, Iodoform, and all the mercury unguents have been in use. The Ungt. Hyd. Nit. is the best of these latter. Copper Oleate (1 in 4 of Lard) was much used by Crocker.

Croton Oil was formerly much employed, but since X-ray epilation there is no justification for its routine use, and the same applies to blistering with cantharides.

Some authorities, discarding oily or greasy applications, rely upon liquid preparations; thus Morris dissolves Salicylic Acid 5 grs. in 1 oz. Chloroform, and applies this frequently to the patches. If for any special reason an ointment is not to be used, the best routine liquid preparation is the Strong Tincture of Iodine. Iodised Phenol, consisting of Iodine 1, liquefied Carbolic Acid 4, or similar amounts of Creosote or Huile de Cade and Iodine, are powerful destroyers of the fungus. If the patches are soaked in Ether or Chloroform previous to the firm application of these agents with a stiff, short brush the liquid may be made to penetrate the follicles.

Quinquad's routine, like those just mentioned, is a severe one; after shampooing the scalp he applies a solution of 3 grs. Biniodide and 15 grs. Perchloride of Mercury in 10 drs. strong spirit and 7 oz. water. Strong Acetic Acid like Strong Carbolic and Sulphurous Acids and concentrated spirituous solutions of Thymol and Menthol have been successfully employed. In mild cases the Oleum Menthæ Pip., Ol. Caryophyl., or any of the essential B.P. Oils except that of mustard, may be used.

Formulæ might be given of many hundreds of so-called anti-ringworm specifics, but the young practitioner who flies from the use of one antiseptic to another will make a serious mistake. Life is too short to make him master of the action of more than a few of these, as close observation is required to become familiar with the amount of irritation which the diseased skin will tolerate from each drug. As all of these antiparasitic drugs excite more or less severe dermatitis or even vesication, the tyro is likely to mistake this for evidence of increased activity of the fungus, and by the practice of ringing the changes from one preparation to another he soon ceases to have any confidence in himself or in the agents which he employs. As Hutchinson states, "the secret of success consists in the patient continuance of the same remedy. Those who change every few weeks from one remedy to another find ringworm almost incurable"; and he has never seen a case resist the persistent application of Chrysarobin. The writer usually begins and ends with the Ungt. Iod. Sulph., varying the strength of the ointment according to the amount of irritation produced, sometimes suspending its use and substituting a mild antiseptic preparation as Ungt. Acid. Borici till the dermatitis has subsided.

Oleate of Mercury (Ointment 25 per cent.) causes little irritation of itself, and when in doubt whether the dermatitis is being produced by the parasite or the remedy it may safely be resorted to. Shoemaker, who employs this drug extensively, states that he has never known it to induce salivation when vigorously rubbed in for weeks as an ointment of 5 to 20 per cent.

All through the duration of the treatment the scalp should be periodically searched by a lens for broken or brittle stumps, and these should be dealt with by further exposure to the X rays or by forceps epilation when sparse in number. Any odd diseased hairs after being pulled out

may have their follicles disinfected by thrusting a blunt needle moistened with pure Carbolic Acid into the recess.

Kerion is a complication which is sometimes observed in ringworm of the scalp. It is the result of a pustular inflammation of the follicles of the diseased patches, whereby the areas become boggy and stand out above the level of the surrounding healthy scalp. The best way of dealing with this is to apply a series of hot Boric compresses under oiled silk, and after the evacuation of all pus and the removal of crusts a weak ointment of Oleate of Mercury (1 in 10) or Boroglyceride should be applied. When kerion results, the disease at the suppurating spot is already far on its way to final resolution.

Vaccine Treatment.—Many attempts are being made to treat the different forms of ringworm by vaccines prepared from the secretions adherent to the hair bulbs. Various satisfactory reports are forthcoming, but, owing to the certainty of the newer antiparasitic remedies, it is very improbable that vaccine treatment, if of any use, will ever be used except as an adjuvans.

Prophylaxis.—This is of much importance in large families of young children and in schools, owing to the highly infective nature of the disease. The steps to be taken are obvious; the affected child should not be permitted to sleep with others, and he should have the hair over the entire scalp clipped close even when the disease is very circumscribed, and he must be compelled to keep a loose silken or linen cap continually over the head. His soap, towels, combs and hair-brushes must be reserved entirely for his own use, and these should be kept in a state of the most absolute cleanliness. Children coming into close contact with affected ones should have the hair on the scalp cut short, and their heads washed regularly with Borax instead of soap, and they may use crude petroleum as a hair-oil or the prophylactic pomade of Harrison may be used—

℞. *Ungt. Eucalypti*
Ungt. Acidi Borici
Olei Nucis Cocoæ ana ʒij.
Olei Caryophylli ♏. xxx. *Misce.*

Tinea Sycosis.—Ringworm of the beard or barber's itch is a most intractable affection if not dealt with promptly on its first appearance. The treatment must be carried out on the same principles as should be pursued in the case of ringworm of the scalp, though the parasite is usually the *Trichophyton megalosporon ectothrix* of animal origin, which is liable to cause suppuration of the follicles.

The entire beard must be clipped short and shaving prohibited, though Levin recommends shaving daily. Epilation is imperative; owing to the strength of the hair shafts these can be more effectually plucked out of the diseased follicles than in the case of the more brittle scalp hairs, but the process is painful and tedious. A score of affected hairs may, however, be removed at a single sitting, and much more than this number can be readily extracted when loosened by suppuration.

The X rays should be resorted to when mechanical epilation is impracticable owing to the extensive surface invaded.

After the removal of all crusts and of hairs visibly altered by the fungus and of those with pus at their roots, any of the antiparasitic applications should be well rubbed in twice a day. A 1 in 10 Iodine Ointment and the Ungt Iod. Sulph. are excellent, but objectionable owing to the unsightly discoloration which they produce. The Ungt. Hyd. Nit. or the Ungt. Hyd. Ammon. may be selected, as their colour is scarcely noticeable; the same remark applies to Carbolic, Calomel, and Creosote ointments, but these are not reliable. Whichever antiseptic preparation is selected, it should be combined with a fatty basis, as aqueous or spirituous solutions cannot be got to reach the bottom of the deep follicles where the fungus is flourishing, and ointments to be of value must be firmly rubbed in, pressure being necessary to force the fat into the bottom of the recesses, and a considerable degree of dermatitis is usually desirable to get the best results. Some authorities recommend blistering with Liquor Epispasticus on the theory of the value of counter-irritation, but it must be remembered that cantharidin is itself a powerful germ-destroyer. Vaccine treatment with a preparation of the spores after the method of Strickler (*Journal Cutaneous Disease,* 1915) has been employed successfully.

Coccogenic Sycosis is a different affection, caused by *Staphylococcus aureus* and *albus,* and like true ringworm is a most intractable disease. It may be suspected when the hairs do not loosen and readily fall out. X rays are therefore clearly indicated for epilation, after which the Ungt. Hyd. Ammon. or Ungt. Hyd. Nit. must be persistently employed. Repeated poulticing with well-boiled Starch will be necessary for the removal of the crusts which continually form, and occasionally the puncturing of purulent points will be necessary, after which hot fomentations should be applied. Crocker's treatment consisted in shaving the part, using oil instead of soap, after which he rubbed in a 3 per cent. ointment of Iodoform, Europhen, Loretin or Oleate of Mercury.

The condition commonly occurs in weak debilitated subjects, and most authorities extol Cod-Liver Oil administration. In chronic cases a Vaccine should be prepared from the perifollicular pus and injected; this treatment has given most satisfactory results, and should always be resorted to when the pus-forming cocci cannot be reached by antiseptics.

Tinea Unguium, or ringworm of the nails, known also as Onychomycosis, is caused by the large-spored fungus. The best treatment is to soften the nail by applying Boric solution on lint under oiled silk, or painting with equal parts of Liquor Potassæ and water, after which it should be well scraped and enveloped in a 1 in 200 solution of Perchloride of Mercury applied on lint and covered with a rubber finger-stall.

TINNITUS AURIUM.

Buzzing or painful sounds felt in the ear are but subjective symptoms of some irritation of the acoustic nerve. The treatment of this symptom will obviously depend upon the various exciting causes, and the treat-

ment of the different diseases of the ear, in which tinnitus is a prominent symptom, will be found detailed under Ear Diseases. Under the same heading will be found the details of the treatment of Ménière's vertigo, in which tinnitus is usually an important part of the symptom-complex. Operative procedures have been carried out successfully for the relief of tinnitus, as removal of the malleus or incus, division of the tensor tympani tendon, trephining the cochlea, and total destruction of the cochlear division of the nerve.

Symptomatic treatment is justifiable when the primary cause is irremovable; Bromides possess a sedative action on the affected nerve which in many cases will cause the disappearance of tinnitus as long as the patient is kept under the influence of the drug. Hydrobromic Acid is often recommended, has similar but much weaker power, and 20-gr. doses of Sodium Bromide should always be preferred; this amount may be taken three times a day for long periods as in epilepsy. Strychnine is usually combined with the bromide treatment advantageously, but the common mistake is made of giving the alkaloid in full doses, which often increases the tinnitus. Not more than $\frac{1}{50}$ gr. (2 mins. B.P. Liquor) should be given. Iodides in full doses may be tried alone or in combination with bromides. Some authorities advocate the administration of Quinine and Salicylates on the *similia similibus curantur* theory, since these drugs in full doses produce tinnitus, but the result is as a rule most unsatisfactory.

Pilocarpine hypodermically has been useful in some acute distressing cases, but such an agent can only be employed at long intervals. Air containing Chloroform vapour, when injected into the Eustachian tube, sometimes gives speedy but temporary relief.

Many patients with incurable internal ear trouble suffering from persistent tinnitus obtain a considerable degree of relief by repeated blisters applied behind the ear.

The Ton-behandlung treatment consists in replacing the subjective sounds by real ones produced by a tuning-fork, the objective notes being as far as possible removed in pitch from the subjective sounds.

A strong galvanic or the high-frequency current has given relief in many cases, and some aurists have resorted to lumbar puncture when the tinnitus is due to high blood-pressure.

The mental condition will require attention, as the sounds often suggest brain disease or insanity to the patient, but even when subjective tunes are heard he may be assured that the trouble is a purely local one.

Such primary and incurable affections as arterio-sclerosis and renal diseases when present will require palliatives as Nitro-glycerin or other vaso-dilators and Saline purgatives.

Profound anæmia should be treated by Iron or Arsenic or a combination of these drugs, and it should not be forgotten that in some cases tinnitus may be a reflex phenomenon due to carious teeth or to nasal trouble. For the former condition extraction is clearly indicated, and for the latter removal of the posterior half of the inferior turbinate or of any outgrowths from the vomer.

TONGUE, Diseases of.

Cancer of this organ will be found dealt with on p. 129 in the article on Cancer.

Inflammation of the tongue is to be treated as described under the article Glossitis, upon p. 338.

Superficial ulcerations are to be dealt with as mentioned under Stomatitis, upon p. 910.

Deeper ulceration is commonly the result of injury caused by the organ coming into constant contact with jagged stumps of decaying teeth or imperfectly constructed dental fittings. The abrasion so formed through the admission of various micro-organisms always present in the mouth is liable to become deep, with thickened and inflamed margins and a sloughing base. The treatment of these so-called "dental ulcers" consists in the immediate removal of the offending tooth or dental plate and the free use of any antiseptic mouth-wash after cleansing the surface of the ulcer and swabbing it lightly with pure Carbolic Acid. A chronic indurated dental ulcer should be thoroughly excised to prevent the supervention of epithelioma.

Tuberculous ulcer should be excised by a ∧-shaped incision cutting wide of the affected tissue, after which the lips of the wound must be brought together by deep sutures.

Syphilitic affections of the tongue are to be treated by the rules and principles mentioned under Syphilis, according to the stage of the disease at which they appear. The secondary ulcers are usually slight and superficial, yielding to Mercury. When extensive, the drug should be administered by inunction. In the late tertiary stage deep ulcers may result from the breaking down of gummata, and these must be treated by very large doses of Iodides internally. Ulcers occurring in the early tertiary or very late secondary period should be treated by both mercury and iodides. The best local treatment will consist in drying the ulcerated surface and lightly touching it with Liq. Hyd. Pernit., 5 per cent. Chromic Acid solution, or Strong Carbolic Acid.

Hypertrophy of the tongue, or *Muscular Macroglossia*, has been, when of limited extent, successfully treated by pressure in a few cases. Any concentrated astringent solution which does not produce irritation may be applied on strips of lint wrapped around the enlarged and protruding organ. Over these, strips of Isinglass Plaster may be placed so as to exert moderate pressure in a uniform manner.

In the condition known as *Lymphangiomatous Macroglossia*, as in the simple muscular form, when the enlargement is great, the question of operation will have to be met. This may be done by the knife, scissors, écraseur, thermo- or galvano-cautery. A few stout needles are passed through the enlarged organ in front of the spot where the section is to occur, the tip being well pulled forward, the écraseur is laid on, and the anterior portion of the tongue removed.

Where the deformity is not so great the favourite operation is to make a

Λ-shaped incision, and remove the wedge of tissue by the knife or scissors, after which the edges of the incision may be brought together by a series of deep and superficial wire sutures, after any bleeding vessels have been secured and twisted or ligatured with catgut. When the surgeon has the choice of time, he may defer operation till about the end of the fourth month, but where feeding is rendered difficult he must operate sooner.

Neuralgia of the tongue is a rare and intractable disease. The only hope in this affection of any permanent relief will lie in the persevering use of the remedies mentioned under Neuralgia, upon p. 583. Beginning with large doses of Quinine, combined with Chloride of Ammonium and a little Morphia, the various antineuralgic agents should get a fair trial, whilst, by improved food, change of air, freedom from worry and other ills, the general health is brought up to the highest standard. A weak continuous current passed through the organ gives good results if steadily adhered to, and relief has been known to follow even a few applications of the battery.

Local treatment will consist in the employment of local analgesics. Cocaine dissolved in Glycerin (12 grs. to 1 oz.) may be tried, or tabloids of Cocaine or lozenges of Carbolic Acid may be frequently allowed to dissolve in the mouth.

The following combination is a very efficient pain reliever:

℞ *Cocainæ Hydrochlor.* gr. xv.
Glycerini Boracis ʒij. *Misce.*

Fiat applicatio. Signa.—"*A little of this liquid to be brushed over the tongue every hour or two hours during the day, and always a short time before taking food.*"

Menthol is the local analgesic recommended by Butlin; it may be used alternately with the cocaine treatment. To prevent the decomposition of the salivary and buccal secretions due to the immobility of the tongue it will be necessary to wash out the mouth frequently, and the best wash for this purpose is a weak Carbolic Acid Lotion. Condy's Fluid may be tried when there is any decomposition. The sensitiveness of the tongue interferes with the feeding, and hence it is well to have the food administered in the liquid form. Section or stretching of the gustatory nerve may be resorted to when the ordinary antineuralgic remedies fail, or an attempt may be made to inject the nerve with strong Alcohol.

Leucoplakia or "Smoker's Patch" may be regarded as a localised form of chronic superficial glossitis due to the irritation of hot tobacco smoke or of some other local irritant. It is also known by a variety of fanciful names as Tylosis, Leucoma, Leukokeratosis, Psoriasis, and Ichthyosis of the tongue.

It is most resistant to both local and constitutional agents, and is very liable to end in epithelial cancer. All treatment is useless till the source of the irritation has been removed. Hence the extraction of any irritating tooth or teeth, or the filing down and polishing of their crowns, and total abstinence from tobacco and alcohol should be insisted upon. Very hot

liquids are likewise to be forbidden, and all spiced foods and sauces avoided.

Though strong Nitrate of Silver, Lactic and Chromic Acids, Pernitrate of Mercury, etc., have been advocated, all strong caustics should be strictly avoided, as they only eventually end in stimulating the growth of the epithelial cells. The best routine is that advocated by Rosenberg, who brushes a 1 in 5 solution of Iodide of Potassium over the patch and surrounding tongue surface, by which means sometimes the disease disappears. The constant use of a Chlorate of Potash, Borax or Carbolic mouth-wash may be tried, or tabloids of these substances may be allowed to slowly melt in the mouth. A 1 in 50 solution of Bichromate of Potassium is also a favourite local application to the patch. Leistikow applies a paste of 22½ grs. Terræ Silica, 45 grs. Resorcin, and 1 oz. Lard several times a day. In syphilitic subjects, Iodides and Mercury should be pushed. The method of Diathermy has been used for the removal of inoperable growths by Harmer. As soon as the failure of these agents has been demonstrated, no time should be lost in resorting to total excision of the diseased epithelial tissue, as in a radical removal lies the only prevention of malignant disease.

Tongue-tie is remedied by the simple operation of snipping the frænum, which is resorted to much more frequently than is necessary. The most satisfactory method of operating is to pass in the index-finger and the next one under the tongue, the frænum being put upon the stretch between th m, and, with a curved scissors, the point being held downwards, the constricting band is divided by a single snip, care being taken not to divide the ranine vessels as the child struggles. (For the treatment of Ranula, see under its own heading.)

Wounds of the tongue are usually due to biting of the organ during an epileptic seizure. As a rule suturing is seldom necessary; the best procedure is to direct the continuous use of an antiseptic mouth-wash to prevent infection of the wound with micro-organisms. If hæmorrhage is profuse, the organ should be pulled well forwards under a general anæsthetic and the spouting vessel secured after enlarging the original wound, which must then be closed with deep sutures.

TONSILS, Diseases of.

In the common form of "*Sore Throat*," known as acute catarrhal pharyngitis, hospital sore throat, angina simplex, etc., the tonsils are more or less constantly involved, though the affection should be considered as a septic inflammation starting originally in the mucous membrane of the pharynx, and from thence invading the tonsils, uvula, palate, fauces and often the nasopharynx and even the larynx. The treatment of this condition has been already described under Pharyngitis.

The present article deals with the treatment of the various forms of tonsillitis, though these glands are seldom found to be involved alone, the inflammatory action usually extending to the mucous membrane covering other parts of the throat.

Acute Tonsillitis.—Various types of this affection have been described and named, the two most common being that recognised as acute *catarrhal* and acute *follicular* tonsillitis, which may be regarded from the therapeutic standpoint as practically identical with acute pharyngitis. Either of these types may, however, pass into the more severe form of the *suppurative* or *parenchymatous* tonsillitis or of the variety known as *peritonsillitis*. Hence at first sight the treatment of the various types of inflammatory sore throat and of tonsillitis appears to be as confusing a problem as are their diagnosis and pathology, but in practice this is not so difficult a question as it appears at first sight.

The first important point for realisation is to grasp the fact that all these types must be regarded as infectious, and isolation of the patient should be insisted upon as soon as the presence of the acute inflammation has declared itself. The nature or identity of the specific infection need not be considered, as probably there is no specific microbe, the infective process being multiple. *Streptococcus pyogenes*, various strains of staphylococci, and whatever organisms produce acute rheumatism are often present together. As pointed out by Richards, the tonsils should be regarded as defensive organs, and if this view be realised, their function as a barrier to the introduction of septic organisms readily accounts for the accumulation of heterogeneous microbes in their crypts.

Acute Follicular Tonsillitis.—The importance of this type of tonsillitis rests in its liability to be mistaken for diphtheria. In every doubtful case the antidiphtheritic serum should be injected, as it cannot possibly do harm. Often it will be necessary to do this instead of waiting for a bacterial investigation.

Constitutional treatment is demanded in every severe case, and it is much more effectual in relieving the severe malaise than local applications to the throat.

Antipyrine seems to combine with or to neutralise the toxins of the micro-organisms which are absorbed from the tonsillar crypts. After its administration the high temperature, headache and back pains rapidly diminish. On the rheumatic theory of tonsillar inflammation, Salicylates are much employed; undoubtedly the Sodium Salt is a valuable drug, but its effects are not so reliable as those obtainable by antipyrine.

Small doses of the latter drug suffice to afford relief provided they are administered with sufficient frequency. For the fever and rapidity of the heart's action minute and frequent doses of Tincture of Aconite have long enjoyed a reputation; ½ min. of the tincture may be given every 15 minutes for several hours. The following combination is very safe and efficacious:

℞ *Tinct. Aconiti* ℥ viij.
Phenazoni gr. xxiv.
Caffein. Cit. gr. xvj.
Aquæ Camphoræ ℥viij. *Misce.*

Fiat mistura. Capt. ℥j. *statim et* ℥ss. *omni hora.*

It may be observed that the whole of the above mixture if swallowed in a single dose would probably do no harm; if administered in 2-oz. doses three times a day very little benefit, if any, would be noticed; but when given in ½-oz. doses at short intervals very marked effects are produced.

This treatment is also applicable to the *Epidemic* form of tonsillitis which sometimes shows itself in certain districts, and in which marked enlargement of the cervical glands is present and sometimes cardiac complications. Pruen in these cases employs an autogenous Vaccine and prolonged rest.

The entire class of salicylate preparations including Aspirin, Novaspirin, Solol, Saloquinine, Rheumatin, etc., have been employed in a routine manner.

Large doses of Quinine are recommended, but this treatment often fails, and the deafness and buzzing of the ears add to the patient's discomfort without markedly reducing the fever.

A smart saline purge should be administered at the commencement of treatment. The patient should be put to bed and placed upon thin farinaceous foods, which are more easily swallowed than fluids. Rarely will alcoholic stimulants be indicated, but strong, thick soups should be freely given to weak subjects.

Local treatment should consist of the application of weak unirritating antiseptics, as 1 dr. Carbolic Acid dissolved in 12 oz. Rose Water, which may be more easily employed as a spray than as a gargle. This may be used every hour if the patient depresses his chin so that the condensed spray will flow out through the open mouth. Fettero extols the application of Aspirin in dry powder on the point of a probe covered with cotton-wool.

Where much pultaceous secretion blocks the orifices of the lacunæ a swab of Peroxide of Hydrogen may be used two or three times a day; the old plan of applying strong nitrate of silver solution or other caustic should be discarded. When the tonsillar swelling is great and much pain in swallowing is present, nothing is so efficacious as the inhalation of the vapour of boiling water under a sheet loosely thrown over the patient's head.

At a later stage a gargle of Chlorate of Potassium (1 in 50) assists in altering and cutting short the unhealthy condition of the mucous membrane, and Boric Acid solution or Glycerin of Borax diluted (1 in 20) may be frequently employed as a mouth-wash.

Ice may be sucked or applied to the outside of the jaws when pain is severe. More frequently a layer of dry cotton-wool under oiled silk affords relief.

In mild cases with little fever a Carbolic Acid or Guaiacum Lozenge slowly sucked in the mouth or a tabloid of Chlorate of Potassium with Cocaine used in the same manner is all that is necessary. The advantage of using carbolic acid lies in its action as a local anæsthetic independent of its antiseptic qualities, and by paralysing the sensation of the mucous membrane of the palate it prevents the painful and unnecessary attempts

at swallowing the saliva. Cocaine is a disappointing drug in throat affections; its application is liable to be followed afterwards by dryness and toxic effects.

Parenchymatous Tonsillitis and Peritonsillitis.—These are also known as the *Suppurative* types, and in the severe form as *Quinsy* or *Cynanche Tonsillaris*. As already stated, suppuration may supervene upon the follicular or catarrhal types, but in its severe form it is always the result of a streptococcal invasion, and the symptoms are formidable from the start.

The constitutional treatment should be conducted upon the same lines as in the severe variety of the follicular type, and as soon as the malaise has been somewhat relieved by Antipyrine, large doses of Quinine and iron should be freely administered. The best preparation is the Tincture of the Perchloride, which may be administered in doses of 30 mins. with 1 dr. of Glycerin and 1 oz. water every 4 hours. To this in adynamic cases 5 grs. Quinine may be added.

Feeding is important owing to the speedy exhaustion caused by the action of the toxins, and strong, thick soups and beef juice should be administered as frequently as the difficulty and pain of swallowing permit.

The best local treatment is the Carbolic Acid spray (1 in 100), as gargling is often impossible. The frequent steaming of the throat is, however, the only agent to be relied upon to relieve pain and ineffectual attempts at swallowing, and it should be resorted to every 2 or 3 hours, by which means pointing of the abscess is also hastened. A large hot poultice applied round the jaws usually affords some degree of relief.

As soon as an abscess has formed the pus should be evacuated. This may be accomplished by taking a sharp-pointed bistoury and protecting its blade with a layer of strapping to within $\frac{3}{8}$ to $\frac{1}{2}$ inch of its tip, after which it may be thrust into the most prominent part of the tonsil, the cutting edge being directed inwards so as to avoid danger to the internal carotid artery. The opening of large abscesses may be imperative, as deaths have occurred from suffocation caused by their pressure or by the pus being discharged into the air passages, especially during sleep or by the supervention of œdema of the glottis.

Some surgeons dispense with the knife and open the abscess by plunging a fine pair of dressing forceps into the bulging tonsil through the soft palate near to the base of the uvula. The best procedure is to use the forceps after making the incision with the bistoury, and by opening the blades thorough evacuation of the pus is accomplished through the enlarged opening. Before using either knife or forceps the mucous membrane should be well cocainised, which will enable the surgeon to insert his index finger against the swollen gland, whilst the fingers of the opposite hand are made to cause firm pressure against the tonsil from without at the angle of the jaw as he feels for fluctuation.

Often it will be advisable to puncture the great œdema of the mucous membrane over the uvula and soft palate where no evidence of suppura-

tion is visible, and where the acute septic inflammation extends to the opening of the larynx, œdema must be promptly met by scarifying the parts or by intubation or tracheotomy.

When the suppuration is *peritonsillar* the treatment is identical. Some surgeons restrict the term Quinsy to this type, and as the collection of pus is usually in the supratonsillar fossa and tends to invade the soft palate, the incision should be made through the latter close to the pillar of the fauces. When pus does not escape immediately after a deep incision the surgeon may wait before making another, as often the matter soon makes its way into the incision.

Ulcerative Tonsillitis is a rare condition, the so-called "ulcerated sore throat" being usually due to severe follicular inflammation, the secretion blocking the follicles being commonly mistaken for ulcers. When well-marked ulcers exist, some form of stomatitis, as the mercurial, is often present, and the patient is always a debilitated subject. The treatment is to be directed to the primary condition, and local agents used as for the follicular type. The ulcers should be freely swabbed with Hydrogen Peroxide, and if slow in healing a strong solution of Silver Nitrate may be brushed over each abrasion. Tuberculous ulceration is best attacked by the galvano-cautery. Snail-track ulcers may be lightly touched with Pernitrate of Mercury solution after drying the surface with absorbent wool, or the entire tonsillar surface may be freely swabbed with Weak Tincture of Iodine.

Chronic Tonsillitis.—This shows itself usually as an *enlargement* of one or both tonsils, the result of repeated attacks of acute inflammation. Constitutional treatment is very disappointing. Iodides (Syr. Ferri Iod.), Cod-Liver Oil and other antiscrofulous remedies as fresh air, seaside residence, over-feeding, etc., may be tried when the enlargement is of a simple hypertrophic nature, but these agents generally fail and end in loss of time.

Local applications are equally futile: swabbing with Tincture of Iodine or painting with astringents as the Glycerins of Tannin and Alum or Perchloride of Iron may be tried. One of the best routine applications will be the following applied with a large camel's-hair brush twice a day:

℞. *Tincturæ Iodi Mit.* ʒiv.
Glycerin. Aluminis ʒj.
Glycerin. Acid. Carbol. ʒiv. *Misce.*

The application of the solid Nitrate of Silver, which should be thrust firmly into the crypts, is a very painful method of treatment. Chromic Acid and Trichloracetic Acid, used upon a fine probe covered with cotton-wool and employed in a similar way, sometimes act very satisfactorily in bleeders where a cutting operation cannot be attempted. Oral sepsis should be invariably seen to, and all carious teeth must be removed.

Reduction of the enlargement may be effected by the galvano-cautery. The swollen gland having been injected in several places with a few drops

of a solution of Eucaine, the fine point of the cautery is thrust into the hypertrophic tissue at several spots so as to destroy small areas of the enlarged gland; the subsequent cicatrisation may cause marked shrinking of the diseased organ. The plan of reducing the size of flabby tonsils by the application of a mild continuous current has been practised, but it usually fails.

Removal of enlarged tonsils by the knife, guillotine, snare, enucleation, or piecemeal extraction by punch forceps (morcellement) is the only satisfactory and reliable procedure in the great majority of instances.

Much difference of opinion exists about the relative value of the above-mentioned methods and of the various details in each operation. Some authorities recommend a partial removal and trust to the subsequent cicatrisation for effecting the reduction of the enlarged remnant of the gland. Others insist upon the continuous dangers of septic absorption from the recesses of the stump, and recommend complete enucleation. When the guillotine operation is decided upon, this may usually be carried out after cocainisation of the tonsil by a 5 per cent. solution. Burns strongly advises Quinine and Urea in 2 per cent. solution as the best local anæsthetic; he injects a few minims into several parts of the tonsil 5 or 6 minutes before operating. In children a general anæsthetic should be administered, and all authorities agree that Ether is the safest. As hæmorrhage is a danger always to be anticipated, it is advisable to administer Chloride of Calcium for a few days before operation. An injection of Pituitary Extract is, however, much more reliable.

The spade guillotine of Mackenzie may be passed into the illuminated mouth as the patient sits facing the operator with his tongue depressed by the surgeon's finger, and after the projecting part of the gland has been manipulated into the lumen or ring of the instrument the blade is pushed firmly home by the operator's thumb as he keeps the guillotine steady by a firm hold of his fingers. In slicing a very firm or tough tonsil by this method much help will be obtained by firm pressure from without at the angle of the jaw, so as to keep the tonsil from escaping from the lumen of the instrument before pushing home the blade.

By skilful manipulation of the guillotine the entire tonsil can be enucleated satisfactorily, and the faucial pillars and part of the capsule left.

Hæmorrhage may be controlled by swabbing with Adrenalin solution; rarely will it be necessary to tie or twist any vessel. The galvano-cautery may be employed to touch a bleeding spot. Ice usually stops capillary oozing.

The after-treatment consists in keeping the patient quiet in bed with his head raised, and food in the form of cold or iced milk should be administered at short intervals. The 1 in 100 Carbolic spray is the most convenient and efficacious antiseptic application. Peroxide of Hydrogen is also a valuable local antiseptic.

Some surgeons prefer to seize the tonsil with volsella forceps, and remove a slice from the enlarged organ by a sharp probe-pointed bistoury. The

snare or écraseur with a hot wire is employed sometimes when there are special reasons for anticipating hæmorrhage and when the enlargement is great. The piecemeal operation is seldom indicated, unless when the enlargement cannot be got into the guillotine. It is carried out by seizing the organ at several points with Rault or Tilley's punch forceps, and removing a portion of tissue with each bite till the bulk of the organ is considerably reduced.

Enucleation may be carried out by Waugh's operation, in which the capsule of the tonsil is fully exposed by a long incision made with a fine-toothed forceps close to the free margin of the anterior faucial pillar while the tonsil is drawn upon by a Hartmann's conchotome. By steady traction and the use of forceps or blunt-pointed curved scissors, the enlarged organ is separated from its bed and removed.

The enucleation of an enlarged tonsil by the finger alone may be effected as in operation for adenoids, but usually it will be found more convenient to snip with a scissors the faucial mucous membrane, after which the gland may be shelled out by the use of the finger-nail. As a rule the hæmorhage is slight.

As already stated, complete enucleation can be effected by using the guillotine, as Mackenzie advises, by adjusting the ring around the tonsil from below and behind, pressing the gland strongly forwards and upwards, when the surgeon's index-finger, by pressing on the bulging soft palate, causes the tonsil to turn inside out through the ring of the instrument before cutting.

Murphy performs the operation of circumcision on the tonsil, in which he removes the plica triangularis (which is the obstacle to proper drainage of the tonsil) by means of the Hartmann tonsil punch.

Both tonsils may be removed at the same time by any of the above-mentioned methods, and when adenoids are present they should be also extracted.

TOOTHACHE.

The pain is usually due to caries, the result of bacterial activity which involves the dentine or causes acute inflammation of the pulp; it may also arise from periostitis or suppuration of the alveolar bone, or the impaction of a wisdom tooth.

The first step is to exclude neuralgia by an examination of the seat of pain, and next to determine the nature of the dental lesion. The carious cavity should be gently cleared of all débris and dried with a small mop of absorbent wool on the point of a fine probe, after which it should be thoroughly disinfected by Oil of Clove, and plugged with an impervious gutta-percha or mastic filling should the pain be slight. Usually it will be necessary to avoid impervious plugging and resort to pledgets of wool moistened with the clove oil, creosote or carbolic acid; these must be frequently changed till all pain has been removed, after which the cavity may be permanently filled with metallic stopping.

The same treatment should be followed when the pulp has become

inflamed, but the gentlest packing of the cavity with oil of clove pledgets may for the moment increase the pain, and in order to prevent frequent changing of the wool it is advisable to roof over the cavern by inserting a plug soaked in strong alcoholic solution of mastic, which need not be removed for 12 to 24 hours. One of the best routine local anæsthetics for relieving the pain of an inflamed pulp-cavity is a mixture of Carbolic Acid and Collodion. This obliterates sensibility, and seals up the chamber if applied carefully upon cotton-wool. Cocaine may be combined with the Acid.

℞ *Collodii B.P.* ʒiij.
Acidi Carbolici (*Cryst.*) ʒiij.
Cocainæ Hydrochlor. gr. x. *Misce.*

Fiat solutio. Signa.—"*A small portion to be applied upon cotton-wool to the dried-out pulp-cavity of the painful tooth.*"

The pulp-cavity may be packed with drugs in the dry state. Thus Cocaine, Chloral, Butyl-Chloral, Camphor, Menthol, Morphine, Opium, Antipyrine or Exalgin may be placed in the hollow, and kept in position by a little cotton-wool loosely packed upon the top.

In adults, where there is very severe pain originating in the living pulp of a carious tooth, the most satisfactory method will be to remove any stoppings, if such exist, or to gently remove any carious dentine till the pulp-cavity is well exposed, and then by a minute quantity of powdered White Arsenic left *in situ* by a plug of cotton-wool the vitality of the pulp will be entirely destroyed. Chloride of Zinc and Nitric Acid or solid Nitrate of Silver may be used in the same way.

Tomes points out that for the relief of pain a dead tooth should be left quite open, and a live tooth sealed closely up. This is seen where the pain results from pus in the pulp-cavity. No relief can be expected till the pulp-cavity is opened up and the matter evacuated, and further tension prevented by leaving a way for free exit.

Abscesses in the alveoli should be evacuated by a free incision of the periosteum, and when severe pain is caused by septic absorption from a dead pulp, the only remedy which affords any immediate relief is extraction of the dead tooth. If the pain be not very severe, however, relief may be obtained by injecting pure Carbolic Acid through the dead pulp down into the hollow fangs or root canal, and sometimes by drilling the alveolar process, at the root of the tooth, pus may be evacuated and the incisor or bicuspid saved after disinfecting from above.

The popular remedies for external application are of little use, and the plan of rubbing Aconite, Belladonna or Chloroform along the gums does more harm than good. Chewing of Pellitory Root sometimes relieves the pain depending upon congestion of the fangs or of the periosteum. The antineuralgic remedies internally are also not to be relied upon as long as the local conditions remain unattended to.

It is hardly necessary to insist upon the importance of saving the tooth.

Extraction should only be resorted to when the disease in the tooth substance is too extensive to permit of the hope of a solid stopping being inserted after the subsidence of the acute symptoms or when the tooth cannot be thoroughly disinfected or rendered totally aseptic.

It is almost impossible to exaggerate the importance of the treatment of dental caries, as so much harm is done by the absorption of pus and microbes from the cavities of suppurating teeth. Dyspepsia, ear disease, tuberculosis, adenitis, ulcerative endocarditis, pernicious anæmia and many other serious forms of general infection arise from the microbes or their toxins being absorbed. Turner insists upon the importance of sacrificing every temporary tooth and the first permanent molars rather than leaving a child with painful or foul teeth in its mouth.

The *prevention* of dental caries is a very important matter, and the treatment may be summed up in absolute cleanliness of the mouth and the avoidance of continuous indulgence in sweetmeats and excessive use of starchy foods. The use of bakers' bread made from refined white flour is believed to be a prolific cause of dental caries. The writer advises patients who have suffered from loss of a tooth by caries to once a day place a little oil of cloves on the point of a wooden tooth-pick inserted between each tooth after cleansing the mouth. This operation can be accomplished inside one minute, and the mouth remains aseptic for the day.

Extraction may be the only means of giving relief where the pain is caused by the impaction of a wisdom tooth. If possible, the wisdom tooth itself should be removed, as it is generally much less valuable than the molar in front of it, but this latter may have to be sacrificed if the wisdom tooth cannot be brought within the grasp of the forceps.

TORTICOLLIS, OR WRY-NECK.

Several different diseased conditions are included under these titles, which call for treatment based on totally different principles.

Rheumatic Torticollis, or "stiff neck," is an acute transient condition allied to lumbago and other forms of fibrositis which come on after exposure to cold. The pain, tenderness, and stiffness of the sterno-mastoid and trapezius muscles are best relieved by the application of a rubber bottle partially filled with hot water, or by enveloping the neck with warm cotton-wool covered over with thin mackintosh sheeting, or by the use of a hot poultice or thick layer of Antiphlogistine or Cataplasma Kaolini. Gentle massage hastens the resolution of the fibrositis, but this should not be commenced till after the expiration of a few days.

Constitutional remedies of the antirheumatic type as Salicylates, Aspirin, etc., should be given as in acute lumbago.

Congenital or Fixed Torticollis is either due to some developmental error in the sterno-mastoid muscle or to its rupture during labour. In these latter cases, after the local treatment of the hæmatoma by heat, mild friction with Lin. Pot. Iod. cum Sapone and the envelopment of the neck in cotton-wool, the deformity generally entirely disappears.

In the congenital cases due to arrested development of the muscle and those instances of permanent wry-neck which return after the resolution of the ruptured muscle, surgical treatment is usually necessary. When the affection is due to the presence of a gumma, which is rarely the case, iodides should be administered.

Before resorting to operation, however, if the case be seen early the muscles may be stretched under general anæsthesia, and the head fixed in its normal position by a poroplastic or other form of unyielding splint. This method, when assiduously followed up by massage, douching, electricity, and passive movements, occasionally effects a cure.

The best procedure in all intractable cases is to make a free horizontal incision above the line of the clavicle, so as thoroughly to expose both heads of origin of the sterno-mastoid. The heads are then identified, the sternal head divided about 1½ inches above its insertion, and the clavicular head close to the bone. The face is then rotated into the corrected position, and the lower end of the clavicular portion sutured to the upper end of the sternal portion still attached to the sternum, all bands of fascia, especially the posterior sheath of the sterno-mastoid, being carefully divided before the suture. Sometimes it is necessary that the scalenus anticus should be divided at the same time. Some surgeons operate through an incision made along the anterior border of the sterno-mastoid. The subcutaneous operation is now universally abandoned for these open methods. After suturing the wound the head should be placed in an over-corrected position between sand-bags, and when healing has taken place a plaster of Paris, poroplastic or stout leather splint should be applied, or an apparatus with elastic cords adjusted so as to keep up mild traction on the head.

The after-treatment will consist in persevering passive movements, massage, electricity and douching. At night a cap, with strings to bind the head towards the unaffected side, should be worn.

In cases of the so-called *False Torticollis* which supervenes upon caries of the cervical vertebræ, the above operative procedure seldom affords a satisfactory result.

Spasmodic Torticollis is a most intractable affection. The disease must be recognised as a "neurosis" arising independently of any morbid condition of the muscles, and often shows itself in neurotic subjects after some profound mental or psychic disturbance. The site of the functional mischief is supposed to be in the motor cortex, and the muscles involved are those supplied by the spinal accessory and upper cervical nerves. The sterno-mastoid and trapezius are often affected at the same time, and the splenius is not infrequently also at fault, though the sterno-mastoid may alone be involved. The condition may be due in some cases to reflex irritation, and the exciting cause should in every case be carefully sought for, though in advanced cases the original excitant may have disappeared after the tonic and clonic spasms have become established. If the disease originates in an occupation neurosis, or is the result of a faulty position of the head due to astigmatism or other error of refraction, by correcting

these in the very early stage of the affection the patient may be saved from the advent of the established neurosis.

In some cases spasmodic torticollis may be of the nature of a true tic, the movement being a purposive act, the result of a mental action, which by frequent repetition becomes habitual and involuntary, as in the so-called mental torticollis of Brissaud. In this form of disease, if proper treatment is commenced early, the condition may be effectually removed. Such treatment will consist in re-educational exercises on the principles carried out in the respiratory gymnastics employed in the management of stammering. The exercises suitable for the treatment of the tic type of torticollis should embrace efforts at immobilisation. The patient seated in front of a mirror attempts to correct the deformed position of the head and shoulders by a strong voluntary effort, which after repeated trials he soon is enabled to accomplish and maintain for a few seconds at a time, whilst during rhythmical movements of the arms and body in various directions he steadily learns to replace the faulty movement of the head by the normal one. Such exercises to be of any lasting benefit must be performed at stated periods of the day with great deliberation and prolonged patience till his volition becomes schooled and strengthened by a careful exercise of his will power under the supervision and suggestion of his medical attendant.

Drug treatment is usually disappointing. Bromides have been given in large doses, and occasionally relief may be obtained from the severe spasms. Hyoscine has been employed, and a combination of both agents ($\frac{1}{250}$ gr. hyoscine hydrobromide with 20 grs. sodium bromide) administered thrice daily often diminishes the severity of the spasms in a marked manner. Weir Mitchell's plan consists in the administration of Gelsemium in doses sufficient to produce very pronounced symptoms of the physiological action of the drug. Hypodermic injections of Atropine are less satisfactory than Hyoscine. Gowers finds that Morphia hypodermically, when persisted in daily for months in amounts of $\frac{1}{2}$ to 1 gr., is often curative. He points out the obvious objection to the establishment of the opium habit, and recommends that the patient should not pass out of the physician's hands till he has been treated for the morphinism induced by the use of the remedy.

Electricity is seldom of any real service if used alone, unless in one type of spasmodic torticollis where the malady is really of paralytic origin. In the ordinary clonic and tonic forms electricity when employed with massage and after surgical procedure is always of use, and should have a trial. The best way to apply electricity is in the form of a weak galvanic or *continuous* current to the muscles which are the site of the tonic or clonic spasms. If the interrupted current is used it should only be applied to the opposing weak muscles, and sometimes marked benefit has been thus obtained by causing lively contractions in the weakened antagonists whilst the spasms are modified in the sterno-mastoid and trapezius by the continuous current.

Injection of strong alcohol into the spinal accessory trunk and other

nerves or into the tissues immediately surrounding them has been advocated, but the method is an impracticable one without exposing the nerves, which then can be more easily excised than injected.

The plan of fixing the head and neck in an immovable apparatus has been abandoned, since this nearly always aggravates the patient's suffering and does no permanent good; it is found impracticable by this means to tire out the opposing muscles.

Surgical procedures usually afford a very considerable degree of relief, and sometimes complete disappearance of all the symptoms speedily follows, but relapses are so frequent that operation should only be resorted to as a last resource.

Stretching the spinal accessory is the least serious of the operations recommended, but almost invariably the spasms, both tonic and clonic, return after a brief interval. Better results are obtainable by excising a considerable portion of this nerve trunk, and when the splenius is not affected permanent relief may follow. Some surgeons practice the operation of avulsion, or tearing out the nerve by its roots. Should the spasms return, the more radical operation should be resorted to of cutting down upon the posterior primary divisions of the first five cervical nerves, and excising a portion of each. Section of the muscles by the open method without division of their nerves has been performed by some surgeons, but as a rule this is an operation only suitable for the congenital type of fixed torticollis. Kocher has, however, successfully removed the entire sterno-mastoid. Chiene, recognising that the seat of the functional mischief was in the cortex of the brain, recommended trephining and the removal of a superficial slice of the cerebral surface.

TRANCE.

Under Hysteria the treatment, moral and medicinal, of the hysterical condition which generally underlies trance will be found detailed. If the state of trance be not very "deep," the treatment described under Catalepsy will be successful. Electricity in the form of a strong interrupted current should be used in all cases, and when there is any evidence of a return to half-consciousness the battery should be at once applied to the arms and legs. Snuff, strong Ammonia, Nitrite of Amyl, etc., may be used at the same time, but they are of little value in genuine trance.

When these measures are used at the same hour each day, as Gowers recommends, there may be induced a tendency to periodical waking, which will ultimately culminate in a cessation of the attack. Till then every attention must be paid to the maintenance of life. Feeding should be carried on by the rubber tube of the stomach-pump, introduced through the nose or mouth. Rectal alimentation may be essential also in prolonged cases. Strong tea and coffee are indicated.

By the judicious application of warmth and skilful nursing much may be done to minimise the exhaustion sure to follow, especially in those cases where food cannot be administered.

Bromides are clearly contra-indicated. Antispasmodics as Musk,

Valerian, Asafœtida, Sumbul, and other antihysterical agents may be given by the bowel or by the nasal tube, but they do little good.

As Strychnine so often aggravates the abnormal sensations complained of by the hysterical patient, the writer believes that the best drug treatment in this affection may be found to be the steady administration of strychnine by the hypodermic syringe with the view of increasing the sensitiveness of the nerve centres and the peripheries of the sensory nerves and nerves of special sense.

TRENCH FEVER.

Little need be said about the treatment of this condition, since it is not likely to be met with again during the present generation. The pathology of the affection is still obscure. Houston isolated an enterococcus from the blood and prepared a Vaccine which was successful in the few cases in which it was tried. Lice appear to play an important rôle in its spread, and cleanliness is an obvious feature in prevention. When the fever, pains and malaise appear the best routine is absolute rest in bed, and full doses of Salicylates alternating with large doses of Quinine.

TRENCH FOOT—see mention under Madura Foot.

TRICHIASIS—see also under Ectropion.

The irregularly growing lashes may be epilated by forceps, but this only affords very temporary relief, as they are sure to grow again in their faulty position.

Electrolysis gives better results, and should always be resorted to when only a very few odd cilia are involved; this destroys the hair bulbs. It is accomplished by inserting a needle into the hair follicle, connecting it to the negative pole of a battery, whilst the positive pole is placed over the skin in the vicinity of the eye; a current such as is produced by three or four ordinary cells, passed for half a minute or so, is usually sufficient, but some dexterity is needed to insert the fine needle exactly into the follicle.

If only a limited number of hairs at a particular spot along the lid margin are at fault, the best plan is to make two parallel incisions along the margin of the lid and to carefully dissect out the lashes and their bulbs.

As described under Ectropion and Entropion, the operation of transplantation is to be performed when the entire row of hairs is faulty; it is done by splitting the lid along its marginal surface between the hair-bulbs and the tarsus and excising an elongated or elliptical piece of skin from the outer margin of the eyelid and fastening the cut surfaces by sutures, so as to evert the lid, or by inserting a piece of mucous membrane into the gap formed by the splitting of the lid without removing any skin.

TRICHINOSIS.

Preventive measures are of much more importance than therapeutic methods, since little can be done once the larvæ of *Trichina spiralis* have become encysted in the muscle of the human patient. Prophylaxis is obvious, since the disease can be entirely prevented by thorough cooking of all food obtained from the muscles and tissues of the pig. As the

latter animal becomes infected from the excreta of rats which gain admission to the pigstyes, the sanitary environment of this food supplier should be most carefully attended to.

Where ham and some varieties of sausages are eaten in the uncooked state, as in Northern Germany, the pork is submitted to careful examination before being exposed to the curing process, as this latter does not destroy the parasite. A small portion of the tongue, diaphragm, intercostal and abdominal muscles are examined by a lens, and if the parasite is detected the carcass is rejected.

In Britain, where ham is never eaten in the raw state, the only danger of infection arises from incomplete boiling of large hams. A temperature of 176° F. is necessary for the destruction of the parasite, and this temperature in the centre of a large ham is not reached till after at least 8 hours' continuous boiling, hence heavy hams should always be cut in two before boiling. Freezing of ham and bacon has no effect upon the trichinæ.

After the ingestion of trichinised food in the stage in which nausea, vertigo, diarrhœa and fever are present, the best treatment will be to clear out the stomach by means of a good emetic, followed by a large dose of some smart purgative, as 1 or 2 oz. of Castor Oil, 10 or 20 grs. of Calomel, or 2 or 3 oz. of Black Draught or White Mixture. The only drug likely to be of any use in the early stage, before the parasites have left the intestinal canal, is Thymol in doses of 15 to 30 grs. every two hours for three or four times. The colon should be thoroughly irrigated; the parasites have been found for weeks coming away in the washings. During this time it should be realised that the trichinæ continue to shower their living young into the lumen of the bowel, so that by repeated purging and the administration of thymol and colon irrigation much may be done to minimise the infection of the muscles.

Once the larvæ have gained admission to the muscles no drug given by the mouth has any specific action upon them. Kahn dissolves 50 grs. thymol in 50 c.c. olive oil, and administers 2-3 c.c. of this subcutaneously or intermuscularly daily for one week, when after a rest for 10 days the injections are repeated daily for another week. Cures, he affirms, are to be expected, as the drug reaches and destroys the parasites in the muscles, as shown by great quantities of eosinophiles in the urine.

Salvarsan and Neosalvarsan have been injected with varying success. Salzer in an epidemic in New York successfully employed injections of the blood-serum of patients who had recovered from the disease. Pain, stiffness and tenderness of the muscles should be met by local anodynes. Fever may be relieved by small doses of Antipyrine or Aspirin, and the patient's strength maintained by rest, suitable liquid nourishment, rectal feeding with peptonised food, etc.

TRICHORRHEXIS NODOSA.

This interesting condition of the hair of the beard and whiskers, in which the shafts are marked by a series of partial breaks, causing at irregular intervals the appearance of white transverse bands like porcupine markings,

was exhaustively investigated by the author many years ago. The results were published in the Dublin *Journal of Medicine* in 1879, and show that after an examination of 300 individuals taken at random the condition was invariably found to be present in some hairs in *every* case. This demonstration of its universal presence, though in varying degrees of severity, was decidedly against the view of any specific microbic origin, and no specific parasite has since been discovered.

As the condition was always found in a great abundance of the hairs of those cleanly individuals who used soap and water freely, the author arrived at the conclusion that the condition could not be regarded as pathological in the ordinary sense. The outer fibre cells of the cortex of the shaft of a growing hair become hard like those of the nails, and these not yielding to the expansion of the inner living cells of the medulla are gradually separated from each other and produce the disintegration characteristic of the condition, the process being probably hastened by the acute bending of the shaft in the employment of friction by the towel after the free use of soap. Simple torsion will not produce the condition, which seldom or never is present in the hairs on the upper lip.

The application of antiseptics is irrational, and repeated shaving with the view of ultimately producing a final crop of perfectly formed hairs is futile. The recommendation that the individual or so-called "patient" should seek a change of climate should not be taken seriously. The hairs of the head were never found to be affected in the author's cases.

The only step necessary for the correction of the condition is to daily anoint the hair lightly with any vegetable or animal fat as Almond or Trotter Oil or mixed pomade, and to use only as little soap and towelling as is necessary for cleanliness.

Trichorrhexis nodosa is not to be confounded with the rare condition described by Walter Smith as Monilethrix, which is congenital and affects all the hairs of the body.

TRYPANOSOMIASIS—see Sleeping-Sickness.

TUBERCULOSIS.

In the various articles dealing with the treatment of the different local manifestations of disease caused by the tubercle bacillus the principles and details of treatment have been already fully dealt with, especially under Phthisis, Peritonitis (Tuberculous), Mesenteric Gland Disease, Caries, Meningitis, Lupus, etc.

Great advance has been made in both the treatment and prevention of the ravages of tuberculosis in all its forms during late years by a clearer conception of the views promulgated by Henry MacCormac of Belfast, who first forcibly pointed out the value of the open-air treatment which is now recognised as the basis of the sanatorium and climatic methods afterwards systematised at Göbersdorf by Brehmer. The mortality has been further reduced by the overfeeding and suralimentation methods, and in suitable cases by Vaccine therapy.

The universal acceptance of these methods has tended to place the value of drugs upon a lower plane than they formerly occupied, but in selected cases the efficacy of many drugs in turning the scale against the bacillus when already handicapped by open-air treatment cannot be ignored.

Prophylaxis has attracted great attention during the last decade, and possibly it is owing to a clearer conception of the communicability of the disease that the death-rate from tuberculosis has been reduced so markedly. As stated under Phthisis, the weight of evidence is decidedly against the route of ingress being by the respiratory passages. Much advance is made by a recognition of the fact that no matter how tubercle bacilli gain an entrance into the blood, they are liable to be filtered out by the fine capillaries of the lung, and their presence in this organ is consequently no evidence that they had been inhaled.

In his Cavendish Lecture (1908) the writer has shown that living tubercle bacilli introduced into the stomach of the guinea-pig are to be found in a few hours (4) in the lung substance, and fine carbon particles administered at the same time are filtered out by the pulmonary organs so effectively as to colour the lung black. That the bacilli can pass rapidly through the intact intestinal mucosa without producing any local lesion is now almost universally accepted. The histological differences between the mesenteric glands of young and old animals is a factor of greatest interest in the problem of infection. Vanstenberghe and Grysez maintain that when carbon in fine division is introduced into the stomach of a very young animal it is arrested in its progress to the thoracic duct by the fine reticulum of the mesenteric lymphatic glands. This supports von Behring's theory that adult pulmonary tuberculosis is the result of an infection of these glands received in early life, the bacilli remaining long quiescent and imprisoned in the abdomen.

Calmette's experiments for inducing artificial anthracosis in animals have demonstrated that when carbon particles are inhaled for a considerable period they accumulate in the throat, are swallowed with the saliva, and enter the stomach and bowel, from which they find their way to the lung by the thoracic duct. By ligaturing the œsophagus of the animal, this observer found that the carbon was prevented from reaching the lung. These facts go a long way to prove the contention that pulmonary tuberculosis is not contracted by inhalation, but by the ingestion of bacilli which penetrate the intestinal mucosa. The importance of this cannot be exaggerated when we come to consider the prophylaxis of pulmonary and other forms of human tuberculosis. By a blind adherence to the inhalation theory the part played by the unprotected state of the intestinal surface has been minimised, and, indeed, denied by Koch, whilst an infected milk supply has been permitted to inflict its ravages upon the human race. Elsewhere the writer has stated that he was enabled to stamp out outbreaks of bovine tuberculosis in a colony of Industrial School children by sterilising the milk supply, and to thoroughly protect this community from the bovine form of tuberculosis by rigidly persisting in the sterilisation.

When we consider the numbers of patients suffering from phthisis and of milch cattle affected with tubercle, it must be conceded, notwithstanding the protests of Cornet, that in these latitudes the bacillus is *ubiquitous*. After all has been said, the most important consideration resolves itself into the question of *dosage*. Small quantities of bacilli are continually being admitted into the human organism by various channels (mainly, if not exclusively, by the intestinal route), and the natural defensive mechanism of the body is equal to cope with these, but when a large dose gains admission the phagocytes are overcome and tuberculosis supervenes. Even when a dose has been admitted which under ordinary healthful conditions is innocuous, this may prove potent should the defensive mechanism be deficient or lowered in some region of the body, as, for example, when bones have been previously injured, or exposed glands like the testicles have been the seat of even slight trauma, or the pleura has been previously affected by a simple inflammatory process.

Hence in the prevention of tuberculosis the overwhelming evidence of the importance of guarding the comparatively unprotected intestinal mucosa should be realised, and should command the attention of the physician and of every officer of public health. The debatable question of the unity of the human and bovine tubercle bacillus has drawn a red herring across the track, but in a work dedicated entirely to therapeutics there is no space left for discussion of a purely pathological problem. The reader will find this problem in its bearing upon treatment fully dealt with in the author's Cavendish Lecture (1908), already referred to: suffice it to say that the issues at stake afford in either case no justification for relaxing the prophylactic measures already mentioned.

The methods so successful in the treatment of every form of tuberculosis, as open-air and over-feeding, are also powerful prophylactic agents, and it is due to MacCormac to remember that he insisted upon an unlimited supply of pure fresh air day and night, together with the freest amounts of nourishing food, as preventives against pulmonary phthisis, and tuberculosis of bones and of lymphatic glands.

Whilst the treatment, medical and surgical, of the different phases of tuberculosis will be found under the headings of each, there remains for consideration the management of the following:

ACUTE GENERAL MILIARY TUBERCULOSIS.

Little can be done for this fatal malady, which usually pursues its course in a few weeks. The treatment must be entirely symptomatic. Fever will call for repeated cold sponging, as the action of the newer antipyretic drugs is too dangerously depressing to the heart to admit of their routine administration. Sweating when profuse must be met by Quinine in full doses, which sometimes also checks the rise of temperature liable to follow after the skin action passes off. Dyspnœa may be sometimes considerably relieved in the pulmonary form of miliary tuberculosis by the inhalation of Oxygen. Cardiac failure should be com-

bated by Strychnine administered hypodermically, and Alcohol may be freely given by the mouth. Vaccine treatment is clearly contra-indicated; it can only hasten the fatal issue. The futility of pouring in antiseptic drugs with the view of destroying the bacilli in the blood or tissues is obvious. Creosote, however, often affords measurable relief by its power of neutralising the toxins, and it may with advantage be resorted to.

The important consideration of prevention of the attack should never be lost sight of. The general invasion being always the result of the breaking down of an old caseous deposit in some part of the body which causes perforation of a bloodvessel, the importance of dealing surgically with such foci is obvious, but their removal must be radical, as partial attempts, as in the case of scraping or gouging bone, are liable to cause a fatal general infection. For the same reason a caseating testicle should be promptly removed by radical operation, whilst as a rule indolent lymphatic glands are best left alone owing to the difficulty of the entire removal of the diseased tissues. These foci are nearly always of bovine origin.

TUMOURS.

Whether these be of innocent or of malignant nature, when situated in any part of the body which permits of their complete excision, the sooner the growths are removed the better, since clinical experience has amply demonstrated the tendency of many benign neoplasms to take on malignant action as the patient increases in years.

Under such headings as Cancer, Ovary, Diseases of, Lymphatic Glands, Nævi, Moles, Hydatids, Elephantiasis, etc., the suitable methods of removal and other details of treatment will be found discussed.

TYLOSIS.

This is the title given to the condition in which the horny stratum of the epidermis has become the seat of hypertrophic change. Tylosis of the tongue, or smoker's patch, which is so liable to take on malignant action, should be treated radically as described under Tongue Diseases.

Tylosis affects the skin which has been subjected to intermittent pressure, especially upon the feet and on the hands of those who employ certain tools in manual labour. The treatment in these cases resolves itself into the removal of all sources of pressure, and after the thickened epidermis has been shaved away by a sharp knife, a strong solution of Salicylic Acid (1 in 5) in Collodion, or Salicylic Plaster, should be frequently applied. (See under Corns and Callosities, p. 186.)

TYMPANITES.

This is but a symptom, and its relief will depend entirely upon the causes producing it. The treatment of these has already been detailed under their various headings, so that further notice here is unnecessary. The reader is referred to the articles upon Dyspepsia, Intestinal Obstruction, Typhoid Fever, etc.

Where the causes are not removable, agents may be employed in each

case suitable to the condition of the patient. Thus, in hopeless cases of abdominal obstruction from cancer, where colotomy or other operation is contra-indicated, the abdominal wall and intestines may be pierced by a fine aspirator needle, and the imprisoned flatus let free. As a rule, this affords but little relief.

A much better plan is to perform the operation of enterostomy by making a *small* opening in the middle line, and, having secured the first coil of distended bowel presenting, to open this and leave it *in situ* in the abdominal wound after tying in a small glass canula with a flange. Elsewhere the writer has stated his experience of the uselessness of the long tube introduced into the rectum. Enemata of Turpentine, Creosote, Asafœtida and the internal administration of these agents at the same time, alone or combined with Galbanum, Musk, Ammonia, Alcohol, Charcoal, Ginger, Capsicum, Cajuput, Peppermint, or other carminative may be resorted to.

TYPHOID FEVER.

PROPHYLAXIS.—This is of vital importance to the public health in a disease of such widespread distribution, frequent incidence and serious mortality. The *Bacillus typhosus* is easily carried by water, milk, food contaminated by flies, shellfish as cockles, whelks and mussels collected from the polluted foreshore in the vicinity of maritime cities, and by the use of uncooked vegetables or salads soiled by the excreta of typhoid patients, and probably it is conveyed by the bites of insects.

The water supply obviously should be guarded against the possibility of contamination by rigid protection of the catchment area, conduit pipes, filters and house cisterns. In times of epidemic, house-filters should not be depended upon, but all water used for drinking and cleansing purposes should be boiled. In many of the milk-borne epidemics the spread of the affection has been traced, not to disease in the milk-supplying animal, but to the use of polluted well-water employed in rinsing out the milk-pails. Acid Sodium Sulphate in tablet form is of great value for disinfecting doubtful water when boiling cannot be resorted to; 15 grs. will sterilise 20 oz. water in 15 minutes.

The necessity of sterilising all milk admitted to the house, whether for the use of the healthy or for the typhoid victim, in areas where the disease is prevalent is also obvious.

Though the potentiality of sewer gas as a carrier of infection has been denied, nevertheless it is imperative that the house drains should be tested and put in perfect order. The writer has witnessed a formidable hospital epidemic caused by turning a jet of waste steam into a sewer, which caused all the house traps to be forced by the abnormal pressure. In this case an otherwise isolated building became converted into a hot-bed of typhoid fever which for years defied every effort made for its disinfection, one nurse after another becoming affected by the disease in spite of every precaution which perfect cleanliness and a sterile milk and water supply provided.

The rigid isolation of the typhoid patient is necessary, and the treatment of such in the wards of a general hospital should not be permitted.

As the bacillus is excreted in the fæces and urine of typhoid patients, these discharges should be rigidly sterilised by the use of strong antiseptics before being emptied into the closet or buried in the soil. In the latter medium the bacillus may retain its virulence unimpaired for at least a year. The best disinfectant and the cheapest is Chlorinated Lime, which should be previously placed in the bed-pan, night stool and urinal. Absolute cleanliness will effectually prevent the spread of the disease in all isolated cases.

It has been a recognised fact that the bacilli may continue to be discharged in the urine of patients long convalescent of the disease, since T. Houston published his case in 1899, but the somewhat alarming discovery of the "*typhoid-carrier*" has upset all former calculations regarding the spread of the affection by personal contact. Many of these individuals present no history of ever having suffered from typhoid fever, or they may have been victims to it several years before coming under notice; nevertheless, the bacilli are to be found in great numbers in their bile, bowel discharges, or in the urinary secretion.

The discovery of this source of the disease has introduced a new problem into the prophylaxis of typhoid fever. It may be regarded as proven that the bacilli in typhoid carriers are mainly produced in the gall-bladder. As they continue to be passed out in the fæces and urine in enormous numbers during intermitting periods, and possibly for the whole length of a carrier's long life, the existence of these individuals is a standing menace to public health. Fortunately compulsory notification aids the health officer to trace each epidemic to its source, but the new problem is—what is to be done with the typhoid carrier as soon as he has been discovered? (Theodore Thomson calculates that 3 per cent. of the patients who pass through an attack of typhoid fever become carriers; this would give 108,000 carriers for England, and for London alone about 14,000.) The problem has been solved in lunatic-asylum practice by performing the operation of removal of the gall-bladder, but this is a measure to which few carriers would submit. Vaccine treatment, though successfully carried out in a case by Houston and Irwin, has failed in the hands of others, and it has been demonstrated that the opsonic index of the typhoid carrier is generally much above the normal.

By the administration of Urotropine, Lactate of Sodium, Lactic Acid Bacilli, Citrate or Bicarbonate of Potassium, etc., the amount of organisms in the urine and fæces has been lessened for a time, but it must be recognised that all our present known agents are futile for the permanent sterilisation of the typhoid carrier. Such individuals cannot be compulsorily segregated, but they should be prohibited from pursuing any occupation which involves the handling of food supplies purchased by the public, and the doctrine of the most rigid cleanliness should be instilled into them. With the conscientious carrying out of such precautions as just

mentioned, the typhoid carriers' constant menace to public health may be greatly minimised.

Vaccine Prophylaxis or *Antityphoid Inoculation* has demonstrated its remarkable efficiency during the late war. The fact is now so firmly established that the necessity of quoting statistics is no longer needed. In the British Army, at an early stage of the war, the incidence of the disease was found to be 14 times greater, and the deaths 42 times more frequent, amongst the uninoculated than amongst the inoculated. There is ground for hoping that by improved methods this relative immunity may be made absolute; the inoculations as at present practised confer more or less immunity for several years, but they are not protective till after the lapse of a few weeks from the first injection. This method of protection against typhoid should be carried out in every individual who is going to take up residence or to travel in regions where the disease is endemic.

The usual dose is 1.000 million killed bacilli, followed in a week by double this dose. The first injection is liable to be followed by a considerable amount of reaction: in one case the writer witnessed a rise of temperature to almost 105°, but such a result is very rare. The second dose, though much greater, is usually followed by little or no disturbance. Obviously the individual should be confined to bed for 1 to 2 days should the reaction be marked.

Castellani maintains that more satisfactory immunising results are obtainable by using attenuated living cultures, and that a mixed method is the best routine. This he carries out by injecting 0·5 c.c. of dead culture prepared by Wright's method, which is followed up by a 1 c.c. live attenuated culture after the lapse of a week. The live culture is prepared by inoculating broth-tubes with a 48 hours' old culture of a typhoid strain, which has been kept alive in the laboratory for 3 years till it has lost its virulence. Many authorities now recommend a Triple Vaccine of *typhoid*, *paratyphoid A* and *paratyphoid B*: this was often necessary during the war.

As soon as the diagnosis has been made of typhoid fever, the patient should be at once sent to bed if he has not already been laid up by the malaise, headache, etc. There is no single factor in the management of the disease of such vital importance as the stage at which the patient is compelled to take absolute rest. Recovery is expedited and the mortality of the disease considerably reduced in those patients who take to bed as soon as the first symptoms of the disease show themselves. It is a grave mistake to wait for a positive Widal reaction, as this may not show itself till after the end of the first week.

The selection of the sick-room should be seen to by the physician, and it should be quiet, well ventilated, large, and airy, with abundance of light, which can be easily cut off when desired. Where a large room can be obtained it should be selected, even in winter, and by a few screens placed around, but at a distance from the bed, an agreeable aspect of comfort can be easily produced. A fire, even in summer, is usually desirable for

heating milk, etc.; moreover, it aids in ventilation and in the maintenance of an equable temperature. The less furniture the better, and carpets should be removed, their place being taken by a few thin rugs; all unnecessary articles and ornaments should be taken away.

The plan of having two rooms, one for the night and one for the day, is theoretically a good one, but in practice a dangerous one, owing to the serious consequences which may arise from moving the patient about. It may, however, be adopted in those cases where two good rooms open directly into each other, the patient and his bed being carried (not rolled) from the one to the other. An upstair room is preferable (this is most desirable in typhus), and if it opens by French windows on to a balcony and has a well-flushed water-closet on the same level, everything that can be desired is thus secured. The temperature of the room should be kept at about 60° F.

Two moderately small beds, of precisely the same height from the floor, should be provided, so that, when drawn up exactly alongside each other, the patient can be shifted from the one to the other as safely as from one part of a large bed to the other. There is nothing so suitable as a firm straw palliasse, with a good hair mattress upon the top. A wire mattress instead of the straw palliasse is preferred by some as being cooler, but it lacks in firmness. The bed should be so placed—not in a corner—as to permit of the nurse and physician being able to walk all round it. Everything in the shape of hangings is to be forbidden. The bed-clothing must be light, and it is a good plan to replace the ordinary counterpane by a linen sheet, which can be frequently renewed. Mackintosh sheeting underneath is to be regarded as a questionable adjuvant, but abundance of draw-sheets should be available.

The patient should be clad in a loose linen night-shirt, which must open down its entire length in front; sometimes a very thin woollen garment fashioned on the same principle may be substituted when there is considerable perspiration.

As skilful nursing is of much more importance than drugging, the services of two experienced nurses, one for the day and the other for the night, are to be secured, when possible, and it should be insisted that they regularly keep up a written report or journal of the temperature, bowels, doses, nourishment, etc. In summarising the effects of different treatments and in arriving at a conclusion about the advisability of altering any of the details of treatment in a case, it is essential for the physician to have a chart before him giving him a graphic or bird's-eye view of the variations in the temperature and number of evacuations passed daily.

The patient should be educated to the use of the bed-pan and the urinal from the start of his illness in order to secure the maximum of absolute rest in the horizontal position. If these utensils be first insisted upon after the patient has entered upon his second or third week in bed, he cannot use them to advantage owing to muscular weakness.

Cases where perforation, hæmorrhage and death have followed the exertion of the patient's getting up to the night-chair are numerous.

It must, however, be acknowledged that the bed-pan is the greatest difficulty in the nursing of typhoid fever; some patients cannot tolerate its use, and in some cases the physician may feel himself compelled to select the lesser of two evils, and permit the patient to be assisted to the night-chair. Straining on the bed-pan must be avoided by the prevention of constipation, and a small enema or a Glycerin suppository judiciously administered often settles the bed-pan difficulty.

Ewart points out the importance of keeping the patient as much as possible lying in a position of slight inclination towards the left side. This is effected by putting a bolster under the right side of the mattress, so as to prop the body forwards, or by raising the two right feet of the bed on blocks whilst the patient lies on his back, the object being to cause emptying of what he calls the cæcal pool—*i.e.*, the retention of the liquid fæces in the right iliac fossa, which he believes causes the toxic typhoid state. The entire body may be sponged daily in detachments, a little Permanganate solution being added to the tepid water.

A linen draw-sheet should be constantly worn, and scrupulous cleanliness insisted upon. It is necessary, as already mentioned under prophylaxis, to have the motions disinfected by some antiseptic as Chlorinated Lime, Terebene, etc., as soon as they are passed. One of these may be placed in the bed-pan and urinal each time before being used. The soiled bed linen should be soaked in a bath of weak carbolic acid solution.

Dietetic Treatment.—This is of the utmost consequence; indeed, except, perhaps, in the case of diabetes, there is no affection in which the question of dietary is of such vital importance, and the young physician must recognise that there is no point in connection with this subject which he can afford to regard as too trivial for his consideration. Few men can be in practice long without being able to testify to the disastrous or fatal consequences which occur from the patient's indiscretion in this matter. A good rule to have ever before the mind is to forbid every form of food all through the attack, except such as would *readily pass through the meshes of a fine sieve*. Not that it will be necessary to sift any food, but to lay clearly before the patient and nurse that only substances in the liquid form or those containing impalpable powders are admissible.

Cow's milk meets all requirements for the majority of patients, and when they can take it, which is nearly always the case, there need be little trouble about the dietary in the early and acute stages of the disease. It is needless to say it should be pure and fresh.

For adults the quantity should be not less than three or four pints in the twenty-four hours. Some patients will be found who can take and digest twice this amount, and when very large quantities are taken it may be advisable to skim it occasionally.

The rate or method by which this liquid nourishment is to be administered is of quite as great importance as is the quantity. It must be given in small amounts at short intervals, so as to prevent the patient filling his stomach by a large drink. A wineglassful every hour would represent three pints in the twenty-four hours; but then, in ordinary cases, the

patient should not be disturbed frequently during the night, and therefore double this amount may have to be given during the day and evening. The nurse must, therefore, be permitted to use her discretion according to the individual peculiarities or tastes of the patient, the main idea being adhered to that, as far as practicable, the total amount of nourishment should be as evenly as possible divided over the time. In the early morning the patient generally needs his food most, and in typhoid and typhus fevers in their advanced stages the life of the patient may be depending upon the conscientious discharge of the nurse's duties at this particular time of the day.

Over-feeding must be guarded against; nothing but injury can follow the administration of quantities of milk beyond the digestive powers of the patient, and the physician by inspecting the motions from time to time can gain valuable information upon this point. It is hard to hit off the requisite amount necessary, but upon the whole it will be better to err *a little* on the side of giving too much. The milk may be given warm, cold, or even iced to suit any strong inclination upon the part of the patient. It will be better to give it iced when possible.

Potash, Soda or plain carbonated water may be mixed with it in varying amounts according to the requirements of the case. It is desirable to give an occasional draught of water or iced water when the patient craves for it; the only objection to this is when water or ice is allowed to take the place of nourishment in patients who have little appetite, as may often be seen in the case of children. One system of treating typhoid fever consists in the administration of large quantities of water with the view of promoting elimination. It should always be kept in mind that the patient requires water in some form, and hence the necessity for diluting his milk. At a later stage, should vomiting threaten or diarrhœa be severe, Lime Water may be used to dilute the milk. Yeo recommends Semmola's glycerin drink as an occasional remedy for thirst and dryness of the throat; it is made by mixing 1 oz. glycerin and 30 grs. citric acid with 1 pint of water. It may be better to double the acid and water where there is much thirst, but where there is a tendency to hæmorrhage citrates must be avoided.

Should the milk be peptonised? The writer does not hesitate to say that this should not be resorted to as a routine practice in every case. With patients possessing good digestive powers it is generally unnecessary, and sometimes turns them against the food. An inspection of the motions may settle the question. If much firm curd, or if in liquid motions the undigested flaky coagula are clearly visible, the diet must be altered. Either the patient is not being fed at proper intervals, or he is having more than it is possible for him to digest, or else his digestive powers are weakened, or else the irritability of the bowel is hurrying its contents too rapidly along the canal to permit of digestion and absorption, and a little reflection will dictate the best course in such cases.

Lime water or kali water may effect the desired change by its action upon the milk, and occasionally barley water is agreeable. Sometimes

a change to beef tea or cold chicken jelly may set matters right, or a little good arrowroot may be boiled with the milk, or a very pure isinglass may be added. If the patient's vital powers are low, the milk may then be peptonised by adding a little of the Liquor Pancreaticus.

In such a case the question of stimulants will have to come to the front, as will be presently discussed, and if these are indicated the requisite dose of brandy or whiskey may be mixed with the milk before administration. This latter plan often succeeds better than any other, even in those cases where solid curd is vomited.

Where milk cannot be taken in sufficient amount, the question of liquid animal food must be considered. Some physicians give beef tea and soups in all cases as a matter of routine. These certainly may be given in typhus always, but in many cases of typhoid fever they excite or increase diarrhœa, and may do harm. In many cases, and, indeed, in nearly all cases at some period of their progress in typhoid fever, beef tea strengthened by meat extracts, and good soups, carefully strained, are advantageous.

The clear strained soup made by boiling down half an average sized chicken or the equivalent of one pound of butcher's meat made into beef tea may be given during the twenty-four hours alternately with the doses of milk in most cases from the very beginning, if care be taken to suspend its administration upon the onset of diarrhœa. Constipation is often present throughout the attack, and it is then that the value of animal soups is most apparent. Where the opposite condition is present, pure Gelatin made into a firm jelly and flavoured with a little Sherry becomes a valuable article of food.

The writer's routine custom in hospital and private practice is to adhere to milk till constipation declares itself, and then either to suspend the milk entirely for a time, or to give an equal amount of beef tea or strained chicken soup alternately with it. At a later stage an occasional dose of mutton broth, carefully strained through a fine sieve and deprived of all fatty matters, will prove a substitute for Castor Oil or the enema. Raw beef juice and barley and oatmeal gruels well strained are praised by Ziemssen. Calves'-foot jelly and gelatin blanc-mange are admissible, but only in cases where the patient is able to take a sufficient amount of milk or other valuable nourishment. Rennet, with a little carefully prepared currant *jelly* or strained fruit juice, may be permitted.

On any change from the pure milk diet the temperature chart is to be closely scanned, and it will be often observed that the rise which sometimes follows can be attributed to the animal food.

Much attention has in recent years been directed to what is known as the High-Calory dietetic treatment of typhoid fever, and results appear to be convincing in the report of Coleman, who treated 444 consecutive cases, half of which where placed on exclusive milk, and the other half on high-calory diet, with the result that the mortality in the first mentioned was 17·6, and in the latter only 8·1. Carbohydrates in fair amount in conjunction with milk constitute the main element in this diet. The

writer enters a protest against eggs, though their use was advocated by Murchison, Cayley and others.

The so-called "*empty bowel*" treatment advocated by Ewart consists in feeding the patient on peptonised whey, with the view of leaving the minimum of bowel residue.

When the fever has subsided for a few days, the physician will be tempted to permit a change in the diet. In contemplating this it will be advisable to summon up the mental picture of the possible state of the ulcerated Peyer's patches and solitary glands, and it will be advisable to refuse the patient's request for solids for 10 days after the normal temperature has been reached.

White fish well boiled is, perhaps, the first solid meat which can be safely permitted, with tea or weak coffee, in which any plain biscuit may be soaked. Ord advised a return to solid food at an early date if the patient clamours for it. He stated that he had learned to give in to this strongly stated desire upon the part of the patient for solid food. The writer has not yet learned to do so. The intermittent attempts to establish authority for an early resort to solid food arise from an abuse of liquid feeding, and the fashion is taken up and advocated by the young physician till he meets with a case of perforation from this practice. By adding good nourishing soups, arrowroot, fine sago, or cornflour, to the milk diet undue wasting is prevented, and the patient may safely be kept for 10 or 12 days on this liquid regimen after the subsidence of fever.

Vaccine Therapy.—Notwithstanding ceaseless activity in this method of treating typhoid fever, it is still impossible to pronounce very definitely in its favour, especially as there is still sharp differences of opinion about details. Some recommend a Stock Vaccine with a dose of 200 to 500 million, others insist upon a *sterilised* autogenous vaccine. Some use *living* autogenous organisms, others *sensitized* vaccines. One physician recommends intravenous injections, whilst others rely upon the hypodermic method; but all seem to agree in one point—if there is any benefit to be obtained, the vaccine treatment should be commenced early.

Captain D. Thomson's new method may solve the difficulty. He gets rid of the endotoxin in the killed bacilli by washing with weak acids, so that very large doses of a culture capable of producing great quantities of antibodies may be safely injected. Only future clinical experience can demonstrate the value of this departure in vaccine therapy.

Serum Therapy.—Serum from convalescent cases and from immunised animals has been tried, and many observers conclude that the best results are to be obtained from a combination of this with vaccines.

Drug Treatment.—No one seriously believes that the course of the disease can be cut short or its mortality sensibly diminished by the use of antiseptic drugs administered in the ordinary way. Whilst the complications arising during the attack often afford clear indications for the employment of drugs, officious routine drugging must be condemned.

Colloidal Gold in doses of 1 to 2 c.c. by the veins has been vaunted, but the severe reaction is sometimes an alarming symptom, and the

results are not convincing. If the physician is satisfied that he must employ some routine drug treatment to secure the confidence and maintain the hope of a nervous and apprehensive patient during the long siege of the fever, he may resort to the least objectionable of all the routine methods. This is what has been known as the Swedish treatment, and consists in the administration of a mineral acid, as in the following simple combination:

℞. *Acid. Hydrochlor. Dil.* ℥iij.
Glycerini ℥j.
Aquæ Destillatæ ad ℥viij. *Misce.*

Fiat mistura. Capiat ℥ss. *ex* ℥j. *aquæ quartis horis.*

The above should not, however, be regarded as a mere placebo: the acid on coming into contact with the buccal and pharyngeal mucosa tends to stimulate the salivary and mucous gland secretion, thus keeping the mouth moist and preventing the parched feeling and thirst. The glycerin prolongs the local effect by preventing drying, and the admission of the acid to the stomach acts as a restorative by supplying a constituent of the gastric secretion, which is always diminished in feverish states. This mixture does not interfere with the dietary unless when given immediately before or after a draught of milk.

Of the so-called antiseptic forms of treatment that of Yeo is the least objectionable. It is carried out by giving 1 oz. every 2 or 3 hours of a mixture made by adding 1 dr. pure Hydrochloric Acid to 30 grs. Potassium Chlorate in an empty 12-oz. phial, and adding water gradually with brisk shaking to absorb all the free chlorine gas liberated. 24 to 36 grs. Quinine Sulphate with 1 oz. Syrup of Orange are finally added. This mixture, known as Euchlorine, probably exerts no antiseptic action save in the mouth or pharynx, and any good which it achieves is probably similar to that obtained by the simpler acid mixture; both combinations tend to cleanse the tongue and act locally as antipyretics by their sialagogue effect in keeping the mucosa moistened.

Calomel in large doses (10 grs.) is a favourite antiseptic routine on the Continent when given at the commencement of the disease, and it is maintained that by resorting early to its use the disease may be cut short. Liebermeister gave 3 or 4 such doses during the first 24 hours, and satisfied himself that he was able in some instances to abort the disease. Beyond the thorough emptying of the entire intestinal tract, it is very doubtful if any good can possibly follow such a procedure, which, moreover, might cause a fatal issue if resorted to at a later stage of the disease. There are good reasons for believing that calomel is capable of exerting a decided antiseptic action on the bowel mucosa when given continually in small doses ($\frac{1}{4}$ gr.) at very short intervals, but such treatment is inadmissible in a prolonged disease like typhoid fever, where salivation must certainly follow should the drug be pushed.

Perchloride and Biniodide of Mercury have been vaunted as anti-

septics, but they cannot, owing to their solubility, be expected to act upon the diseased intestine until after their absorption and dilution by the great volume of the circulating fluid. Crispolti advocated the intravenous injection of $\frac{1}{6}$ gr. of the perchloride. Wedgwood's mercurial treatment is advocated by Ewart: it consists in the administration of $\frac{1}{50}$ gr. Perchloride with 15 mins. Tr. Ferri Perchlor. every 6 hours, and is said never to cause salivation.

Urotropine has been demonstrated to be a reliable disinfectant of the urinary tract, and though its administration reduces the number of bacilli in the urine, its routine employment in the treatment of the acute stages of the disease is futile.

Oil of Cinnamon is the least objectionable of the antiseptics tried. 2 to 5 mins. given in capsule or emulsion as recommended by C. Ross may be given every 2 hours for long periods or throughout the entire attack till the temperature falls. Whether the drug acts through increasing the natural resistance by promoting phagocytosis, as some believe, or by neutralising the toxins, it often seems to minimise the severity of the symptoms. The great barrier to its use is the irritation of the stomach which usually supervenes when the drug is pushed for any length of time; its mild hypnotic action is very beneficial in some cases where insomnia is prominent.

Antipyretic Treatment.—The plan of treatment by antipyretic drugs, like antipyrine, has been universally abandoned, owing to the depressing action of the drugs upon the heart when administered for any length of time, and also from the fact that the pyrexia returns in greater force almost immediately after their suspension.

Quinine is upon a somewhat different footing; though it often fails signally in reducing fever heat, it nevertheless exerts its specific tonic action and usually does no harm. To be of use, however, as an antipyretic agent it must be given in large doses (20 grs.) a few hours before the expected maximum, and cinchonism is very liable to add to the patient's discomfort. In the case of children the antipyretic action of the drug is much better marked; 5 grs. administered in cachet 2 hours before the evening rise will usually prevent this, and it may safely be continued in one daily dose at this hour for long periods. It is, however, a doubtful question whether such depression of temperature will cause any permanent benefit beyond preventing the undue wasting by the prolonged and continuous pyrexia. The tonic action of the drug in smaller doses will often be clearly indicated, and these may be obtained by resorting to Yeo's Chlorine mixture, though the taste and odour of this compound are strongly resented by children, and indeed by most adults.

Hyperpyrexia must never be met by the administration of any antipyretic drug. A dose capable of influencing these high temperatures would probably prove fatal. Even in heroic doses antipyrine is useless.

Hydropathy.—By the judicious use of cold or tepid water, the fever temperature may be regulated with certainty and safety, and it does not appear that anything but good results have been obtained by keeping

the pyrexia even for long periods or throughout the entire attack moderately depressed by the application of water. This is very different from antipyretic treatment carried out by drugs, in which cases several objectionable depressing factors are introduced which are avoidable in hydrotherapy when properly applied.

There is considerable difference of opinion amongst authorities regarding the limit of temperature which should be accepted as an indication for the use of hydropathic measures. Brand, whose name is associated with the external application of cold or tepid water, advocated the bath as a routine in all cases as soon as the thermometer registered 102·2° F.; Liebermeister's limit was 103°, whilst Goodall advises that the physician should not wait till the temperature rises beyond 101° or 102° if restlessness, insomnia, or delirium be present.

The methods of applying hydrotherapeutic measures are numerous, and the physician will be wise in not adhering blindly to any particular plan as a routine, but to select the method suitable to each case. Thus in the mild continuous type, especially in the case of children, a sufficient antipyretic effect may be produced and maintained by cold or tepid *sponging* of the body, the limbs and trunk being successively uncovered and well moistened by a sponge saturated with cold or tepid water. By placing a mackintosh sheet under the limb operated on, a small stream of water may be squeezed from the sponge and allowed to trickle over the surface and flow into a receptacle by the side of the bed. Sometimes the sponging may be supplemented by rubbing over the skin with a large smooth piece of ice. This plan does not necessitate any considerable moving of the patient's body, and may be kept up almost continually as he lies still in the horizontal position, provided a couple of nurses are available to carry it out day and night in severe cases. As soon as the temperature falls to near the normal the skin may be allowed to dry by evaporation if the patient be lying between blankets.

It is advisable to commence with water at about the temperature of 70° F., gradually cooling it to 50°, or if the fever is high ice may be added; on the appearance of any symptom of collapse or shivering the sponging should be suspended or water at 80° or 90° substituted for the cooler fluid.

Baths are employed at various temperatures; thus in Brand's routine a temperature of 68° F. is the standard, but as a rule no advantage is obtained from plunging a fever-stricken patient into water which feels to his burning skin to be very cold. By commencing with the water at 85° shock and discomfort are prevented, and further reduction of the heat can be gradually accomplished by adding cold water. In hyperpyrexia no time should be lost by tempering the bath to the feelings of the patient, who should be at once placed in a bath about 60°, which can be further reduced.

For routine practice the bath in average cases of severity should be given every 3 or 4 hours, and the duration of the immersion need not exceed 15 to 20 minutes to reduce the patient's temperature in the rectum to about 100°. As a rule a drop of about 2½° should suffice in all mild cases. After being lifted out of the water in which the entire body has been

immersed (save the head), whilst the patient keeps in the horizontal position he is placed on a blanket and the surface of the body lightly dried by a towel, leaving the abdominal surface to dry spontaneously. Usually it will be advisable, certainly at first, to give a small dose of Alcohol or a little strong and warm beef tea before the bathing process is commenced, and this may be repeated to advantage after he returns between the sheets, whilst any chilling of the lower extremities should be counteracted by placing a hot-water bottle at the feet.

In severe hæmorrhage and in great tympanites with signs of local peritonitis indicative of deep ulceration, resort to this method is certainly attended with a considerable degree of danger. When great cardiac depression is present the temperature of the bath at first should not be under 90°, and a full dose of Alcohol may be administered whilst in the bath, and a hypodermic of Strychnine given previously.

The great drawbacks to the Brand treatment of typhoid fever are the necessary movement of the body entailed by repeated bathing, and the difficulty of carrying it out without relays of trained nurses, especially in heavy subjects. It is only in a well-equipped fever hospital that the routine can be carried out to advantage, where a large portable bath on wheels can be brought alongside the patient's bed, and three nurses are usually required to carry out the necessary manœuvres whilst lowering the body in a sheet into the bath.

To obviate the dangers of changes of position and the consequent temporary increase of abdominal pressure innumerable forms of apparatus have been designed, but as yet none can be said to be quite satisfactory. Dr. Bull's mackintosh portable bath is the best of these.

The *continuous* bath introduced by Barr consists of a tank 6 feet by 3 feet by 1 foot, in which the patient lives for 3 or 4 weeks surrounded by water at a temperature of 90° to 98°, with a blanket wrapped round his body and a pillow sufficiently high to keep his head above water. A large opening in the bottom about the centre of the tank is provided for the rapid draining away of the water when soiled by bowel evacuation. Excellent results are stated to be obtainable from this hydropathic method, which obviates the dangers liable to follow movements of the body.

Various forms of chamber have been tried in which the abstraction of heat is effected by cold air, the patient's bed being wheeled into the chamber at intervals. By employing a tubular mattress connected with a freezing or circulating apparatus, a similar effect may be produced. These methods are all most unsatisfactory in their working. In the case of children a cooling apparatus may be extemporised by placing a large cradle over the cot, and hanging this on the inside with a number of small ice-pails, a sheet being thrown over it as a cover whilst the surface of the body is exposed to the influence of the reduced air temperature.

Leiter's Coils have been used and ice bags or iced poultices employed, but all these methods of abstracting heat are much inferior to the direct application of water.

The *Cold Pack*, though mentioned last of the hydrotherapeutic methods,

is really the best of all when the portable bath and well-equipped fever hospital with its ample nursing staff are not admissible. Even when these are available the cold pack should be substituted for the bath if the local abdominal signs suggest the probability of perforation, as it can be carried out with the minimum of change of posture. A sheet wrung out of water at 75° is made to envelop the patient's body and limbs by turning him gently over on it and loosely covering him by its fold as he lies between blankets for about half an hour till the pyrexia falls to about 100°. The effect can be prolonged by keeping the sheet moist with cold water from time to time by sprinkling. In very high temperatures and in hyperpyrexia this method may easily be changed to that of *Cold Affusion* by discarding the upper blanket and pouring a liberal supply of cold water over the sheet; this may be caught by any large receptacle under the bed, which should be raised at its head and protected by mackintosh sheeting. The cold pack in routine practice may be repeated every 3 or 4 hours as in Brand's bath treatment.

The mortality of typhoid fever by the *routine* treatment with hydropathic agents has been reduced so considerably that this method must be regarded as placed upon a most secure and unassailable basis. Statistics when available for large numbers of cases show an all-round reduction to about one-third the mortality obtainable by the ordinary expectant plan of treatment—viz., from a death-rate of about 20 to about 7 per cent.

Stimulating Treatment—Alcohol.—One of the chief dangers in the progress and termination of the disease being the tendency towards heart failure, the employment of large doses of alcohol has constituted itself a part of the routine since the time of Graves and Stokes. There cannot be a doubt that this practice has been pushed so far that gross abuse has resulted. Just at present we are threatened with the swing of the pendulum in the opposite direction, some authorities maintaining that alcohol should never be employed in the treatment of this disease. It will therefore be necessary to look fairly in the face the question of giving or withholding alcoholic stimulants in fever.

There are certain general principles which will meet with almost universal acceptance, whilst some disputed points will be considered later on. The majority of cases do not require any stimulants at any stage of their progress. The *routine* practice of administering stimulants in fevers is growing gradually less and less, if indeed it has not entirely vanished. Seldom if ever are they indicated in the early stages of the disease unless in the case of those addicted to their *habitual* or *daily* consumption. A patient who appears to have the indications for alcohol during the first week of his attack will, in all probability, be beyond the influence of remedial agents. The writer does not hesitate to give alcohol when indicated in the way to be presently mentioned, and when he gives it it is with no sparing hand, but he is decidedly opposed to it as a routine treatment.

Statistics, if impartially considered, would seem to prove that the

routine use of alcohol and the rigid exclusion of alcohol all round bring the mortality to about the same level—a result which has been explained by assuming that the drug is either useless or at least not injurious, since if it does not lower it does not raise the death-rate, but a serious fallacy underlies such a conclusion. The explanation of the uniformity of the two classes of statistics will be found on reflection to be due to the fact that the physician who employs alcohol in every case will cause the death of some patients, while he who withholds it in all cases will also raise the mortality of the disease.

It is the duty of the physician, therefore, to weigh every case upon its own merits, and only to arrive at a decision after examining the indications for and against, just in the same way as if opium or calomel or antipyrine were being discussed for administration to meet certain clear indications.

The debatable question of giving alcohol as a *food* need hardly be discussed here, though there can scarcely be a doubt that a considerable portion of it is burned or used up in the body just as other foods are. A small percentage of cases may be improved, and the patient's chances of recovery increased by giving small doses of alcohol along with the milk food where there is good reason to believe that the digestive powers are weak, and where close observation proves in the case before the physician that the addition of a teaspoonful of good whiskey or brandy actually does assist the digestion of other nourishment when given along with each dose of it or immediately afterwards.

There are various indications which are relied upon as calling for alcohol in severe cases. These are mainly symptoms of cardiac failure, and those who place their faith in alcohol in such cases do so because, amongst other actions which it possesses, they believe alcohol to be the best cardiac stimulant, though it is idle to affirm that the drug can possess any cardiac tonic powers.

An unsteady, weak and easily compressed pulse, and a corresponding condition of the heart, with the typical symptoms of the "typhoid" state, are regarded as clear evidences of the necessity for alcohol. The writer has watched by the bedside the effects of alcohol under these circumstances, and he has satisfied himself that by its use life may sometimes be saved, which, without it, would be lost. The effect of the drug requires the closest watching, and herein lies the secret of success, because it may sometimes be found to do harm in the case where the indications for its use may appear clear, and it is the duty of the physician to give the case his anxious attention for the first 8 or 12 hours after beginning the alcoholic treatment.

This has been forcibly put by Brunton: "The various rules which have been given for the administration of alcohol in fevers may be condensed into one. If the alcohol tends to bring the patient nearer to his normal condition, it is doing good; if it takes him farther away from his healthy condition, it is doing harm.

"The points which are usually specially attended to are the condition

of the tongue, pulse, respiration, skin and nervous system. If it is found that the alcohol (1) renders the dry tongue moist, (2) slows and strengthens the pulse when it is too quick, or quickens it when it has become abnormally slow, (3) slows the hurried respiration, (4) renders the skin cooler or moister when too hot and dry, and (5) lessens delirium and brings on sleep—then its action is beneficial. If it has an opposite effect it does harm. Useful indications regarding the advantage of alcohol and the dose may be obtained by the practitioner remaining beside the patient counting the pulse and watching the tongue, respiration, skin and general condition of the patient for a quarter of an hour after the dose has been given. Particular care should be taken in the administration of alcohol to patients in the small hours of the morning. It is about this time that attendants are most apt to become sleepy and therefore careless, and just at this time also the external temperature is lowest, the fire is apt to get low, and the vital powers of the patient are most likely to sink."

The question of the dose and form in which the alcoholic stimulant is to be given is an important one. First, as regards the variety of alcohol, the writer believes that brandy or whiskey should always be preferred to wine, and the selection of brandy as against whiskey, or *vice versa*, should be made after considering which of these agents can be procured in the purest form. As a rule, in this country, a pure matured whiskey is more easily obtainable than a pure brandy, hence the writer always employs whiskey, and he is satisfied that the product of the patent-still should not be employed. The so-called "silent" spirit and the numerous blends into which it enters do not produce the cardiac stimulating effects of a matured malt whiskey made by the old pot-still process. The ethers produced by the splitting up of the traces of fusel oil left in the latter process possess valuable stimulating properties, and, moreover, they appear to aid in the entire combustion of the spirit in the blood.

The whiskey can be given to the greatest advantage along with the milk, when the patient does not object to this plan, and in proportioning the dose the symptoms and their severity and the ascertained effects of the agent must be taken into account along with the previous history of the patient. 2 to 3 oz. are often prescribed as the daily dose; this can be of no use in severe cases, and in mild types of the disease the patient will probably do better without such a dose. The only value that can come of such a small quantity is that already mentioned—*i.e.*, to aid in the digestion of the liquid nourishment, or to act as a food by being burned up in the organism like carbohydrates.

The practice of the writer is only to give alcohol when clearly and urgently needed. Hence the dose which he generally employs will appear larger than that usually recommended. Less than 5 oz. of old whiskey spread evenly over the 24 hours will be of little use to an adult in the condition indicating the exhibition of alcohol. In bad examples of the typhoid state, with a very fluttering pulse, dry tongue, and the mouth

covered with sordes, the writer has given twice and sometimes three times this quantity with the most satisfactory results.

The views of Wood are similar to those already stated. He says the "guide to the amount given should be the effects produced; so long as it lowers the temperature and pulse-rate, moistens the dry tongue and skin, and quiets the nervous disturbance, it does good. If, however, the tongue grows drier, the pulse puts on an angry, bounding character, and the patient becomes restless and uneasy, stimulation is being pushed too far, and the amount exhibited should be lessened. Whenever the odour of liquor appears upon the breath the patient is almost certainly taking too much."

Very large doses of alcohol have a lowering effect upon the temperature, but it is out of the question to think of using it merely for this purpose in typhoid fever. Where the cold or tepid water bath is being used, a small amount of alcohol is considered necessary, and there is no reason why alcohol, quinine, and the tepid bath may not be all indicated in the same case at the same time.

Often the nature of the complications present will determine the best form for the administration of alcohol. Thus, where stimulants are indicated and the patient is vomiting, champagne may be selected instead of either brandy or whiskey, and if diarrhœa is a marked feature the effects of a good old port wine may be tried, but these wines cannot be given mixed with the food or milk, hence the champagne should be diluted with an effervescing water and the port with plain water.

Elsewhere the writer has summed up the question of the administration of alcoholic stimulants in fevers: "Most authorities would probably agree that alcohol is not necessary at all in the *majority* of cases; that often unpromising cases pull through without it; that in severe cases it cannot be safely withheld from those habituated to it; that occasionally by the use of alcohol life may be saved which would otherwise be lost; and that it is rarely needed in the very large doses prescribed by some—8 to 10 oz. may be regarded as representing a liberal daily allowance of whiskey."

COMPLICATIONS.

The treatment of the various complications occurring during an attack of typhoid fever is to be conducted upon the generally received principles of therapeutics, modified, however, by the presence of the primary zymotic condition. For convenience these may be briefly referred to in their alphabetical order regardless of their frequency or importance.

Bedsores.—Upon p. 76 the treatment of this condition will be found in detail. Bedsores should never be seen in typhoid fever patients where skilful and conscientious nursing has been carried out; on rare occasions their occurrence may be pardonable where a perforation prohibits the slightest change of posture of the patient's body. Frequent changes of soft linen or cotton draw sheets, which should never be permitted to crease, are of vital necessity. The use of mackintosh sheeting is answerable for much mischief; when such is employed it should not be placed

in contact with the patient's skin. Boggs has pointed out that the frequent baths and packs render the skin more liable to abrasions, and he urges the necessity of adding Alum to the water in every case.

Constipation.—This must be avoided for two reasons—the hard fæces may seriously irritate the ulcers when these are lower down than usual in the colon, but a very much more serious objection to constipation is the difficulty which the patient experiences in the bearing-down efforts at defecation. During the increased abdominal pressure the floor of a deep ulcer may give way and cause perforation; this is more likely to occur on the bed-pan than on the night-chair. The cast-iron rule of some physicians that under no circumstances whatever is the patient to be allowed out of bed to use the night-chair is certainly the cause of some deaths from perforation, especially when constipation is present.

The only safe drug is Castor Oil, and a small dose every day or every second day should be given in obstinate cases. The writer's dose is 1 fluid dr. given in two soft gelatin capsules. Pure Paraffin in ½ to 1 oz. doses often acts very satisfactorily. A large soap and water enema is preferred by some, whilst others employ the routine of a Glycerin suppository. Any or all of these methods may be employed in a given case and at the same time. Thus, should the oil fail to act, a suppository should be inserted, and if this does not start the bowel the nurse should be ready to administer a soapy injection whilst the patient is placed on the bed-pan. Goodall administers the soap by the mouth, since his favourite mixture is an emulsion of olive oil (10 oz.) with liquor potassæ (1 oz.), which is really a strong solution of soft soap, but the writer has no experience of how the stomach tolerates this compound, which is recommended in 1-oz. doses 3 or 4 times a day to keep the motions soft.

The plan of administering calomel and saline purgatives for the constipation sometimes occurring during the third week of the fever is a dangerous practice.

Cystitis and Retention of Urine.—The former, if due to the presence of the typhoid bacillus, should be met by 10-gr. doses of Urotropine thrice daily. When the result of other infection, it is always caused by the use of an uncleansed catheter which has been passed to relieve a temporary retention, in which case the urotropine should also be administered. Washing out of the bladder is never necessary when rigid sterilisation of the instrument has been employed.

A note of warning is here necessary to the young practitioner as regards the diagnosis of retention in typhoid, and the writer regrets to say that he has witnessed the overlooking of this grave condition in more than one instance by experienced practitioners, with disastrous result.

In no other affection is the dribbling overflow of a distended bladder so liable to be mistaken for incontinence of urine, as the tympanites often prevents the palpation of the distended organ even when this rises as high as the umbilicus. If the attendant is in doubt he should invariably resort to the catheter, and he will never regret using the instrument.

Delirium.—This is often in proportion to the intensity of the fever,

but it may be an indication of a grave general toxæmia when the pyrexia is moderate. The best routine is cold sponging, cold packs or tepid baths. In the fierce delirium which sometimes characterises the onset of fulminating cases the ice-cap to the shaved scalp is clearly indicated, and this appliance may be employed for the relief of delirium occurring in the third week. Cold affusion is a powerful agent, and may be resorted to when the fever is high. A sinapism to the nucha and large doses of Bromides may be advantageously employed. Alcohol must be used with great caution in such cases. Any possible source of the delirium should be sought for; thus it may be the result of a distended bladder or of pneumonia.

Diarrhœa.—This troublesome symptom should only give the physician much anxiety when the motions become very frequent, foul and watery. When but 3 or 4 fluid motions are passed during the 24 hours the diarrhœa may be let alone. The evacuations should, however, always be inspected carefully with the view of detecting the undigested casein of the milk; should this be present it will be visible in the form of small curds, and is a clear indication for the peptonisation of the milk and a reduction in its amount.

Soups, beef tea and farinaceous foods should be stopped; the only starchy food which is admissible is a good brand of Arrowroot, made thin with peptonised milk or whey. Pure Gelatin may be advantageously administered as a jelly in ½-oz. doses every hour.

The old practice of drenching the patient with vegetable astringents like tannin, catechu, kino and rhatany, and pouring in solutions of lead, copper sulphate, alum, etc., upset gastric digestion, and often aggravate the condition. Calcium Salts are less objectionable, and mild diarrhœa may be controlled by a free dilution of the peptonised milk by Lime Water. Sometimes Chalk Mixture with Bismuth Carbonate is an efficient astringent.

As the main element in the production of the diarrhœa is exalted peristaltic action, Morphia or Opium is the most reliable agent when given in small and frequently repeated doses, but it is a mistake to paralyse and lock up the bowel, which like a stagnant cesspool may remain full of poisonous toxic products, the absorption of which increases the dangerous toxæmia. The ideal treatment should be to restrict the over-active peristalsis by small doses of Opium, and to reduce the source of the primary irritation by combining with the narcotic an intestinal antiseptic as Calomel in ¼-gr. doses, Creosote, Carbolic Acid (2 mins.), Salicylate of Bismuth (20 grs.), Beta-naphthol (10 grs.); or the Euchlorine mixture may be tried. In obstinate cases the writer has found the following combination very efficacious:

℞. *Tannalbin gr.* x.
Morphiæ Hydrochlor. gr. ¼.
Bismuthi Carb. gr. xx. *Misce.*

Fiat pulvis. Mitte xii. *Signa.*—*"One powder to be given three or four times a day wrapped up in moistened wafer paper."*

Where there is much tenesmus, the opium may be given in the form of Laudanum (30 mins.) by the bowel with 3 or 4 oz. thin starch.

When the above measures fail irrigation of the colon may be tried; a large enema of very hot water (108·5°) is employed by Geissler. Teissler recommends cold water, and Shuell passes up a soft rubber tube to the sigmoid, and irrigates the entire colon from a reservoir containing sterilised warm water. These measures are, however, attended with some degree of danger during the ulceration of the colon in the third week of the disease.

Hæmorrhage.—Bleeding from the bowel may prove fatal, and should always demand prompt attention, especially as a small external hæmorrhage may be accompanied or followed by a large outpour of blood into the small intestine or upper part of the colon. The most absolute rest to the body is imperative, and where there is any difficulty in the use of the bed-pan this should be discarded and the patient permitted to pass his motions into oakum or cotton-wool packed loosely about the anus. Cold should be applied to the abdomen by covering the skin with a double ply of lint containing small pieces of ice between its folds. In severe cases a hypodermic of Morphia ($\frac{1}{4}$ to $\frac{1}{3}$ gr.) should be given without delay, in order to paralyse peristalsis. Adrenalin is not to be relied upon, as it may be absorbed by the stomach, and by increasing the blood-pressure may cause increase of the bleeding.

Chloride or Lactate of Calcium is the only hæmostatic of any value; it not only increases rapidly the coagulability of the blood, thereby favouring clotting at the site of the hæmorrhage, and sealing up the mouth of the eroded bloodvessel, but it acts as a tonic to the heart without markedly increasing blood-pressure. The chloride should be given in 20-gr. doses every two hours in solution in chloroform water. 1 dr. may be injected into the rectum, and in desperate cases life may be saved by dissolving the drug in 40 oz. Normal Saline solution, and injecting this quantity hypodermically into the loose cellular tissue in different parts of the body.

Vegetable and mineral astringents of all kinds are to be condemned; they are not only useless, but positively injurious, as they upset digestion and may cause vomiting. Oil of Turpentine is still administered by many physicians, but it never reaches the bleeding-point except in such a state of dilution as to be useless as a hæmostatic. Ergotin and its derivatives—Ernutin, Cornutine, Ergotoxine, Sclerotinic Acid, etc.—are advocated, but the rise of blood-pressure which follows the administration of these substances, either by the mouth or hypodermically, may more than counterbalance any hæmostatic action which they exercise on the eroded vascular walls. For the same reason alcohol should be suspended or given only in such amount as will help to keep the patient alive till the dangerous period is tided over. Strychnine hypodermically may be substituted for it if the heart has been flagging.

Gelatin possesses undeniable hæmostatic powers when injected hypodermically; 30 grs. dissolved in 0·6 normal saline solution may be injected

every hour in severe hæmorrhage, provided the gelatin is thoroughly sterilised. Tubes of sterilised gelatin solution are obtainable for addition to boiled water or normal saline, and the solution may be injected up to the strength of 2 to 10 per cent. In the former case the contents of the tube is dissolved in 5 oz. water, and in the latter 1 oz. water is employed.

Gelatin is, however, of considerable value when administered by the mouth and in the form of a cold, slightly sweetened jelly; it should be given every 5 to 10 minutes in tablespoonful doses in every case as soon as any blood appears in the motions.

Headache.—When this is moderate in severity it always responds to the cold pack, sponging or bathing. The severe head pain which ushers in the grave cerebral type of typhoid fever at the onset must be met by the agents mentioned under Delirium. Cold affusion, Leiter's Tubes or the ice-cap will be indicated, with smart counter-irritation of the nape of the neck. Leeching of the temples may be necessary. Antipyrine (10 grs.) combined with 5 grs. Citrate of Caffeine may be tried every 4 to 6 hours. Quinine always aggravates the condition. If in the very early stage, 10 grs. Calomel may be administered, and sometimes relief may be obtained at this stage of the disease by plunging the legs into a hot mustard bath.

Heart Failure.—The prolonged continuous fever tends to cause serious myocardial degeneration, but even before there is time for this the action of the toxins on the heart may become marked. Digitalis, so valuable in other forms of cardiac weakness, must be regarded as powerless in the condition under consideration, and the same remark applies to Strophanthus. Whether it is owing to the high temperature or to the poisonous action of the toxins, the entire group of cardiac tonics has been tried in vain, some of them having been administered in enormous doses without effect.

The only drug to be relied upon is Strychnine, and this appears to have practically no action on the cardiac muscle or nerve apparatus, unless when given hypodermically in doses of at least $\frac{1}{20}$ to $\frac{1}{10}$ gr.

Alcohol acts as a cardiac stimulant, and, as already pointed out on a previous page, its administration in continued fever is maintained to be the best method of preventing cardiac failure and of aiding the weakened ventricle to do its work once it has been crippled in the general toxæmia.

There cannot be a doubt that the lessened mortality following hydrotherapeutic measures is mainly due to the cardiac tonic action of cold-water treatment by packs, baths or sponging. It is much more rational to attempt to prevent the serious poisoning of the cardiac muscle by an early resort to the use of agents which reduce the temperature, promote elimination of toxic products, and strengthen the ventricular contractions, than to wait till the toxæmia has already occurred and commence pouring in alcoholic stimulants.

Hyperpyrexia.—This has already been dealt with in detailing the bath treatment. The only way to save life is to abandon all hope of reducing the temperature by means of drugs, and to resort immediately to the cold

bath, cold pack, or cold affusion. The speediest, most convenient, and most reliable method of dealing with very high temperature is by a combination of the pack and affusion, which can be carried out in a few minutes without disturbing the patient's horizontal position. By placing him in a sheet wrung out of tepid water on a straw palliasse or wire mattress, tepid gradually changed to cold water should be liberally poured over the sheet and allowed to flow into a receptacle by the foot of the bed till the rectal temperature falls to about 100°.

Insomnia.—The treatment of the sleeplessness occurring in typhoid fever may be relieved by any of the hypnotics mentioned in the article on Insomnia, but as this condition is due to the poisoned blood circulating through the brain, which influences the thermic and higher centres, the free resort to cold sponging or the pack is more rational than the administration of narcotics. Often the patient falls asleep in the pack or soon after coming out of it.

30 mins. Liquor Morphiæ with 30 or 40 grs. Sodium Bromide may be given at bed-time in severe cases. 20 grs. Trional in mild degrees of insomnia answer all requirements if the patient is not kept awake by any form of pain or acute discomfort. Often the real cause of the insomnia is a purely mental one, the patient dreading the ordeal of lying awake all night, in which case a minute dose of any harmless hypnotic may act powerfully by suggestion after cold sponging has been carried out.

Meteorism, or Tympanites.—This may be relieved, sometimes effectually, by a large warm water enema containing Tincture of Asafœtida or Oil of Turpentine, when the colon is the seat of the distension. A safer practice is to wash out the bowel with plain water, and leave in a small quantity of water containing 1 dr. tincture of asafœtida. A large light warm poultice over the abdomen, Leiter's Tubes or an iced poultice may be tried.

When the distension is mainly situated in the small intestines the rational treatment would be to administer an intestinal antiseptic, and Oil of Turpentine in 20-min. capsules is a favourite. A capsule containing 5 mins. Oil of Cinnamon or of Cloves is more reliable and avoids the danger of irritation of the neck of the bladder, which follows turpentine sometimes. Freshly dried Charcoal in very fine powder may be given in drachm doses wrapped up in moistened wafer paper.

Peritonitis.—Signs of local inflammation of the peritoneum may be taken as a warning that the ulcers are deep, and that perforation is liable to occur, hence the necessity of the greatest caution as regards the amount and nature of the food, and the utmost circumspection in any attempt to change the position of the patient's body; the bath must in such cases be abandoned for the cold pack.

Ice to the abdomen is clearly indicated, but often the local pain and tenderness are best relieved by warm applications. As a rule poultices are not well borne owing to their weight; a layer of Spongiopiline wrung out of hot water or a thin stratum of the Cataplasma Kaolini or Antiphlogistine may be applied and kept in position by a light abdominal binder.

General peritonitis is usually the result of perforation, though it may arise from rupture of the spleen, a mesenteric gland abscess, suppurating gall-bladder or appendix, in which cases the treatment suitable for perforation is demanded.

Perforation.—This is the gravest of all possible complications, and accounts for about one-fourth of the total mortality of the disease. As soon as collapse, rapidity of pulse, and suddenly appearing local or general abdominal pain occur, with rigidity of the abdominal muscles on the right side and immobility or paralysis of the muscles on both sides of the abdomen during breathing, the diagnosis may be accepted as established. This is still further verified at a later stage by the usual constitutional symptoms of general peritonitis, as thready pulse, pinched features, absence of liver dulness, etc., but the consensus of opinion is in favour of immediate operation without waiting for these latter signs. There cannot be a question about the urgent necessity of operating at the earliest possible moment. Drugging with opium or morphia to relieve pain once the diagnosis has become established is a most reprehensible practice, as the narcotic masks the symptoms and signs and misleads the surgeon. Only when the collapse is great at the onset, where a large perforation has occurred, is the physician justified in postponing operation till a rally occurs. Even when there may be a reasonable doubt about the accuracy of the diagnosis, most authorities would shrink from the responsibility of vetoing a laparotomy.

The best procedure is to make an incision in the abdominal wall in the neighbourhood of the right semilunar line under a general anæsthetic, or if this is not admissible under local anæsthesia, and, after exposure of the cæcum, to look out for the perforation by examining the ileum, commencing at the appendix, after which the upper part of the colon should be explored. The perforation being discovered and its margins cleansed by gently removing purulent lymph and fæcal matter, it should be invaginated by Lembert sutures. Where there is great injury of the bowel and the condition of the patient justifies a prolonged operation, a resection of the damaged gut may be performed, but as a rule, owing to the serious primary condition, it will be advisable in such case to fasten the loop of the damaged bowel in the abdominal wound, and establish a temporary artificial anus. Any suspicious portion of the intestine which appears to be about to perforate may at the same time be invaginated with sutures. The peritoneum should as rapidly as possible be cleansed with gentle friction by sterile gauze wipes and drainage provided. Some surgeons abstain from any attempt at suturing the perforation, and treat each case by performing an *enterostomy*, which at a later date may be successfully dealt with.

The mortality of the operation has been considerably reduced by resorting to the Fowler-Murphy after-treatment. The patient being placed in bed and supported by pillows in the upright sitting posture, warm normal saline solution is permitted to flow guttatim into the rectum from a reservoir through a rubber catheter, by which means up to 1 gallon

of the solution may be administered during the 24 hours for several days.

Pneumonia.—This complication must be dealt with on generally accepted therapeutic principles. Its presence in typhoid fever should be accepted as a clear indication for pushing hydropathic measures combined with the free administration of Alcohol, and at a later stage Strychnine hypodermically should be administered every 8 hours in doses of at least $\frac{1}{20}$ gr.

Spinal Complications.—"*Typhoid spine*" is the name given to a chronic complication which is rather of the nature of a sequela. The pain in the spine and back muscles may remain severe for many months, and the rigidity and tenderness of the vertebral column may be associated with cord symptoms. The only treatment for this tedious condition is prolonged rest in bed followed at a later stage by gentle massage and electricity. The same remarks apply to those forms of *neuritis*, both multiple and solitary, which often manifest themselves in the convalescing stage of the disease.

Thrombosis.—The plugging of the veins of the lower extremity caused by phlebitis is a serious complication, unless when treated by prolonged rest, owing to the danger of the detachment of the clot, which may cause sudden death in the convalescent period. Friction should never be employed, but a thin layer of absorbent wool being placed round the limb, this may be covered in by thin mackintosh sheeting, and a many-tailed bandage applied with moderate pressure from the toes to the groin. By raising the foot of the bed for 3 to 6 inches the circulation in the limb is materially assisted. When the pain is severe over the inflamed vein, any local anodyne application as the Liniment of Belladonna may be painted on the skin or an ice-poultice may be applied.

In order to diminish the tendency towards clotting Lemon Juice may be administered to decalcify the blood, or the Citrate of Potash may be prescribed as an effervescing mixture.

Vomiting.—Seldom is this troublesome or prominent unless food has been too earnestly pressed beyond the digestive capacity of the patient, and it may be well to remember that some individuals can never take milk in health. By diluting the milk after peptonisation with Potash or Soda Water, the vomiting is often arrested. The writer has found the artificially prepared Koumiss to act most satisfactorily when milk and even soups could not be tolerated.

Champagne is a favourite remedy, but it frequently sets up fermentative changes in the stomach, which aggravate matters. A tablespoonful of old Brandy in a large wineglassful of iced Apollinaris Water is better. Small pieces of ice may be swallowed at intervals, a sinapism to the pit of the stomach and a minute perle of Morphia ($\frac{1}{16}$ gr.) may be given every 4 to 6 hours. When the vomiting is continuous, food by the mouth must be stopped for 12 hours, during which rectal feeding should be employed. On the return to mouth alimentation the best plan is to commence with

small doses of cold strained whey made by adding one wineglassful of Sherry to a pint of boiling milk.

Relapses of typhoid fever are to be treated like the primary attack, and if the patient has been permitted to indulge in solid food, to leave his bed or to relax any of the precautions already insisted upon, his liberty must be immediately restricted, and he should commence the treatment *de novo*.

To prevent relapses, the patient should never be permitted to sit up or leave his bed for at least 14 days after the morning and evening temperatures have returned to the normal.

The following quotation from the late Dr. Bristowe is still worth perusal: "Let me state briefly the treatment to which I should like to be subjected if ever, unfortunately, I should become affected with enteric fever. I should like to be placed in a cool, well-ventilated room and covered lightly with bed-clothes, and to have a skilful and attentive nurse to look after me; to be fed solely with cold milk, unless vomiting should demand the addition to the milk of medicine calculated to allay vomiting. If diarrhœa became troublesome, or if ever there was much pain or tenderness in the cæcal rings and in the bowels, I should like to be treated, not with laxatives, but with Opium, given either by the mouth or by the rectum. If constipation were present, I should, excepting in the first week, like to have enemata only employed for its relief. In the event of intestinal hæmorrhage coming on, I should like to have ice to suck or ice-cold fluids to drink, cold compresses to the belly, and cold injections into the bowels; and, though I am sceptical as to their efficacy, I should still choose to have astringents, and more especially Lead, given to me at short intervals. If perforation should take place, let me have large and repeated doses of Opium. Stimulants I should prefer to do without early in the disease; later, however, and during convalescence, I should like to have them in moderation. As to the cold baths, I would rather not have them, but I would nevertheless leave it to my physician to exercise his discretion in the matter. I would leave it also for him to decide, according to circumstances, whether alcohol should be administered to me in large quantities. I would prefer not to be treated at a temperance hospital."

The quarantine period in typhoid fever is usually stated as three weeks. Owing to the danger of dissemination of the disease by bacilli passed in the urine long after convalescence, the greatest care should be exercised as regards infection from this source as well as from the fæces.

PARATYPHOID FEVER.

Prophylactic Vaccine injections are as successful in both the A and B types of paratyphoid as in typhoid fever, but the specific organism of A or B, or a mixture of both, should be used. Many authorities, especially during the late war, employed a Mixed Vaccine of both types of the paratyphoid bacillus along with that of the *Bacillus typhosus*. The treatment of the established disease should be conducted upon the same lines as indicated in typhoid fever.

TYPHUS FEVER.

Prophylaxis.—The prevention of typhus, especially in time of war, siege, famine, and overcrowding from any cause, particularly when accompanied by destitution, is of vital importance. Except in the case of smallpox, there is no other disease so actively contagious, hence the most effective prophylactic agent is free and abundant supplies of fresh air maintained night and day by thorough ventilation. Rigid isolation of all patients suffering from the affection should be carried out if possible before the appearance of the eruption. Convalescent patients should not be permitted to mix with the healthy for at least 3 weeks, and this may be accepted as the quarantine period. As the disease is carried by articles of clothing, bedding, etc., these should be thoroughly disinfected or burned, and the sick-room sterilised by fumigation.

Experience in the late war has proved that the disease can be transmitted by lice, and hence the great importance of personal cleanliness and the destruction of these parasites, but the writer is morally certain, from experience in more than one epidemic, that typhus may spread from the diseased to the healthy where these parasites are entirely absent, as seen sometimes in hospital cases where there was no possibility of the presence of lice, fleas or bugs. Garlic is stated to have prophylactic powers.

Vaccine Prophylaxis.—Though the identity of the causal organism has not yet been demonstrated beyond a doubt, in the Balkan outbreaks during the late war a vaccine prepared from the suspected bacillus—*B. typhi exanthematicis*—was employed, apparently with very satisfactory results.

The selection of the sick-room is a matter of considerable importance; the details mentioned on p. 987 should be attended to, but a freer supply of air is necessary than in the treatment of typhoid patients. The room should be cut off from the remaining parts of the house, and it is well that it should be in an upper storey with no sleeping-room above it. 3,000 cubic feet of air should be available. This will be obtainable in a room 15 feet square, with a ceiling of 13 feet, for it must be remembered that at least two pairs of lungs will be continually drawing upon this air space, since the patient must never be left alone by his nurse for a moment, and when the delirium is active two attendants will be requisite. When an air space is thus provided of 1,000 to 1,500 cubic feet for each individual, the writer has rarely seen the disease to spread, though he has had considerable experience in more than one small epidemic. The patient should be sent to bed at the earliest moment.

The administration of food should be carried out as in the treatment of typhoid fever; though there are not the same urgent necessities for a purely liquid nourishment, owing to the absence of bowel ulceration, nevertheless the great advantages of a liquid dietary are so well recognised that every detail applying to typhoid fever in this respect holds here equally well. More beef tea and chicken or other soup can be given, as there is not the same danger of exciting diarrhœa, and it is a good plan to give milk and beef tea alternately in most cases where the patient takes to this method.

The indications for Alcohol are the same as in typhoid fever, but

stimulants as a rule should not be given during the first week, unless when the patient has been daily accustomed to the use of alcohol in some form or other. Speaking generally, the writer would say that, in his experience, there is more need of alcohol and more good to be expected from it in typhus than in typhoid fever. All old patients require it, but children very seldom do. The dose may reach 15 or even 20 oz. whiskey in the twenty-four hours. The keynote to the use of alcohol, antipyretics, and baths lies in this one consideration—that the siege, though a severe one, will be almost certain to last only fourteen days, and the entire effort and the one thought of the physician should be to fight the disease, not with the view of exterminating it, but to try by a purely expectant method to keep the patient alive till the expiration of that time. In some cases within sight of the goal, life may be sustained upon stimulants when all else fails, but it must ever be remembered that life can be sustained upon stimulants for a very short time only; alcohol as a *routine* agent must not be recommended in every case, and when employed its action will require close watching.

Chemical antipyretics have been proved to be of no real service, and the value of the cold or tepid bath is not yet quite established in the same way as in typhoid as a routine element in the treatment. The use of the bath is beyond doubt of the greatest value when the temperature is high; but the writer thinks that its routine employment should not be commenced till the temperature reaches at least 103°. Quinine may be used at the same time in some cases with advantage. Cold sponging of the body and limbs should be made a matter of routine in all cases. The writer can speak of its comforts and its benefits from his own personal experience.

If some form of drugging must be carried out, the least objectionable routine would be the administration of 15 mins. Dilute Hydrochloric Acid well diluted with a large volume of water.

Serum Therapy.—This has been tried with apparent success by Nicolle and Blaizot, who injected 10-20 c.c. of the serum of horses immunised by injections of the spleen of experimentally infected guinea-pigs.

Delirium, headache, and *sleeplessness* may be met by Ice to the head and counter-irritation to the nape of the neck. Active delirium calls for most alert nursing; the typhus patient is often treacherous, and should never be left unwatched; owing to his delusions and hallucinations he will often attempt to assault his attendants or jump through a window. Some authorities blister the scalp in such cases. Musk (10-gr. doses) with Oil of Cajuput (5 mins.) the writer has used with advantage when the nervous symptoms and prostration have been alarming. As an hypnotic, Chloral was much used in conjunction with large doses of Bromides; but it should never be given on account of the weakened heart which is an element of typhus. Opium cannot be borne when the headache and delirium are marked, unless when given, as advised by Graves, along with moderate doses of Tartar Emetic; but in the early stage of the disease a 30-min. dose of Liquor Morphia is safe and more certain than any of the numerous new hypnotic drugs. Often in the insomnia of typhus the speediest hypnotic will be the cold pack.

As in typhoid fever, *coma* must be promptly met by cold affusion if the temperature is high, or by rectal injections of strong coffee, or by coffee by the mouth if the stupor is not complete. In *deep stupor* Murchison laid stress upon the necessity of counter-irritation over the loins, either by cupping-glasses or by sinapisms covered by mackintosh, and he blistered the scalp by strong Ammonia in some cases. The writer would recommend the warm pack under such circumstances, and the general treatment for acute uræmia mentioned upon p. 91, if albumin is found in the urine and the temperature be only moderately elevated.

Hyperpyrexia should be promptly met by the cold pack combined with free affusion of cold water by pouring it over the enveloping sheet used in the pack.

On account of the blurred mental condition of the patient his bladder must be carefully watched, and the soft rubber catheter passed as often as needed. Food must be, for the same reason, regularly forced upon him, and his position changed from time to time as he lies in bed to avoid hypostatic congestion.

Heart Failure cannot be anticipated by digitalis, the only reliable drug being Strychnine given in doses of $\frac{1}{30}$ gr. hypodermically.

Pneumonia must be met by free stimulation, counter-irritation, and the internal administration of Ammonia in full doses. If the "typhoid state" be present ammonia should not be given; then full doses of Turpentine, with a little Ether and Cajuput, are admissible. The Glycerin of Borax should be applied to the tongue and mouth frequently, and bits of ice and small but frequent draughts of iced water may be given all through the disease. The patient often fails to ask for water, but the nurse should see that he gets it as regularly as his nourishment and stimulants. Free elimination is of vital moment, and water is too often withheld.

Rapid convalescence begins as soon as the crisis has been safely passed, but owing to the change in the cardiac muscle he must be carefully prevented from suddenly assuming the erect posture or getting out of bed to the night-chair. Stimulants should be lessened after the first 24 hours of apyrexia, and in three or four days almost stopped. By that time the appetite has improved, and semi-solids, as farinaceous foods, fish, chicken, oysters, etc., may be given inside a week from the fall in the fever heat. Sometimes the appetite becomes ravenous, and due care should be exercised in the amount of food permitted. The following tonic is useful during convalescence:

℞ *Quininæ Sulph.* ℥ss.
Acid. Nit.-Hyd. Dil. ℥iv.
Tr. Calumbæ
Tr. Quassiæ *ana* ℥v.
Inf. Aurantii *ad* ℥viij. *Misce.*

Fiat mistura. Capiat cochleare magnum ex cyatho vinario aquæ ante cibos ter in die.

ULCER.

The treatment of ulceration of the Anus is dealt with in the article on Anal Fissure on p. 46.

Gastric Ulcer is dealt with under its own heading on p. 318.

The treatment of Lupoid and Syphilitic ulcerations will be found detailed in the articles on Lupus and Syphilis, and Rodent Ulcer under its own title.

The treatment of Perforating Ulcer of the Foot will be found on p. 677, and that of Ulcers of the Mouth and Tongue under Stomatitis and Tongue Diseases. The form of Ulceration known as Bedsore will be found detailed under its own name.

The present article deals for the most part with the various phases of chronic ulceration which commonly appear on the leg, generally about its lower third. Owing to the frequency with which syphilis enters into the causation of these ulcers, it is advisable to submit the patient's blood to the Wassermann test before commencing treatment. They have been classified so minutely in former times under a variety of confusing and often misleading names that any description of the treatment of each as a separate entity is fraught with considerable difficulty.

This difficulty will, however, disappear if we consider the pathology of the affection and regard the common leg ulcer as usually due to some imperfection in the venous circulation of the blood in the lower part of the limb, which has led to molecular death of the superficial structures. The character taken on by the open sore will vary with the local conditions present, as friction, microbic infection, excessive muscular action, etc., which may convert the simple ulcer into the so-called *irritable* or *inflamed ulcer*, or owing to the presence of constitutional dyscrasia into the *weak*, *sloughing* and *indolent* conditions which have given their names to sores in this region.

When the ulcer has long been neglected, exposed to infective organisms, and the healing process retarded for want of rest, its margins become thickened, and in this condition it has been designated the *callous ulcer*. When the complication of visibly enlarged veins or an eczematous condition is present, the sore is styled a *varicose* or *eczematous ulcer*.

Each name may be therefore taken to represent some condition grafted upon the *simple healing sore*, and not to indicate any real difference in the nature of the ulceration. Theoretically, a sore may pass through such vicissitudes that at a given stage of its existence it may be either inflamed, irritable, sloughing, phagedænic, eczematous, weak, indolent, callous, etc., or all these in turn. The treatment of the primary and most frequently met with form will be first considered.

The Simple Healing Sore or Ulcer.—If the underlying cause of the molecular death of the superficial tissues be removed, the natural tendency of the simple sore to spontaneous healing will manifest itself speedily. Absolute rest to the part with elevation of the limb so as to aid the local circulation will be quite sufficient to insure healing as the venous stasis disappears, and gives place to a freer supply of arterial nourishment.

The patient must take to bed for this rest cure, and the limb should be elevated on a pillow, or blocks may be placed under the foot of the bed. The granulating surface is to be dressed by covering it over with a solution or ointment containing any weak, unirritating antiseptic substance to prevent infection by microbic organisms. When a watery solution is employed, it is usually applied on lint and covered over with oiled silk, the lint being changed at least twice a day, and the granulations cleansed by a gentle stream of sterilised normal serum, or of the antiseptic solution used for saturating the lint, before the dressing is reapplied.

Some surgeons after irrigating the surface apply a piece of perforated oiled silk protective directly to the granulations; on the top of this a double ply of lint saturated with the antiseptic solution is laid on, and the whole covered over with a thick pad of gauze tissue under a bandage, in order to absorb any secretion which oozes from the granulating surface. If an ointment or fatty base be employed, it is not as a rule desirable to cover it in with any form of impervious tissue, but sometimes when the unaffected skin is tender it may be smeared with Lanoline or Vaseline all round the ulcer which is being treated by the aqueous antiseptic solution under oiled silk.

Of local applications the formulæ are without end; the following are frequently employed, the first four of which meet every ordinary requirement: Carbolic Lotion (1 in 40), Spirit Lotion (1 in 4), Saturated Boric solution, Chlorate of Potassium (4 grs. to 1 oz.), Chloride of Zinc (2 grs. to 1 oz.), Sulphate of Zinc (2 grs.), of Copper (1 gr.), Nitrate of Silver (5 grs. per oz.), Black or Yellow lotion, Perchloride of Mercury (¼ gr. per oz.), Liquor Plumbi Dil. and Chloral Hydrate (3 grs. per oz.).

Of ointments the official preparations, save those of Zinc Oxide and Zinc Oleate, are all too concentrated for continuous application to the simple sore. Those of Creosote, Carbolic and Boric Acids, Resin and Calomel should be diluted with at least 3 times their weight of Vaseline. Iodoform, Lead Carbonate, and Hamamelis ointments may be used diluted with equal parts of Vaseline. When an unguent is selected for use, which should only be the case if aqueous solutions are not comfortably borne, the granulating surface will require cleansing by gently swabbing it with soft gauze before renewing the lint, on which the ointment should be evenly spread.

The healing of the simple sore may often be accelerated by employing a thin layer of sheet lead (such as is used for lining tea chests) instead of oiled silk.

Under the above method of rest treatment new skin is formed and complete cicatrisation effected in a few weeks, when the sore is small and healthy looking. Large ulcers with great breaches of surface should be dealt with by skin-grafting in order to save time and give a more resistant cicatrix.

As few busy sufferers will consent to lie up for the necessary period, and as all hospitals except the Poor Law Institutions refuse to fill their wards with patients suffering from simple ulcer of the leg, other means must

be resorted to which will enable the victim to pursue his ordinary avocation during treatment.

Two plans of dealing with the chronic simple sore have been devised to meet these requirements. These are based upon the principle of mechanically aiding the weakened local circulation, and affording a degree of mild pressure or support to the granulations which produce the same effect as prolonged rest.

The first of these and the simplest is the elastic or rubber bandage. Martin's appliance consists of a thin bandage of pure rubber, which is also procurable with numerous small perforations in its substance. Even with these openings there is great risk of the retained secretion and perspiration fretting the healthy skin and producing a sodden condition or a general dermatitis over the entire leg. Some surgeons apply the Martin bandage direct to the limb and sore without any intervening dressing, but this is not a desirable method. In all cases a better result will be obtainable by the following routine:

Cut out with scissors a double ply of lint or gauze of the size and shape of the ulcer, and a single layer of oiled silk about half an inch larger. The lint is soaked in ordinary Carbolic lotion (1 in 40), laid upon the sore, and covered with the oiled silk. Where there is any tendency to eczema, the skin around the edges of the ulcer, where in contact with the oiled silk, may be smeared over with a little Lard, Vaseline, or any stiff emollient ointment. This prevents irritation by the retained secretion under the oiled silk. Over the lint and oiled silk a woven rubber bandage, about $3\frac{1}{2}$ inches wide (such a bandage as is used for Esmarch's bloodless operation), is applied evenly from the toes up to the knee. This bandage is manufactured in the same way as the elastic spring-sides of ordinary boots, and it is known as "elastic webbing." It should be taken off when the patient retires to bed, and put on before he gets up in the morning, any ordinary bandage being used to keep the dressing in its place during the night.

This bandage as ordinarily procurable is stiffened by some form of dressing used in its manufacture. It should, before being applied to the limb, be soaked in tepid water, and after drying should be stretched, bent and kneaded by the fingers to produce suppleness and flexibility, so that it may more easily adapt itself to the contour of the limb.

The second method is also a most efficient one, and in many cases gives better results than the elastic bandage. Both plans are very suitable for the treatment of ulcers when associated with the presence of varicose veins.

The entire limb, after a thorough shaving, cleansing and drying, is slightly elevated to remove any swelling, and a series of coats of Unna's melted Zinc Gelatin Paste is applied with a large brush so as to envelop the leg from the foot to the knee in an even continuous sheet of gelatin, which acts as a second layer of true skin, giving a uniform and elastic support to the limb. The formula for the paste is pure sheet Gelatin, 4 parts soaked for twelve hours in 16 parts of water, and then dissolved by applying heat and adding 6 parts of Oxide of Zinc rubbed with 12 of Glycerin. The paste keeps well, and before being used should be melted on a water-bath.

Where varicosities are present the layer of gelatin is strengthened by previously applying a gauze bandage, which is then painted freely over with the warmed paste.

Jamieson and Low have introduced a modification of this plan which is suitable for the treatment of varicose ulcers and simple varicosities unaccompanied by ulceration. After cleansing the limb with soap and water, and drying with Ether, the varicose veins are painted with Ichthyol Collodion (10 per cent.), and the ulcer covered by a thick layer of Airol and cotton-wool, and the entire limb brushed with warmed Zinc Jelly, on the top of which a double-headed starched muslin bandage wrung out of water is evenly applied. The jelly is made by adding 10 parts of pulverised Gelatin to 40 of water, heated on a water-bath till dissolved, when 10 of Zinc Oxide mixed with 40 parts of Glycerin are stirred in.

The only objection to the gelatin methods is the necessity of frequent change of the envelope if the ulcer is discharging freely; this may to a certain extent be obviated by cutting out a small aperture in the dressing opposite to the site of the sore, which can be occasionally cleansed and treated by weak Boric Acid Ointment before a new coating be applied.

The old-fashioned method of strapping with adhesive plaster should be abandoned for the elastic or gelatin bandage.

We shall next consider the treatment of the simple healing ulcer when it has been subjected to certain local or constitutional causes, engrafting upon it conditions recognisable as inflamed, irritable, weak, etc.

The Inflamed Ulcer occurs when, from local irritation of a mechanical nature, as friction or the use of an irritating lotion, or the invasion of the granulating surface by microbes, the ordinary signs of inflammation supervene in the ulcer, especially about its margins. The treatment must in all cases include rest with marked elevation of the entire limb, and the instant removal of all dressings which do not permit of free exit to the discharge. Any form of cool evaporating lotion should be applied without being covered in by a bandage or oiled silk, and this may be so freely employed as to cause abstraction of local heat. Sometimes one large cold Starch and Boric or Bread and Water poultice is useful to cleanse the sore before applying Spirit or Carbolic Acid lotion. Occasionally a few small incisions with a tenotomy knife near to the margin of the ulcer will act like leeching; bleeding from the cuts should be encouraged by warm Boric compresses, and a full dose of a saline purgative may be advantageously administered. After the subsidence of the pain, heat, redness, and swelling the ulcer is to be dealt with as if a simple healing sore by the methods already described.

The Irritable or Painful Ulcer is allied to the preceding condition, but the pain may be present without any signs of local inflammation, and it may be almost of neuralgic intensity. Rest in bed with elevation of the limb and the removal of all pressure by bandages or strapping and a smart purge should be administered. A pill of 5 grs. Calomel with $\frac{1}{3}$ to $\frac{1}{2}$ min. of Croton Oil often acts most satisfactorily upon the pain, and in some cases seems to have a specific action.

Narcotics are as a rule objectionable, but Aspirin, Antipyrine and Bromides may be tried. The best local sedative will be a 1 in 30 Carbolic lotion applied on lint under oiled silk. It has been advised to search carefully for evidence of any exposed twig of a cutaneous nerve, and divide this with a fine knife, but a better plan is to cocainise the ulcerated surface by painting it with a 5 to 10 per cent. of hydrochloride of cocaine solution, after which the solid Nitrate of Silver or a 1 in 8 solution should be freely applied to the entire surface. Strong Carbolic Acid may be used in the same way, and after cauterisation the sore should be treated by an evaporating lotion till the resulting inflammation has subsided, when the usual treatment of the simple sore may be instituted. It is sometimes necessary to pass a tenotomy knife beneath the base of the ulcer in such a way as to completely divide all sensory nerve fibres on their way to the ulcerated surface.

The old Lead and Opium lotion applied on lint under oiled silk is a favourite local remedy, but it is doubtful if the laudanum contained in it has any analgesic action. Chloral Hydrate (1 in 200) may be applied on lint, or the ulcer may be sprinkled with finely powdered Iodoform or Iodol, or smeared over with Ichthyol. Persistent and intractable pain can only be effectually relieved by a complete excision of the entire ulcer area and the application of skin grafts.

The Weak Ulcer is often due to a general anæmic condition, and is therefore sometimes styled an *anæmic ulcer*. Iron by the mouth, alone or in combination with Arsenic, should be freely administered. The urine should be examined for albumin and sugar; if found present, the agents suitable for the treatment of chronic Bright's disease and Diabetes are indicated.

Local measures should be the direct opposite of those employed for the painful and inflamed condition of the sore which, in the present case, will require the application of a stimulant and not of a sedative. The best routine method is to rub over the granulating surface with a large smooth crystal of Sulphate of Copper, and cover it with a double ply of dry lint or gauze. Solid Nitrate of Silver is much more painful, and upon the whole less satisfactory. Lotions and all liquid preparations under oiled silk should give place to dry dressings and desiccating powders. If the flabby granulations do not yield to these measures, the ulcer may be thoroughly scraped or curetted, or the exuberent granulations may be conveniently and painlessly clipped off with scissors, and the raw surface dusted over with Airol or dressed with Chinosol gauze. The steady pressure exerted by a layer of thin sheet lead under a firm elastic bandage has often a most stimulating effect upon the flabby exuberant granulations. Ungt. Resinæ makes a good stimulating dressing, or fresh-blood supply may be determined by the application of a cupping glass.

The Indolent Ulcer is a vaguely defined condition which is often regarded as identical with the *callous* or with the *weak* sore. The term should be restricted to very chronic ulcers which, without showing any tendency to heal, remain in a lifeless condition without

necessarily exhibiting any great degree of callous margin or flabby granulation.

Rest in bed with warmth applied to the limb and tonic constitutional treatment will be necessary. The ordinary gelatin or elastic bandage will in time promote healing, but the process is very slow and the cicatrix is liable to break down.

Electricity, when continuously applied, is the best local stimulant to growth for this condition, and the writer has found excellent results follow the employment of Bird's plan for treating bedsores in paralytic patients. Any working jeweller can easily prepare two discs, one of silver of the size of the ulcer, and the other of zinc about the dimensions of a crown piece. These are connected by a piece of stout copper wire 4 to 6 inches long. The silver disc being laid in direct contact with the sore, the zinc plate is placed on the skin at some distance from the ulcer over a layer of wash leather soaked in vinegar. The method may be modified by placing a weak solution of a zinc salt on lint under the silver disc, which will induce a weak cataphoresis.

Stoker's plan of stimulating the growth of indolent ulcers by exposure to a small jet of Oxygen is a valuable method of treatment, giving a healthy and resistant cicatrix, and similar results may be obtained in syphilitic subjects by the local application of Calomel vapour generated in the apparatus for giving a hot-air bath in Bright's disease.

As in the treatment of the flabby exuberant granulations of the weak ulcer, the typically indolent sore may be stimulated by the application of Copper Sulphate, Lunar Caustic, solution of Corrosive Sublimate, &c., or of any dry dressing after dusting the sore with Iodoform, Airol, &c. The surface of the indolent sore may be painted over with Blistering Fluid, which should also overlap the neighbouring sound skin.

The Callous Ulcer with its edges often of cartilaginous hardness is always most indolent, and healing can never occur as long as the induration is permitted to remain.

Pressure should have a trial before resorting to surgical measures, and sometimes healing rapidly follows after the hardened margins have become softened or absorbed by the steady pressure of the pure rubber bandage of Martin, which should be applied directly to the face of the sore without any intermediate dressing, and the effect is expedited by permitting the patient to take a fair amount of muscular exercise. The patient should apply it himself every morning before leaving bed, and he soon gets to feel the requisite amount of tension, which increases as he assumes the vertical position. The bandage is kept on all day and not removed until the patient is flat in bed. It is then washed in a basin of water containing a trace of some antiseptic. The ulcer is to be likewise carefully cleansed, and a thick pad of lint soaked in Spirit or Carbolic lotion placed over it till morning under a plain calico or stocking web bandage.

The skin of the limb is generally found so macerated and tender that it will not be advisable to cover in the night lotion by oiled silk, though this may sometimes be done to advantage. Sheet lead, cut a little larger than

the ulcer, may be laid over one or more plies of lint soaked in weak biniodide of mercury or any other lotion, and placed upon the surface of the ulcer, the whole being covered by a pad of lint or gauze, and kept in position by elastic webbing or woven India-rubber bandage as just described. Excellent results follow this method where the pure rubber bandage cannot be tolerated.

By laying a piece of protective over the face of the sore after thoroughly disinfecting it with a 1 in 4,000 Corrosive Sublimate solution, Watson, of Boston, modifies this plan. Over the protective he places a piece of sheet-tin, the whole covered by a dry Corrosive Sublimate gauze dressing, held in place by an evenly applied bandage from the toes to the knee. The lead-foil and woven rubber bandage are better. Where these plans fail blistering may be tried, but the danger of converting the indolent callous condition into a sloughing ulcer in debilitated subjects must not be forgotten.

Of surgical procedures the best is to take a sharp bistoury and make a series of linear incisions through the thickened or callous margins, radiating outwards from the centre of the ulcer, like the spokes of a wheel from the nave. The incisions should penetrate the deep fascia, and extend for an inch or two beyond the margins of the ulcer. Bleeding is easily stopped by pressure.

This method is more successful than mere scraping of the ulcer or paring its margins. The writer thinks it was first practised in the Edinburgh School, and he has seen its great success in many cases in the hands of an old pupil of Syme.

Spaeth describes a modification of this procedure as practised by Harbordt. The entire ulcer is divided lengthwise by a deep incision, extending far into the healthy tissue. Cross incisions are then made through the callous tissue into the healthy at intervals of about $\frac{3}{4}$-inch. The incisions must go through not only the skin, but the underlying fascia; the wounds must gape widely. The bleeding, often profuse, must be stopped with tampons, and the whole wound, which it must be owned has rather a slaughter-house look, is done up with Iodoform dressings. When, after eight to fourteen days, the dressing is changed the difference in appearance is very marked. Healthy granulations are springing up in abundance from the gaping incisions, and soon cover the whole surface, reaching the level of the surrounding skin, from which the growth of new epidermis is seen to advance rapidly.

Where the ulcer is extensive, skin-grafting may be needed, but it is useless to attempt the operation till the entire nature of the sore has been first altered by some of the above plans, or, better still, after thorough excision of the entire ulcer by the knife.

Reverdin's method consists in planting within the margins of the ulcer minute grafts of epidermis with the upper layers of the rete mucosum, and these, by growing into the skin of the margins, give a firm cicatrix. The after-treatment consists in covering the surface with protective bandages under a thick pad of sterile gauze, which should not be removed for 4 or 5 days.

By the Thiersch method a broad piece consisting of epidermis only is shaved off the patient's thigh or forearm. This is laid on a piece of gauze, raw surface uppermost, moistened with normal saline solution, and perforated with numerous pricks with a scalpel point. Graft and gauze are then pressed on the freshened ulcer surface and made to adhere thereto. A dressing of gauze dipped in melted Boric ointment is applied over the graft.

Large grafts of the entire thickness of the skin may be laid on the surface of the scraped and sterilised ulcer, and fastened by sutures; some surgeons employ this method as practised by Young, who places the skin graft on the healthy cleansed granulating surface.

The dressing of grafted surfaces affords a problem not yet satisfactorily solved. Thin sheets of perforated celluloid have lately been used with success. They are kept in position by straps of plaster, and therefore do not displace the delicate graft. They allow the secretions to escape, and prevent adhesions of the graft to the epidermal cells of the graft.

Amputation may be the only resort when all methods fail and the ulcer invades a large area of the entire surface of the leg. The Bell Keatley operation is the best procedure. He scrapes the ulcer thoroughly, removes the bones and soft tissues of the dorsum of the foot, and transfers to the site of the ulcer the whole of the sole of the foot, including muscles, plantar vessels and nerves, and excluding loose tendons after removing a small portion of the lower end of the tibia. The result is a good stump, like a Syme, instead of an ordinary amputation at the knee. He also preserves the dorsal foot flap for ankle amputations in cases of *complete circular ulcer of the leg* by bending it round upon its neck and covering with it the ulcerated surface.

Though the local treatment of the indolent ulcer is most important, little advance can be made unless constitutional measures be closely attended to. This is true also as regards all forms of chronic sore. Healing may be impossible till good food in abundance, and tonics, pure air and every means by which the nutrition of the body can be improved, have got a fair trial.

The Varicose Ulcer.—The treatment of this condition is that of the simple healing sore when complicated with the presence of varicose veins. Excision of the dilated venous trunk may be required in some cases, but as a rule the constant application of the woven rubber or the gelatin bandage meets all requirements. It allows the ulcer to heal, and the prevention of future recurrence can then be safely undertaken on an aseptic field by removal of the veins. The method described on a previous page as practised by Jamieson and Low is the best procedure.

The Eczematous Ulcer is usually associated with the last-mentioned condition, and generally the pure rubber bandage is badly borne. The best plan is to start the treatment of the eczema whilst the patient remains in bed by the application of a suitable ointment containing Liq. Carb. Detergens with White Precipitate and Lead. After a time he may be permitted to go about with this application on lint covered in by a

woven elastic bandage. Aqueous lotions under oiled silk often tend to spread the eczema over the entire limb. When the discharge is profuse, drying powders like Zinc Oxide, Fuller's Earth, Bismuth and Starch may be freely dusted on under the woven rubber bandage.

The Sloughing or Phagedænic Ulcer is seldom met with in the leg, and then only in patients debilitated by alcoholic excesses or those suffering from some profound blood dyscrasia as renal disease or diabetes. As the condition is due to infection with some virulent strain of microbe in addition to active constitutional remedies, energetic disinfectant, combined with Vaccine, treatment must be promptly resorted to.

The limb should be enveloped by frequently changed Charcoal poultices till the surface of the sore has been cleansed from superficial sloughs; Peroxide of Hydrogen is freely swabbed over the ulcer, which may then be exposed to the thermo-cautery, and any deep sloughs removed by the aid of the knife, and the whole thoroughly painted by liquefied Carbolic Acid.

By keeping the leg constantly immersed in a trough containing warm solution of Permanganate of Potassium the stench may be controlled and new action encouraged. In chronic cases an autogenous Vaccine may be employed with advantage.

The ulcers which arise from the condition recognised as Bazin's Disease (see under Erythema) are frequently found on the posterior surface of the leg over the calf. Whilst they are best treated on the above lines by scraping, pressure and local antiseptics, constitutional treatment is of more importance, and generally speaking this should be such as is indicated in tuberculosis. Not infrequently these patients show a positive Wassermann reaction.

URÆMIA—see Bright's Disease.

URETHRAL CARUNCLE.

Removal of the growth should be effected after the application of cocaine by ligaturing or by snipping it off with sharp scissors and applying the cautery to its bleeding base. A simpler plan is to directly apply Paquelin's cautery to the growth and permit it to slough off afterwards. Where the tumour is of any magnitude it should be excised by the knife or scissors, taking a clean sweep of the underlying tissue, avoiding stricture by being careful to join urethral mucous membrane to vaginal by interrupted sutures.

URETHRAL FEVER.

This is also known as Catheter Fever, and has been already incidentally dealt with in the description of stricture of the urethra, enlarged prostate, etc.

If the condition be regarded from the pathological point of view its prevention and treatment become a simple problem in rational therapeutics. It is *always* caused by septic absorption in a patient whose

kidneys are damaged, usually by back pressure, the poison being either conveyed by a catheter which has not been properly sterilised or by a sterilised instrument which has caused some slight abrasion of the urethra, through which some toxic urinary product finds its way into the circulation. In very neurotic subjects obviously a minute dose is sufficient to excite a violent constitutional reaction.

The surgeon should find no difficulty in accepting this view if he reflects upon the smarting pain which invariably accompanies micturition after the passage of even a soft rubber catheter for the first time.

Prevention of catheter fever therefore consists in rigid asepticism and the utmost gentleness in the use of all urethral instruments. When a catheter is used *for the first time*, the patient should previously be put to bed when this is at all possible, or he should be immediately sent to a warm bed till after the first micturition, and he should be directed to delay the emptying of the bladder for a reasonable time after the passage of the instrument.

A hot bath before or immediately after the operation may prevent the attack, and at the commencement of treatment for stricture, which is the usual cause of this complication, the previous hot bath serves a double purpose. Where rigors are anticipated an opiate should be given one or two hours previously, and immediately before operating a few drops of weak cocaine solution should be injected down the urethra. Quinine, which is often valuable after the rigor, generally is useless in preventing it, This the writer often demonstrated in a patient who had intermittent fever in his youth, and who had alarming rigors after every time a bougie was passed through his stricture. Soft instruments when possible should be used, and the most rigid attention to asepsis is imperative. The best lubricant is K.Y. Jelly or the thick Glycerin of Borax of the B.P.

When a catheter or sound is to be passed for a patient who is already passing septic urine, it is necessary when time permits to delay operation till the urine has been rendered aseptic by the administration of Urotropine, Boracic Acid, Creosote, or other urinary antiseptic.

Once the fever or rigors have appeared after catheterisation the symptomatic indications are clear; in the cold stage the patient should be enveloped in warm blankets and have hot-water bottles placed at his feet. A full dose (10 to 15 grs.) Quinine with 20 min. Laudanum should be administered, or a moderate dose of whiskey made into hot punch may be given. In the sweating stage external warmth may be removed, but the perspiration should not be checked. Urinary antiseptics should be given in full doses for a few times.

When suppression of urine accompanies urethral fever the case should be regarded as serious, and should be treated by a very hot blanket bath (see p. 91), or the ordinary hot bath, hot poultices to the loins, dry cupping, or a copious warm or hot water enema may be administered, the general treatment of acute Bright's disease being indicated, including Pilocarpine, in severe cases. Those who regard catheter or urethral fever as always of renal origin caution against the administration of opium or alcohol

in any form, and rely upon smart Salines, warm fomentations to the kidneys, or hot baths. Normal Saline solution should be injected hypodermically and by the rectum.

URETHRAL RUPTURE.

When laceration of the urethra is met with soon after the injury, a sterilised and well-lubricated soft rubber catheter should be passed down the tube and coaxed into the bladder if possible; failing in this attempt, the patient should be put under chloroform and a rigid instrument tried. After the catheter has been introduced into the bladder it should be tied in for a week, and a long piece of rubber attached to siphon off the urine into a vessel placed beneath the bed.

When the bladder cannot be entered in this manner, a full-sized staff should be passed down to the laceration, and the skin and tissues freely divided in the perineum, so as to fully expose the ruptured tube and admit of the discovery of the proximal end of the torn portion. The staff being withdrawn, a full-sized rubber catheter is passed through the meatus and guided through the proximal opening into the bladder, after which the laceration should be sutured over the catheter and the perineal wound closed, a drain being left in and the catheter retained for 10 days with a rubber siphon to continuously drain off the urine as it flows into the bladder from the ureters.

Often, however, it will be found that the bladder end of the rupture escapes detection, and the only resource open to the surgeon is to do suprapubic cystotomy, and guide an instrument from above through the neck of the bladder into the urethra, and out through the perineal wound, or a perineal section down to the seat of the rupture will prevent extravasation and allow the urethral mucous membrane to heal. If division has been complete, an attempt should be made to unite by means of fine catgut sutures the torn ends of the urethra.

Ultimately a suitable plastic operation may be indicated when the patient survives the cystotomy and the sloughing caused by extravasated urine. Sapiejko has obtained success by transplanting grafts taken from the mucous membrane lining the lower lip, with the view of restoring the destroyed portions of the urethra; grafts as large as 1 inch by ¾ inch were sutured to the ends of the divided urethra.

If extravasation of urine has already occurred when the case comes under observation, perineal section should be performed without attempting catheterisation, and a number of deep incisions should be made into the boggy area, one of these passing down to the site of the rupture, and these should be thoroughly irrigated by warm Saline solution.

Ruptured urethra is invariably followed by stricture, for which systematic dilatation will be required, and the patient should be taught to pass a full-sized bougie at regular intervals, as in the treatment of ordinary organic stricture.

URETHRAL STRICTURE—**see Stricture of Urethra.**

URINARY FISTULA.

This may be a sequel to the last-mentioned condition; more frequently it follows as a result of old gonorrhœal stricture, impacted calculi, prostatic abscess, etc. The primary condition which causes the obstruction to the flow of urine must be the obvious aim of all treatment.

Only one sinus about the scrotum or perineum may exist, whilst as many as fifty openings have been seen studded over the same region and extending into the rectum and above the groins. The treatment will, therefore, necessarily vary considerably.

A simple fistula, opening at the one extremity into the urethra and at the other into the perineal region, will be found, in the great majority of cases, to be secondary to a stricture of long standing. Such a fistulous opening will as a rule heal as soon as the urethral stricture is properly dilated. Under the heading of Stricture of the Urethra the various plans of dealing with the primary affection have been detailed, and need not be here repeated. As a rule it will be wise to begin with solid metal bougies, passed every two or three days, till the fullest size which the urethra is capable of taking is reached.

When the anterior end of the stricture is very narrow the continuous process of dilatation will have to be commenced with filiform bougies till a small catheter can be manipulated into the bladder, after which it may be retained for 24 to 48 hours before a larger instrument is similarly tied in for a time. When a No. 6 English is reached the interrupted method may then be commenced.

Should the fistula fail to heal after the dilatation of the stricture, the cause of failure is always due to an escape of urine during micturition, which keeps the track green and prevents healing. The plan of injecting irritants or caustics along the fistulous track in such cases is bad practice, though still advised by some surgeons. The best procedure by far is to teach the patient to pass a large-sized soft instrument, and caution him not to attempt to make water without its aid, or a catheter may be tied in for a day or two. Even before having a motion from the bowels he should immediately pass his catheter, and draw off every drop of urine. In this way all trickling of urine along the fistulous track is completely prevented, and in a short time complete closure results. This method will also be found to be efficacious in those cases of urinary fistula caused by prostatic abscesses.

When two, three, or four openings lead direct from the perineum into the urethra without much induration or any diverticula, success may follow the above line of treatment. When, however, the tracks of the fistulæ are in connection with regions riddled by small abscesses, the perineum should be opened by a free external incision made over a Syme's staff for perineal section, and all indurated tissue freely removed, the fistulous tracks scraped by a sharp curette, and packed with strips of Iodoform gauze. Fenwick advocates free excision of every track or burrow right up to the urethra, and suture of the raw surfaces thus

produced. Scrotal fistula should be treated also in this manner. A Penile fistula usually results from sloughing of the urethra, caused by the impaction of a calculus; hence there is generally much loss of substance. The fistulous track should be freely incised, the edges pared, and the urethroplastic operation of Clark or Nélaton or the more elaborate transplanting method mentioned in the last article may be resorted to.

When the stricture is impassable by any instrument introduced along the urethra, the treatment so successful in simple cases cannot, of course, be pursued. There is nothing left in such cases for the surgeon but to cut down upon the seat of stricture by perineal section, and by the Boutonnière operation the urethra may be divided upon a Wheelhouse's straight grooved steel staff. In some cases Cock's operation may be performed, and the urethra divided behind the stricture in its membranous portion. Wheelhouse's operation is the best for most cases, and it is described along with the other methods under Stricture of the Urethra.

In dealing with some cases of fistulæ it may be necessary to open the bladder above the pubes, and by the method known as "retrograde catheterisation" to introduce into the urethra a catheter from above, as in the operation for dealing with a ruptured urethra.

In some cases after performing external urethrotomy the impermeable stricture may be completely excised or resected, and the divided ends of the urethra carefully sutured together over a full-sized catheter tied in the passage. This is facilitated by placing the patient in the extreme lithotomy position with the hips about eight inches above the level of the shoulders, and having the urethral tissues stained by the use of methylene blue given internally beforehand and immediately before operation injected into the urethra.

URINE, Incontinence of.

The treatment of this condition will be found on p. 447, where the various methods of dealing with the nocturnal form of incontinence known as Enuresis are detailed. In some cases after the failure of all the plans mentioned there, success has been reported from Thyroid Feeding, even when there has been no reason to suspect any failure in the function of the thyroid gland.

URINE, Retention of—see Retention of Urine.

URINE, Suppression of—see Suppression of Urine.

URTICARIA, OR NETTLE RASH.

The first step in the treatment is to discover the exciting cause, which may be either some local irritant or an internal one. In the former case the task is an easy one: nettle or jelly-fish stings, mosquito bites, etc., are as a rule obvious. The internal causes are more difficult to detect, especially in the chronic cases, and one article of food after another must be omitted till the toxic agent is detected. In all cases a milk diet is clearly indicated, as this food is rich in Calcium Salts, as is also butter and spinach.

Fruits, especially acid fruits, should be prohibited, since they tend to decalcify the blood.

In the formidable or so-called *giant urticaria* the symptoms come on suddenly, often soon after a meal, so that the exciting cause may be at once suspected, such as shellfish, fungi, strawberries, raw apples or other fruit, pastry, pork, cheese, etc.

Reflex causes as ovarian irritation are also to be thought of in the search for the primary disturbing element, and dyspepsia and constipation should be remedied.

The treatment of the acute giant form with its alarming but for the most part harmless symptoms is best carried out by the administration of an emetic to rid the stomach of the food or fermenting matter which has probably been the origin of the attack. As soon as emesis has occurred a strong saline purge should be administered in order to expel from the bowel any unabsorbed toxic product.

In the rare form of Willan's *Urticaria tuberosa*, where large hard tumours appear generally during the night-time in the vicinity of joints, similar eliminatory treatment should be employed, the saline purgative being preceded by a full dose of Calomel, and Calcium salts should be administered in courses of short duration periodically.

In the more chronic forms, the main symptom being the feeling of intense burning itch, local remedies suggest themselves; these are, however, as a rule most disappointing. The best of all applications is Bicarbonate of Soda in the warm bath, but as usually recommended the bath is useless. One writer on skin diseases after another advises that 4 oz. of the soda salt should be dissolved in a large bath (30 to 40 gallons of water). 2 lbs. may be advantageously employed. 4 oz. added to 30 gallons of water make a solution of about the strength of 1 gr. to $2\frac{1}{2}$ oz., which can have no therapeutic action. The patient should lie for half to one hour in the stronger solution at a temperature of about 98° F.

Upon coming out of the bath the skin should be dried with a soft towel, and the portions which are the seat of the urticaria may be freely anointed with a 1 in 40 Carbolic Oil. Severe itching may be relieved in a limited area by mopping it with Menthol, 1 part, dissolved in 3 parts of each of the following: Chloroform, Ether and Camphorated Spirit, making a 1 in 10 solution of menthol. It is hardly necessary to say that such a lotion should not be swabbed on a portion of skin which has been deeply scratched or excoriated by the finger-nails. 1 drachm of menthol dissolved in 10 oz. weak spirit may be freely sponged over large areas of skin, and so may ordinary Carbolic Lotion (1 in 40). Any of the sedative applications mentioned in the article on Pruritus may be tried. A favourite lotion is the following:

℞ *Liq. Plumbi Fort.* ℥ij.
Ac. Acetici Dil. ℥j.
Liq. Carbonis Deterg. ℥ij.
Ac. Hydrocyanici Dil. ℥j.
Aquæ Destillatæ ad ℥xvj. *Misce.*

Of drugs for internal use, save such as are indicated for the removal of the primary dyspepsia, gout, etc., there is no agent of any real or specific value save the Chloride or Lactate of Calcium; there is always a diminution in the coagulability of the blood. By administering this drug the wheals and itching generally rapidly improve even when the primary error in the dietary remains uncorrected, and on withholding the lime salt the symptoms will return. Often the irritability of the skin remains for a considerable time after the exciting cause has been removed, but it speedily disappears under calcium administration. The lime salts prevent exudation from the vessels, and thus diminish the pressure on the sensory terminals. Either salt may be prescribed in 15 gr. doses in 1 oz. water thrice daily.

In the urticaria of infants Lime Water or Magnesia added to the milk acts in a similar manner. Free elimination in all chronic cases should be maintained by stimulating the urinary secretion by a liquid dietary and by daily morning doses of a natural mineral water containing Sodium or Magnesium Sulphate. Gouty cases respond to similar treatment in combination with moderate doses of Salicylate of Sodium.

It must not be forgotten that in some susceptible individuals, iodides, salicylates, cubebs, copaiba and santonin may bring on an attack of urticaria, and this often follows serum treatment for diphtheria and other diseases.

In the infantile affection known as *urticaria pigmentosa*, calcium salts are of no avail; the raised pigmented patches always disappear before puberty, and the only indication for treatment is the slight pruritus, which may be relieved by any of the above-mentioned sedative lotions or by sponging with vinegar.

UTERINE DISPLACEMENTS.

From a practical point of view the only two displacements of much importance are backward displacement—*retroversion*—and downward displacement—*prolapse*. A true *anteversion* can only take place in the case of a pregnant uterus in the later months of pregnancy, when it may sag forwards if the abdominal wall is relaxed (see under Pregnancy, Disorders of). A *lateral* displacement occurs under two sets of circumstances, when a tumour in one broad ligament (*e.g.*, a parametritic exudate) pushes the uterus over towards the opposite side of the pelvis, or when the contraction of the newly formed connective tissue, as an inflammatory exudate, becomes organised, pulls the uterus over towards the same side. The uterine axis may lose the normal curve, and may become either straightened out, bent forwards at more or less of an angle—*anteflexion*—or bent backwards—*retroflexion*. The walls of the vagina may share in the descent of the uterus, or may be affected alone, and as such an affection is often, though inaccurately, termed by the laity "falling of the womb," it will be considered in this article. Either the anterior vaginal wall, with the base of the bladder, may bulge into the vulva (*cystocele*), or the posterior with the rectum (*rectocele*). Lastly, I shall describe the treat-

ment of that rare form of uterine displacement, *chronic inversion*; the acute form has already been dealt with under Puerperal Hæmorrhages.

Retroversion.—The cervix is anchored to the sacrum on each side by more or less well-developed bands of connective tissue forming part of the pelvic fascia, and is thus prevented from descending towards the vulva. The fundus is pulled forwards on each side by the round ligaments, which are muscular and elastic, but unable to resist long-continued strain. In cases of retroversion without prolapse the round ligaments are relaxed; when the sacral ligaments are poorly developed or have yielded to the stresses thrown on the lower uterine segment and cervix at childbirth, descent of the uterus accompanies the retroversion. The treatment of the latter class of cases will be more fully considered under the heading of Prolapse.

Retroversion without prolapse is found in women of all ages, in those who have borne children and in virgins. When one considers that in the course of a gynæcological examination a retroversion is not infrequently discovered, to which none of the patient's symptoms can fairly be attributed, and that again a patient's symptoms may be relieved by curing some coincident condition, such as endometritis, though nothing is done to replace the uterus in its normal position, one is tempted to doubt whether retroversion *per se* is capable of giving rise to symptoms at all. But we must remember that the abnormal position of the uterus in itself predisposes to congestion, with consequent increase in the weight and bulk of the organ, and increased liability not only to microbic infection setting up a true endometritis, usually in the cervix, but also to that hypertrophy of the endometrium often associated with capillary dilatation and known variously as "fungoid," "polypoid," or "hæmorrhagic endometritis," which provides such a wide field for the victories of the curette. It is not uncommon to find one or both ovaries enlarged and prolapsed in a case of retroversion.

When a retroversion is discovered in the course of a pelvic examination, and when the uterus is free from any other pathological condition, the practitioner should seriously ask himself before commencing any special treatment whether the patient's symptoms can be fairly referred to the displaced uterus, for time and skill will only be wasted in attempting to cure symptoms due to neurasthenia, anæmia or debility by measures directed solely to the restoration of the misplaced organ to a normal position.

In the average case of retroversion with symptoms of sacral pain or dragging, leucorrhœa and menorrhagia, the best plan is to commence by a course of treatment directed to the relief of any pelvic congestion or uterine inflammation present. Glycerin of Subitol (10 per cent.) or Boroglyceride tampons should be inserted in the vagina once a week, and hot antiseptic or astringent douches (1 in 10,000 Perchloride, half saturated Boric Acid, weak Permanganate, drachm to the quart Sulphate of Zinc) given daily. (See also under Endometritis and Leucorrhœa.) The patient's general health should be attended to, for rest, tonics and

change of air all play a part in the cure of such symptoms. Many of these cases are much improved by curetting, which relieves the congestion, gets rid of diseased mucous membrane, and by the week or so of enforced rest often gives the patient a start on the road to recovery.

When such measures are insufficient to relieve the pain and weakness in the back and pelvis, or when the relief is only temporary and symptoms return with, or soon after, the cessation of treatment, the effect of replacing the uterus and keeping it in position with a pessary should be tried. Almost everyone is familiar with Schultze's method of reposition, which consists in first raising the fundus from the hollow of the sacrum by means of two fingers introduced into the vagina. The fingers of the other hand then grasp the fundus through the abdominal wall, while the vaginal fingers are placed in front of the cervix and press it backwards so that the uterus is brought into a position of anteversion. This manœuvre is more easy to describe than to carry out. It is facilitated by a preliminary course of tampons and douches, by placing the patient for the manipulation in the lateral position, with her hips elevated on a pillow, and sometimes by introducing one finger into the vagina, and the second finger into the rectum. It is by no means easy to get the uterus to stay anteverted even when the method has succeeded.

When the uterus has been replaced, and sometimes as a means of effecting replacement when that cannot be accomplished satisfactorily by the manual method, a pessary is inserted. In some cases the wearing of this instrument for some months enables the round ligaments to regain their tone, and is followed by restoration of the normal position of the uterus for a longer or shorter period after removal of the pessary. Such a happy result is not to be generally expected, and the restoration to the normal cannot be expected to be permanent when retroversion is combined with descent of the uterus, the usual condition in parous women. But even though we do not look for a radical cure, the measure undoubtedly relieves symptoms in very many cases, and should be tried as an adjunct or a sequel to the local therapy already described, when the relief afforded has been merely temporary, and when operative measures are inadvisable or are refused. A pessary should not be used when active inflammation of the uterus or adnexa is present, when there is a pyosalpinx or pelvic abscess, or where there is an enlarged tender prolapsed ovary.

The most commonly used pessary for retroversion is a Smith-Hodge, which theoretically puts the vagina on the stretch longitudinally, and so carries the cervix backwards. The finger should be introduced into the posterior fornix after the uterus has been replaced, if possible, and the length of the vagina to a point just behind the urethral orifice measured. This gives the approximate size of the pessary which should be used. During its introduction, the forefinger of the left hand should hook the perineum backwards, and the pessary should be held obliquely, pressure being made with one side of it downwards against the right of the perineum, while the other side slips in to the left of the urethral orifice. When it has been introduced, the posterior bar is carried by the forefinger snugly

behind the cervix, while the anterior bar rests on the perineum. It is more satisfactory to make the wider end anterior. If the pessary, when introduced, causes undue stretching of the vagina, or if discomfort or actual pain is complained of, it should be removed and a smaller instrument inserted. Any patient who is wearing a pessary should be directed to douche the vagina at least twice a week with two quarts of warm water, to which two teaspoonfuls of a mixture of soda bicarb. and boric acid (equal parts) have been added. She should have the pessary removed for a week every three months, and she should be instructed to return for examination at any time if pain, excessive leucorrhœa or abnormal hæmorrhage arises. A round rubber ring is sometimes used for retroversion, especially if associated with prolapse. It is usually recommended that this should be of vulcanite or hard rubber for the sake of cleanliness. If the precautions detailed above are insisted on, a "watch-spring" soft rubber ring may be used with safety, or a "combination fluid pessary," which consists of a ring covered with a soft rubber cushion filled with glycerin. These pessaries often give relief in cases of irreducible retroversion. Ring pessaries are best introduced by depressing the perineum and rolling the ring in over it in an oblique position as described for a Smith-Hodge. It is scarcely necessary to say that the pessary, after passing the vulval entrance, lies in a transverse plane in the vagina.

Operative Treatment.—Operation should be resorted to when local therapy and pessaries fail, when the patient objects to the wearing of a pessary, or persistently neglects the hygienic precautions necessary while wearing one; when the case is complicated by the presence of erosion, ectropion or such a degree of perineal laceration that a pessary cannot be retained, or by enlarged, tender and prolapsed ovaries, pyosalpinx, pelvic abscess or adhesions binding down the fundus. It should not be undertaken solely for the restoration of the normal position of the uterus, but only for the relief of symptoms which have withstood a thorough trial of measures directed to the cure of the complications mentioned, and the appropriate operative treatment of these complications should form a part of the operation undertaken.

The restoration of the misplaced uterus may be effected by *vaginal fixation*, in which the fundus is brought forwards to lie between the bladder and anterior vaginal wall, or by *abdominal fixation*, in which it is brought through the peritoneum of the anterior abdominal wall and sutured to the recti muscles, or, still better, to the back of the anterior wall of the rectal sheath. These measures effectually fix the uterus and prevent not only retroversion, but also prolapse. They should never be carried out on any patient who has not passed the child-bearing age, as pregnancy in a uterus so fixed would be disastrous. When pregnancy is still a possibility, the uterus should be suspended from the anterior abdominal wall. This may be done in many ways. Those most favoured at present are *Gilliam's operation*, in which the round ligaments are picked up in the middle of their length and drawn out taut through the recti muscles on either side; and lastly the *Alexander Adams operation*, in which the

round ligaments are exposed in the inguinal canals, drawn upon so as to elevate the uterus, and then fixed to the aponeurosis.

Prolapse.—The subjects of prolapse and retroversion are closely connected, for a prolapsed uterus is invariably retroverted. The prolapse may be of less or greater extent, and it is noticeable that more pain and dragging are complained of when the prolapsed organ still lies within the orifice of the vulva than when its supports have yielded completely, and it has made its way outside the body (procidentia). In the majority of cases advanced prolapse is associated with hypertrophy and elongation of the cervix, which in procidentia may attain two or three times its normal dimensions, and in these circumstances ulceration often arises from the exposure of the mucous membrane to mechanical injury.

The uterine displacement is often associated with eversion of the vagina through a *relaxed vaginal outlet* caused by stretching or rupture of the anterior fibres of the levator ani, with *cystocele*, a hernial protrusion of the anterior vaginal wall and bladder, or *rectocele*, a similar protrusion of the posterior vaginal wall and rectum. These conditions may be present without marked prolapse of the uterus itself and may require treatment.

In undertaking the care of a case of prolapse, including cystocele and rectocele, two lines of treatment are open—radical or palliative—and in deciding on which is to be adopted the following considerations should be kept in view: When the patient is young and likely to become pregnant at no long interval, there is little benefit to be gained by an operation for repairing lacerations which will probably be renewed at the next confinement, or for narrowing a canal which is soon to be distended by a full-term fœtal head. On the other hand, when the approach of the menopause finds a woman with a gaping vulva and uterine prolapse, it is scarcely good practice to advise her to endure the discomforts and restraint of a pessary for the term of a long post-sexual life, even if the stretching of fascia and weakening of muscle which accompany the loss of youthful vigour are not likely to render the wearing of such a support ineffectual. When the patient suffers from cervical endometritis, an attempt should be made to cure it before a pessary is inserted, and if the cure demands curetting or the repair of a cervical laceration, a complete operation for the relief of the prolapse will add little to the risk and will be more satisfactory. Operation may be only partially successful, and the patient may have to resort to the wearing of a pessary through yielding of the united structures. On the other hand, many patients cannot retain a pessary on account of relaxation of the vaginal outlet, and operation is necessary if they are to have any comfort at all. There is no inherent objection to a pessary if a patient prefers it to operation, if she will submit to proper hygiene while wearing it, and if a suitable one can be fitted.

If a pessary is decided on, the methods of using the instrument already described under retroversion should be followed. Broadly speaking, the most satisfactory results will be got from a ring, but in cases of rectocele a Smith-Hodge with the broad end forwards is sometimes more successful,

and in cases of cystocele a Galabin's cradle or a Gehrung pessary may be more serviceable. A bad case of prolapse can often be kept up by a stem pessary, when a ring cannot be retained; the ring portion is first introduced and the stem is then screwed into place. A still better form is the "shelf" pessary, which is, however, very difficult to introduce. In the worst cases a cup-and-stem pessary supported by a belt with perineal straps may be the only apparatus that will keep up the uterus.

Operative treatment usually entails a number of procedures, and it may be taken for granted that a simple perineorrhaphy will seldom cure a prolapse, though it usually enables a pessary to be retained when that could not be done before. It is wise to commence by curetting the uterus to remove any traces of chronic endometritis, and to promote involution of the organ, which is usually in a state of congestive hyperæmia. The cervix often requires to be attended to; lacerations should be sutured, and hypertrophy should be met by a wedge-shaped excision of the exuberant tissue. The vagina frequently requires to be narrowed, and this may be effected by anterior colporrhaphy if cystocele be present, or by posterior or lateral colporrhaphy. The vulval opening should be narrowed by a perineorrhaphy, either Lawson Tait's or a modified Emmett. Lastly, in cases of advanced prolapse, where the uterine supports are so lax as to have lost all value, means must be taken to anchor the uterus in its place, and this may be done by abdominal suspension or fixation, or by vaginal suspension as suggested under Retroversion (*q.v.*). The temptation to remove a uterus for procidentia should never be yielded to, as, no matter how neat the result at the time, the vagina itself is practically certain to yield and a hernial protrusion of it to form.

Anteflexion.—An exaggeration of the normal forward bend of the uterus is met with fairly commonly. It is often associated with underdevelopment of the cervix (conical cervix), and by many it is assumed to have a causal connection with some cases of dysmenorrhœa (*q.v.*), and of sterility. For the relief of these conditions it has been suggested by some specialists that a hollow intra-uterine stem should be worn, but there is little evidence that such an appliance serves any useful purpose. If these symptoms are present in a case of anteflexion, relief is as likely to be obtained from dilatation of the cervical canal up to 12 or 14 Hegar as from any more elaborate method of treatment. If no such symptoms are caused by the condition, no treatment should be instituted.

Chronic Inversion.—When an acute inversion of the uterus (see under Post-Partum Hæmorrhage) has not been diagnosed or reduced until the uterus has involuted, the main symptom is hæmorrhage, which may be confined to the menstrual epoch, or may recur at irregular intervals. In addition, the patient often complains of something coming down, and a mucoid or leucorrhœal discharge is usually present. A careful bimanual examination will show the nature of the case, and will distinguish it from a fibroid polypus, a cervical fibroid, or inversion due to a fibroid tumour, the conditions with which it is most likely to be confounded.

It is probably useless in any of these cases to attempt reduction by

manual taxis, even under an anæsthetic, and harm may be done by too violent manipulation. Steady elastic pressure exerted by means of Aveling's or Lawson Tait's repositors is likely to be effectual. A repositor is chosen of a size which will permit the fundus to lie snugly in its cup. Should the vagina be very lax, it is advisable to pack lightly with iodoform gauze around the instrument, so as to prevent it from shifting off the fundus. The elastic cords on the stem of the repositor are then attached to a waistbelt so as to exercise moderate pressure, and the apparatus is left in place for 24 hours. At the end of that time it is removed and readjusted. The method should be given a trial of at least a week's duration, adjustment being renewed daily. Should this fail, recourse must be had to operation. The best results seem to have been obtained by incising the cervix through an abdominal incision and then reinverting the fundus.—R. J. J.

UTERINE FIBROIDS.

The treatment of fibroids is in the main operative, and this is due entirely to the fact that the operative measures for their removal have been so far perfected in technique that the risk of myomectomy or hysteromyomectomy is now comparatively negligible, while the results both immediate and remote are gratifying in the extreme. So completely has operative treatment won the field, that at the present day I do not think a single gynæcologist of note could be found who does not recommend the removal of fibroids as soon as they give rise to symptoms of pain, hæmorrhage or discharge, since experience shows that once symptoms have made their appearance there is no treatment short of removal which can be relied on to put an effectual check upon them, and since the risk of operation is so slight that it cannot be held to outweigh the practical certainty of shortened life, and more or less chronic invalidism which a bleeding or infected tumour entails.

While the views just put forward are undoubtedly those of the majority of gynæcological surgeons, it is but fair to say that within the past few years a very large amount of work has been done in the treatment of fibroid tumours by X rays and by radium, and the results already reported are so encouraging that the day seems almost to have arrived when, in cases suffering from uterine fibroids, a choice will have to be made between operation and radiotherapy. This is especially the case in patients whose main symptom is hæmorrhage. The rationale of radiotherapy is partly the destructive effect of the rays on the ovaries, causing a premature menopause, and partly direct action on the tumour elements, causing shrinkage of the growth. Although a number of cases have been reported in which the action of the rays was so nicely graduated that a menorrhagia gave place to normal menstruation, instead of an amenorrhœa, it seems to be generally admitted that the most suitable cases for radiology are those which are already approaching the menopause, and that cases of submucous or gangrenous fibroids, and those in which inflammatory lesions such as pyosalpinx complicate the case, are unsuitable for the method.

Fibroids without Symptoms.—There is a growing body of opinion, influenced by the established fact of malignant degeneration in a certain percentage of fibroids, and by the very great probability that the tumour will ultimately cause symptoms, to the effect that once the presence of a fibroid is discovered it should be marked as suspect even in the absence of symptoms, that it should be carefully watched and examined at regular intervals, and that rapid growth or the development of tenderness should be regarded as signals for its immediate removal. In estimating the possibilities of such a tumour, it should be remembered that a subperitoneal or pedunculated fibroid is less likely to cause symptoms, while an interstitial and still more a submucous one is almost certain to set up hæmorrhage sooner or later. The patient's time of life should be kept in mind. If she is near the menopause or past it, there is a greater chance of her escaping practically every risk of a fibroid except malignant degeneration, but at the same time her age removes one strong objection to a hysterectomy, for her hope of offspring is already gone. In a young woman, on the other hand, it is important not to perform an operation unless there are strong indications for it, which would so mutilate her that pregnancy ceases to be possible, but we must bear in mind that the years of sexual life still to come give every opportunity for the growth of the tumour and the development of symptoms, while, if large or multiple fibroids are present, the probability of the patient becoming pregnant and going to term is very slender. The general condition as to health and estate of the patient should also be considered. If she is a strong healthy woman compelled to lead an active life, one would be more inclined to recommend removal than if she were weak, the subject of chronic disease, or were enabled by her circumstances to take life easily.

Fibroids causing Symptoms.—The palliative treatment of symptoms caused by fibroids is not very satisfactory. In most cases it can only be temporary, as the symptoms are likely to increase in severity, and it is in the highest degree ill-judged to allow a patient to become anæmic, wasted, and an invalid from hæmorrhage or pain before setting about the removal of the cause of her sufferings, since the risk of operation is increased without gaining any advantage by its postponement. Hæmorrhage may be relieved by rest in bed at the menstrual epoch. Ergot and ergotin are sometimes given, but have very little effect, as the loss is not one which can be checked by improving the tone of the uterine muscle. Calcium lactate in 20-gr. doses may be given with a view to increasing the coagulability of the blood, and with the same object sterilised gelatin has been injected. Styptol, thyroid extract and hydrastis canadensis have also been employed. An alarming hæmorrhage can usually be checked for the time by a firmly applied vaginal or intra-uterine tamponade. Curetting with subsequent tamponade of the uterus gives relief which may last for some months, but there is a certain amount of risk of setting up necrosis of the tumour. Both pain and hæmorrhage are often relieved by the use of copious hot (110° to 120° F.) vaginal douches. Cases of hæmorrhage may be put under radio-therapy, but it should be remembered that the first

effect of the rays is often to increase the hæmorrhage for a short time.

If a patient is very anæmic and weak it is advisable to put her to bed, and to institute a course of iron and forced feeding (see under Anæmia) before subjecting her to operation. The choice of operation depends on the conditions present and on the age and circumstances of the patient. Speaking generally, the most satisfactory operation is a supravaginal hysterectomy, which confers almost complete freedom from the possibility of uterine trouble in the future, and has less immediate risk than a complete hysterectomy, the operation recommended by some surgeons on account of the possibility, remote though it is, of cancer developing in the cervical stump. Myomectomy or the removal of the tumour, leaving the uterus intact, can be carried out most successfully if the tumour is small and single. The risk is rather greater than that of a supravaginal hysterectomy, and there is always the probability of a second fibroid developing in the uterus. It should be reserved for cases in which pregnancy is still possible, and the whole facts should be put before the patient, as she has certainly a right to decide whether she will run the risk of a recurrence of her tumour for the sake of a rather problematical chance of becoming a mother.

A cervical or pedunculated submucous fibroid can be easily and efficiently dealt with by the vaginal route. Small submucous tumours may be enucleated by the same route after incising the anterior wall of the uterus. Subperitoneal tumours are best dealt with through the abdomen. In the removal of a sloughing fibroid care must be taken to insure adequate disinfection of the uterine cavity and to provide free drainage afterwards. If the tumour is in the cervix it can be twisted out with Schultze's spoon forceps, and the cavity lightly packed with iodoform gauze. If it is in the interior of the uterus, a thorough douching should be given with antiseptic, and the uterine cavity firmly packed with gauze wrung out of 40 per cent. formalin before the organ is removed. The vagina should then be packed with dry sterilised gauze, which should be removed by an attendant as the vagina is severed, for it is advisable in these cases to do a complete hysterectomy, and vaginal drainage should be provided.

In regard to the after-treatment the practitioner is referred to the article on Operations. He should be especially on the watch for symptoms of intestinal obstruction which sometimes arises after hysterectomy through adhesion of bowel to the wound in the pelvic peritoneum, and also for symptoms of phlebitis, which is a fairly common sequela in these cases.

Fibroids in Pregnancy.—A pregnant woman with a fibroid is exposed to several dangers. She is likely to abort or to be confined prematurely. The fibroid, if situated in the cervix or lower uterine segment, may block the pelvis or may lead to a malpresentation. Its presence may cause ante- or post-partum hæmorrhage. During the puerperium, necrosis of the tumour may occur. In spite of all these possibilities it is wonderful how many women with a fibroid go to term, are delivered and recover

without a bad symptom; and in many cases the fibroid is even reported as having disappeared with the normal involution of the uterus. One must make allowance in these results for mistakes in diagnosis, since not every firm area in a pregnant uterus is necessarily fibroid. Still, sufficient well-attested cases remain to lead one to adopt a waiting policy unless urgent symptoms develop. Even when a tumour seems to block the pelvis it is wiser to wait for labour to begin, as it may be drawn up by the contraction of the uterus. If it is not, Cæsarean section can be done followed by a hysterectomy. If signs of necrosis in the tumour make their appearance during the puerperium, it is well to remove the uterus at once for fear of puerperal sepsis. The onset of hæmorrhage or severe pain during the pregnancy is an indication for hysterectomy. A pedunculated subperitoneal fibroid may be removed without interrupting pregnancy, but attempted enucleation is apt to end in hysterectomy on account of the difficulty of stopping hæmorrhage from the bed of the tumour.—R. J. J.

UTERUS, Diseases of—see under Dysmenorrhœa, Menorrhagia, Cancer, Endometritis, etc.

VAGINISMUS.

The following local analgesic may be tried in severe cases which fail to respond to local sedative or simple emollient applications:

℞. *Cocainæ Purificatæ gr.* xxx.
Morphinæ Purificatæ gr. xv.
Unguenti Conii ℥j. *Misce.*

Fiat unguentum. Signa.—"A little to be smeared over the painful spots with the finger."

Cocaine may be used in the form of a medicated pessary:

℞. *Cocainæ Purificatæ gr.* j.
Iodoformi gr. x.
Extracti Belladonnæ Vir. gr. iss.
Olei Theobromatis q.s.

Ut fiat suppositorium.

A careful inspection of the vaginal orifice should be made when the above applications fail to afford speedy relief, and any abrasions, irritable caruncles, fissures or ulcers should be cauterised with Nitrate of Silver or pure Carbolic, and if this is ineffectual removed by knife or scissors after the application of a strong Cocaine solution, or under chloroform. When the patient is anæsthetised, it is well to remove the hymen completely with its base, and to stretch the vaginal orifice with the fingers. This operation usually cures the complaint.

After operation a *large* vaginal bougie or a glass dilator should be introduced and worn by the patient for several days, and afterwards for a few hours daily.

Vaginitis is not to be confused with vaginismus: its treatment is mentioned under Leucorrhœa.

VARICELLA, OR CHICKEN-POX.

This mild fever as a rule requires no treatment save isolation of the patient, a milk diet for the first few days, and rest in bed when the temperature does not speedily fall to the normal. As in some cases there is considerable itching, care should be taken that the vesicles be not ruptured by the finger-nails, otherwise pitting, especially on the face, may result.

In the rare gangrenous type of the disease the vesicles should be kept aseptic by dressing with Boric Acid Ointment after cleansing the surface from crusts by a warm compress of Carbolic lotion or Boric Acid. Should smart constitutional symptoms accompany the disorganisation of the bullæ or vesicles, a mild diaphoretic and a generous fluid dietary of soups or beef juice will be necessary. A quarantine period of about 21 days is accepted as the recognised term. Children may be allowed to mix with others as soon as all traces of the eruption have disappeared and a bath well stained with Permanganate of Potash has been administered.

VARICOCELE.

In all mild degrees of this condition, palliative measures should have a fair trial before operative procedures are thought of, unless where the subject of it is exposed to severe physical exertion, or where he wishes to enter into some department of the public service. Indeed, many cases cease to give trouble after a few years even without treatment.

By relinquishing an occupation which entails long standing without exercise, and substituting for it one involving a fair amount of sitting, the diseased condition often disappears. In all cases the scrotum requires the support of a good suspensory bandage; constant bathing and sponging of the skin does good. The regular and persistent use of a cold douche night and morning, or oftener in hot weather, is of great service. It can be very easily applied by means of a piece of India-rubber tubing, which can be attached to the cold-water tap in the bath, and in this way a stream of water can be directed on the scrotum. It should be kept running till the part becomes almost numb. The writer has satisfied himself that great benefit may be obtained by kneading the scrotum between the finger and thumb several times a day so as to excite contraction of the muscular elements. This is especially valuable in those cases where the scrotum is very lax and toneless.

Lotions are of little use, as they must be covered in with oiled silk, when they soon act as poultices. The following may be sponged over the scrotum every morning before the patient begins to dress:

℞. *Hazelini* ʒiij.
Spiritus Vini Rectif. ʒiiss.
Aquæ Destillatæ ʒivss. *Misce.*

Fiat lotio.

Sexual excitement and excesses should be guarded against, and constipation must be carefully avoided. Electricity may have a trial; a weak continuous current passed through the moistened scrotal integument morning and night, combined with massage, greatly assists in improving the tone of the part.

Ergot, Hamamelis and other drugs supposed to act upon the blood-vessels when administered internally are useless, but there is no doubt that any good tonic which improves the general tone will assist the varicocele weakness. Quinine, Iron and Strychnine in combination as in Easton's Syrup may be tried.

Sometimes the mental condition will require attention from the physician, as individuals are apt to become hypochondriacal and dread the supervention of sterility or of impotence, becoming also morbid in their dread of having permanently damaged themselves by early abuse. As a rule the calm and positive assurance that no such results need be feared is quite sufficient to remove any depression. The question of a secondary wasting of the testicle is a more difficult one, as this does sometimes happen and is often made the final reason by the surgeon for performing a radical operation on the dilated veins. In the writer's experience of varicocele, which has not been a limited one, owing to his having to examine candidates for various services, he has seen wasting of the testicle follow operation in many cases where the gland showed no tendency to atrophy before.

When the individual is a candidate for any of the public services or when the tumour is large and is causing severe dragging pain, especially if he contemplates emigrating to some region where surgical assistance is not easily procurable, operation should be decided upon.

The open method of operation is now always preferred to the subcutaneous. The scrotum and surrounding skin must be thoroughly sterilised, and the various steps of the operation carried out under the most rigid asepsis. The incision should be made through the smooth skin in preference to that of the scrotum, and a wound in the line of the cord about 1 inch long over the external abdominal ring dividing the skin and subcutaneous tissue will expose the dilated vessels after incising the spermatic fascia. The veins, being carefully dissected from the cord and from their surrounding areolar tissue, are to be ligatured with strong catgut at the external abdominal ring and near the epididymis, and the intervening mass of veins excised between the ligatures. The bunch of veins beyond the ligature above and below the part removed are then *sutured* together. This prevents the slipping of one or other ligature, as sometimes happens when they are simply tied together. The cord is

thus shortened, the dilated veins are removed and obliterated, and the drag, largely due to the weight of blood, disappears. The wound is closed in layers by interrupted sutures, no drainage being required. The patient should rest in bed for at least 14 days, and for a couple of months after beginning to move about he must wear a suspensory bandage.

When the scrotum is thin and pendulous, Brault advises the excision of an oval piece of its tissue.

VARICOSE VEINS.

Palliative treatment is all that is required in most cases. Prolonged standing, the use of garters, chronic constipation, and anæmia or plethora should be guarded against, and everything calculated to improve the general health and diminish venous engorgement must be insisted upon.

Support to the dilated vessels by means of a properly applied rubber bandage affords the best treatment for this condition. The bandage should be applied from the toes to the upper limit of the varix before the patient assumes the vertical position in the morning, and it should not be removed till he lies down in bed at night. Where the skin gets tender under its use a perforated rubber bandage may be employed, but the elastic webbing described upon p. 1014 meets every requirement. These appliances are superior to the old-fashioned elastic stocking, which should never be recommended unless the patient refuses to take the trouble of employing a rubber bandage. The writer has obtained good results by the application of the elastic webbing or a pure rubber bandage over an ordinary silk or cotton stocking. Each morning the limb should be well douched or sponged with cold water and rubbed upwards before the bandage is applied.

On p. 1014 under Ulcer is described the use of the Gelatin bandage and the modified method of employing it as recommended by Jamieson and Low.

The supporting appliance made by Harris of Birmingham and known as the "Ambient" is a great advance on the old elastic stocking; it is easily and readily applied, the pressure being graduated by the tightness of the lacing. It is constructed on the principle of Murphy's Leg Corset, in which *inelastic* pressure is employed.

Surgical procedures are indicated when bandaging fails, when the varicosities are above the knee, and when recurring attacks of phlebitis have been experienced, or when the patient wishes to escape from the trouble inherent on constant need of bandaging.

The most efficient operation for the treatment of varicose veins is that practised by A. B. Mitchell. He insists upon the importance of removing the entire saphenous vein. He divides the internal saphenous vein below the saphenous opening, after making a short transverse incision in the thigh, and applies an iodine catgut ligature to its proximal end. By pulling on the forceps attached to the distal end the line of the vessel beneath the skin is easily located by the index-finger of the other

hand. A 1-inch transverse incision is next made 5 inches down the thigh and the vein picked up and clamped with forceps; by drawing alternately on the upper and lower forceps in a see-saw fashion the vein is pulled up and down and its tributary branches torn. The upper forceps are now removed, and by traction on the lower the trunk of the vein is pulled out through the lower wound and cut off. Further incisions are made and the above manœuvres executed till the knee is reached, when the wounds are sutured and sealed up with a mixture of Tr. Benz. Co. and Flexile Collodion to prevent infection whilst the leg is being operated on.

The vein is next pursued below the knee in a similar manner, the incisions being closer together and vertical, but not exceeding ½ inch, and made over every branch of dilated vein, great care being taken not to cut into the varices which here lie in contact with the skin. The entire vein is thus thoroughly eradicated down to the ankle, no intermediate portion lying between the incisions being left.

The short vertical incisions below the knee require no suturing as a rule, but are closed by a firm bandage applied over sterile gauze, which will not require removal for a week.

Finally, after removal of the bandage, the leg and thigh receive a coating of Unna's Ichthyol Gelatin, a new bandage is applied, and the patient is able to leave his room within a fortnight after the operation. Mitchell claims for this operation the great advantages arising from no ligatures being left in the limb save the one on the proximal end of the saphenous trunk. The results are permanent, the recovery rapid, and the dangers of thrombosis nil, owing to the complete removal of the vein and its tributaries.

Mayo's method is planned on similar lines; he divides the saphenous vein in the upper part of the thigh after ligaturing it; the distal end of the vein is then drawn through a steel ring mounted at an angle on a long handle, and by pushing downwards this contrivance the trunk of the vein is stripped of its branches, and at a distance of 8 inches from the first incision the ring is cut down upon, and this extent of vein pulled out through the wound. The ring enucleator is again introduced into the new incision, and the operation repeated till the entire trunk is removed.

Recently an heroic operation has been introduced by Riendfleisch; a piece of the internal saphenous having been excised in the thigh, a spiral incision is commenced below the knee, passing round the leg several times till the foot is reached, cutting through all the varices more than once and down to the muscular fascia; veins which continue to bleed are tied, and the wound plugged and made to heal by granulation.

A new method of sealing up the trunk and its tributary branches has been devised and carried out by Schiassi of Bologna. He divides the saphenous vein high up after ligature, and into the open distal end of the dilated trunk he injects a weak solution of Iodine, after which he closes the vein by a ligature, shutting in about 1 oz. of the solution.

A new rapid excision operation has been introduced by Babcock and

modified by Gray of Aberdeen, which gives excellent results. The vein is divided in the upper part of the thigh, and its proximal end is ligatured. Into the distal end a long metal stilet is passed as far as the ankle if possible. The olive-tipped extremity of this is cut down upon, and the entire vein is drawn through the lower wound, the upper portion of the vein having been previously fastened to the other end of the stilet.

The main objection to this method, as it is also the objection to Mayo's method, is that in removing the main vein the tributaries are torn across and bleed into the track of the main vessel. To obviate this, operation should be performed with the foot well elevated, and care taken to press out all blood from the affected channel before applying the bandage.

VARIOLA, OR SMALLPOX.

Prophylaxis is of vital importance in a disease of such a highly contagious nature, and as vaccination affords a high degree of immunity, especially when repeated at intervals of 15 to 20 years, every individual in the community above 15 years should be revaccinated as soon as the presence of a case is reported. If periodical revaccination were compulsory it is highly probable that the disease would never be seen in such protected communities. Even as it is, with revaccination never resorted to except in the face of an epidemic, the mortality, as pointed out by Moore, is only the one-seventieth part of the death-rate in prevaccination times.

The most rigid isolation in a properly equipped hospital of every patient affected is essential, and a period of 15 clear days is the shortest quarantine for those who have been in contact with the disease.

All linen, bedding, clothes, etc., which have been about the patient before his removal to hospital should be burned when possible, and the room or entire house in which he has been lying should be efficiently fumigated, and every individual within the zone of his infection should be vaccinated. Schools should be closed up in epidemics. Rigid precautions should be taken to prevent any convalescent child's return to school till long after every trace of eruption has disappeared and he has been thoroughly disinfected. All children in the immediate vicinity of an infected house should be prohibited from attendance at school.

Every body in case of death should be carried from the hospital direct to the place of burial, and not permitted to be brought to the home, as the emanations from the cadaver are highly contagious, and the striking power of the infection has been demonstrated to extend for great distances.

Mild cases of the disease require very little treatment of any kind, and in those of average severity the various routine measures already described under Typhoid Fever, Measles, Scarlatina and Typhus will be indicated.

The environment of the patient demands the most careful attention, not only on account of the highly infectious nature of the disease, but also because of the extensive suppuration. Hence the most rigid isolation and the necessity for thorough ventilation. The details referring to the choice and arrangement of the sick-room and the patient's bed should receive special care. It is advisable to keep the temperature of the sick-

room between 55° and 60° F. (see under Typhus, p. 1009), but in every possible case the patient should be removed to hospital, and not treated in his own dwelling.

In the confluent type and in all severe cases the pain in the back may be so intense as to call for relief. 5 grs. Antipyrine, 10 grs. Aspirin or a 1-gr. dose of Opium may be given. Moore advocates the application of the india-rubber hot bottle and dry cupping.

No drug is known which exercises a specific action over the parasite causing the disease, hence the treatment must be expectant and symptomatic. Antiseptic drugs have been extensively employed with the view of destroying the organism causing the fever, but it does not yet appear that any marked results have been obtained. Sansom's plan of administering the Sulphite of Sodium in 20 or 30 gr. doses or the Sulphocarbolates in similar quantities can do no harm; and though they have generally failed in making any very decided impression upon the constitutional symptoms, they may possibly sometimes turn the scale in the struggle against the microbe. Yeo has forcibly shown that slight modifications in the environment of the parasite may materially modify its activity. Thymol, Eucalyptus, Carbolic Acid, Corrosive Sublimate and Salicylic Acid have been extensively employed.

As the result of his extensive experience, Sir J. W. Moore states that in Quinine in 5-gr. doses and in Tincture of Perchloride of Iron in 20 to 30 min. doses we possess the two most valuable antiseptics known so far as smallpox is concerned.

Bianchi carries out the antiseptic treatment to the fullest extent, with apparently excellent results (no deaths in 96 cases). He renders the surface of the patient, his bedding, room, and all his surroundings, as aseptic as possible. The writer strongly recommends inunction of the patient's skin with the Oil of Eucalyptus mixed with Olive Oil (1 in 5) from the very commencement of the disease, but this is not to be applied to the face when free suppuration is taking place.

Reports of the successful treatment of smallpox by injections of Salvarsan have raised the hope that in this new steriliser may be found a method of dealing with the disease on rational and scientific lines, but it is still too early to judge of its action on the causal parasite, and the same remark applies to the intravenous injections of 50 c.c. Electrargol employed by Denman in the late outbreak in the Mauritius.

The Mineral Acids internally, as in the other eruptive fevers, give very good results, and in mild cases or modified smallpox should constitute the only drugs administered.

Alcohol in some form is often needed, the indications being those already discussed under Typhoid Fever. The presence of free suppuration, moreover, constitutes a further indication for alcoholic stimulation and free feeding by strong soups and extra nourishment in liquid form.

As in the other infectious fevers, cold sponging, cold baths and cold packs will be indicated by the height of the temperature, and these are always demanded in the confluent type of the disease. During the period

of free pustulation the tepid bath is obviously indicated for its antiseptic action, when weak Permanganate or other steriliser may be added to it.

Hæmorrhagic smallpox will demand the free administration of Calcium Chloride with Quinine and Iron Perchloride; Alcohol will probably also be clearly indicated.

Ergotin by deep parenchymatous injection and Turpentine by both mouth and bowel are generally used. Moore's routine combination is:

℞ *Extracti Ergotæ Liq.* ℥iij.
Olei Terebinthinæ ℥iij.
Spiritus Ætheris Nit. ℥ij.
Spiritus Rectificati ℥j.
Ovi Vitellum
Aquæ Menthæ Pip. ad ℥viij. *Misce.*

Fiat mistura. Signa.—"*One-eighth part every third, fourth or sixth hour, as required.*"

Delirium may be very fierce, in which case the cold pack and ice-bag to the head are the best measures; drugs are not to be relied on, but occasionally the excitement may demand a full hypodermic dose of Morphia. The treatment of such complications as headache, insomnia and diarrhœa is already detailed under Typhoid Fever.

The treatment of the eruption, especially that on the face, constitutes a large part of the management of the disease. Stokes insisted that the air should be excluded from the rash, that the skin should be kept permanently moist so as to prevent the crusts hardening, and that the local irritation should be reduced to a minimum. These three indications he carried out by the application of warm poultices; these have passed out of fashion since the introduction of aseptic surgery, but MacCombie still advocates a mask of lint lined with a thin layer of linseed poultice, which latter should be smeared over with Iodoform Vaseline; this should be changed every 2 hours, and apertures left for the eyes, nose and mouth.

After the removal of all crusts or scabs the application of warm Boric Acid Compresses under oiled silk is perhaps the safest and most effective routine which the young physician can employ.

Perchloride of Mercury solution (3 grs. in 10 oz.) has been used by Skoda and Hebra. Carbolic Lotion (1 in 80), Carbolic Oil (1 in 12), and Carbolic Pastes made with Chalk and Oil are all recommended highly.

Thick oily preparations are more valuable than watery solutions. The writer recommends the following:

℞ *Linimenti Calcis* ℥viiss.
Olei Eucalypti ℥iv.
Calaminæ Præparatæ ℥j. *Misce.*

Fiat applicatio. Signa.—"*To be applied with a large camel's-hair brush to the skin of the face every two or three hours.*"

Weak Tincture of Iodine has been extensively used for brushing over the papules till the free suppuration stage has occurred. This is a good routine, the only difficulty being in the smarting of the eyes which the iodine vapour produces after the spirit has been allowed to evaporate. After the superficial layer of the skin has been shed by the iodine a lint mask well lined with the firm Boric Acid Ointment of the B.P. may be applied.

Mercurial Ointment, diluted with 5 to 15 parts of Lard, has been tried and reported upon favourably, but it is not without serious danger. A very innocent plan is to smear over the face with Olive Oil, and then to apply a powder consisting of equal parts of Subnitrate of Bismuth and prepared Chalk, but most authorities condemn all powdery applications during the stage when crusts are present.

Ultra-violet rays have some influence upon the skin, and it has been recommended to only admit red light through red glass window-panes or red curtains. Turkey-red window-blinds would answer every purpose and keep the sick-room cheerful. The plan of rigidly excluding daylight from the sick-room has some advocates, but it is manifestly objectionable, and by no means certain in its effects.

Cauterisation of the vesicles by solid Nitrate of Silver, or their evacuation by means of a fine needle, and many other plans formerly in vogue, as the painting on of Collodion, applying Gold Leaf, &c., are not to be recommended.

Sir John Moore covers the face by a light mask of lint soaked in a mixture of Iced Water and Glycerin (8 to 1), and covers over the mask with oiled silk. Richardière covers the head and face with a helmet made of bandages soaked in solution of Sublimate (1 gr. in 5 oz. water), which is kept on all through the disease, the muslin being wetted several times a day with the solution.

Inspection of the eyes, which should be continually cleansed by weak Boric solution and Vaseline applied to the margins of the lids, is a necessary precaution, and when corneal ulcers appear they should be dressed with Hyd. Ox. Flav. Ointment (1 gr. to each drachm), to which Atropine may be added with advantage (1 per cent.).

For the general eruption, some authorities treat the entire cutaneous surface of the body by immersion in various medicated baths for long periods. A plan is immersion in a tepid or warm bath containing 150 grs. Sublimate for 15 minutes twice a day. Permanganate of Potassium is safer and equally efficacious.

Glycerin of Borax is the best application for the mouth and throat; and for laryngeal troubles the spray of Carbolic Acid, mentioned upon p. 701, answers all purposes. Cocaine may be added with advantage when there is much pain present.

VERTIGO.

The treatment of this condition is dealt with under Ear, Diseases of, on p. 244.

VITILIGOIDEA.

This curious affection, known also as Xanthelasma and Xanthoma, seldom calls for treatment. The yellow plaques or nodes which usually affect the skin of the eyelids tend to remain permanent and unaltered, and are uninfluenced by any local or constitutional agents, except when they suddenly appear in glycosuric and diabetic patients, in which case they often yield to general dietetic measures.

If the patches or plaques are causing obvious deformity or unsightliness, they may be excised through an oval incision, which is to extend through the entire thickness of the corium.

VOMITING.

The treatment of this symptom is detailed under the various headings of the different diseased conditions which produce it. (See under Dyspepsia, Cancer of Stomach, Gastralgia, Gastric Ulcer, Gastritis, Meningitis, Bright's Disease, Intestinal Obstruction, Sea-sickness, Diarrhœa, &c.) The treatment of the vomiting of pregnancy is dealt with in the article on Pregnancy.

VULVITIS.

The affection is almost always gonorrhœal in origin, but is sometimes seen in children as the result of neglect and uncleanliness. It usually yields readily to frequent cleansing with weak antiseptic and astringent solutions such as weak permanganate, saturated boric acid or the like. If pain and irritation are marked, the patient should be put to bed and lint or old linen soaked in warm Lead and Opium lotion kept applied to the parts. If a vaginal discharge is present, a douche may be given at short intervals to get rid of the flow of pus which is keeping up the irritation.

Bartholin's glands are often infected as part of a vulvitis. If an abscess forms, it should be freely incised and packed with iodoform gauze. If the infection becomes chronic, the gland may be transformed into a small, hard, tender nodule or into a cyst filled with mucoid fluid, and under such circumstances should be excised.

One sees not infrequently a form of vulvitis in which numerous small chancres or ulcers are present on the inner surfaces of the swollen and inflamed labia. The affection usually yields to dusting with a powder of equal parts of Calomel and Salol, and to the application of Black Wash on lint. The possibility of syphilis should not be lost sight of in these cases.

The vulvitis following on irritation caused by pruritus due to diabetes or other causes is cured by the removal of the cause (see under Pruritus).—R. J. J.

WARTS, OR VERRUCA.

Most simple cases of warts about the hand and fingers are best treated by once a day touching the elevations with a pointed piece of soft wood soaked in Glacial Acetic Acid. Where there is a very extensive layer of epithelium, the wart should be shaved by a razor or a sharp scalpel before

applying the acid, and when this is carefully done and any bleeding controlled by pressure, one application of the acid may be sufficient. Failure results through want of attention to this detail, the horny epithelium shielding the vascular tissue from the action of the acid. After the dried crust falls off or is removed the acid should be reapplied till entire destruction is accomplished. Saturated solution of Caustic Potash or the liquefied drug may be applied. It is more speedy and certain than the acid. A less painful application is that of Salicylic Acid in saturated solution in Collodion, which should be applied after moistening the growth with strong spirit and allowing it to dry. It must be remembered that these epithelial growths are infectious.

Fowler's Solution of Arsenic applied daily with a fine camel's-hair brush is a reliable wart destroyer, but the writer has found that it produces such pain after a time that often its use must be stopped. A minute quantity of arsenic made into a paste with water and applied to the wart causes its certain destruction. It is stated upon good authority that Fowler's Solution internally will check the growth of warts; the same has been said of Magnesia.

Resorcin, Butyr of Antimony, Nitrate of Silver, Chromic Acid, Mercuric Nitrate, Nitric Acid, Corrosive Sublimate and nearly every known caustic has been recommended, but the Glacial Acetic Acid answers every requirement, even in the most unpromising cases. (See also Condylomata, p. 169.)

Lobligeois always uses electricity, the continuous current alone or with ionisation being employed, the negative electrode being attached to a platinum needle thrust into the wart. X rays and Radium are efficacious.

Whilst the warts about the face of old people may be touched with the cautery and excised with the knife, the best treatment is radio-therapy, two or three applications often being completely successful.

WHITLOW, OR PARONYCHIA.

The treatment of this affection is dealt with in the article on Onychia.

WHOOPING-COUGH—**see under Pertussis.**

WORMS—**see under Tapeworm, Threadworm, Ascaris and Anchylostomiasis.**

WOUNDS.

Operation Wounds.—The object of the surgeon is to obtain primary union in all wounds which he necessarily inflicts during a cutting operation. This can only be effected by the most rigid asepsis, arrest of hæmorrhage, and the bringing together in accurate apposition the edges of the wound, which is then to be shut out from the air by the application of dry sterile gauze. A recent method of securing accurate apposition in operation wounds is very popular. This consists in making a series of scratches parallel and about one inch apart *across* the line of the skin incision.

Perfect asepsis is only obtainable by a very close attention to numerous

details, the omission of any one of which vitiates the result. The first step consists in a thorough cleansing of the skin, which should be freed from hairs by shaving. Soap and a hair-brush are to be freely used to remove all filth and dead epithelial cells with their accumulated microbes; the scrubbing must be conscientiously performed, being the basis of all sterilising treatment. The cleansed surface is next swilled with Turpentine Oil or Ether to dissolve all sebaceous or fatty secretion, and strong Rectified Spirit is applied to remove the turpentine, after which the entire area is washed with a 1 to 1,000 Bichloride of Mercury or Biniodide solution.

When immediate operation is not necessary, these steps are gone through on the previous night, and the part covered with a 2 per cent. Formalin Compress or a layer of gauze soaked in the mercurial solution. If Iodine or Picric Acid solution is to be used, the compress is omitted and the part covered with a layer of sterile lint. In the morning the operation field is painted over with the Iodine or Picric, a process which is repeated when the patient reaches the operation table.

Many surgeons now employ Iodine by painting over the entire area with the strong tincture a short time before operating, as practised first by Eiselsberg of Vienna. This is a very decided advance upon all former methods of sterilising the skin, but it does not do away with the necessary cleansing, scrubbing, turpentine and alcohol. When the skin is tender a mixture of equal parts of the strong and weak tincture may be used, and it is desirable not to apply any moist lotion afterwards, as the drier the skin is kept the better in order to keep the mouths of the cutaneous glands sealed up during and after the operation. Sir Alexander Dempsey has informed the writer that he has observed the skin discoloured for a considerable depth, when the cutaneous section is examined by the naked eye, which proves that the solution penetrates the upper layers of the true skin.

The hands and forearms of the operator are to be submitted to the same cleansing process by soap and nail-brush, turpentine and alcohol, and finally by being thoroughly immersed in the mercurial solution. (Iodine is here obviously inadmissible owing to its staining powers.) At intervals during a prolonged operation the surgeon will require to immerse his hands in the mercurial solution to destroy any germs which have exuded from the cutaneous glands. Some operators rely upon frequent rinsing with Saline solution, but Watson Cheyne sounds a note of warning against the too rigid observance of maintaining perfect asepsis without the employment of antiseptic solutions, and he points out that sterilisation of towels and instruments should not be left entirely to heat. During a prolonged operation instruments, swabs, sponges, &c., though previously sterilised by heat, should be occasionally dropped into an antiseptic liquid instead of being rinsed or wrung out of Saline solution.

The area of the skin in the neighbourhood of the incision should be protected by sterilised towels, and it is hardly necessary to state that everything brought into contact with the wound should be in a perfectly aseptic condition. Most surgeons, especially in abdominal operations,

envelop the hands in fine rubber gloves previously sterilised by boiling, or by powdering and placing them in the drum with dressings, coats, &c., to be sterilised by dry heat.

Drainage is provided where much oozing is anticipated, but ordinarily where strict asepsis has been maintained it is only necessary to control all hæmorrhage by ligature or torsion, and seal the wound up by suturing the margins in accurate apposition, covering the incision and surrounding skin with several layers of sterile gauze, upon the top of which sterilised Gamgee tissue or Wood Wool is laid. The edges of the wound should not be submitted to the action of any antiseptic; when the final toilet is performed the skin may be washed with the perchloride, iodine or picric solution after suturing and before applying the dry dressing. By the end of a week, the dressings being removed, healing by first intention will be found in a complete or advanced condition. (See also article on Operations, Treatment of.)

Accidental Incised Wounds.—These, being usually infected before coming under the surgeon's notice, will require sterilisation. There are two ways in common use. One depends for its success on thorough scrubbing, first of the surroundings, and after these have been cleansed of the wound itself with soap and water, turpentine, ether or spirit, and an antiseptic, such as Biniodide of Mercury. The other method relies on the antiseptic action of weak Tincture of Iodine, if used on dry skin. Here no washing of any kind whatsoever is done, the wound being simply swabbed over two or three times with the iodine.

Much will depend upon the care with which the margins of the wound are brought together and maintained by sutures, as undue tension is certain to end in failure. Deep wounds will require separate buried sutures in each layer of tissue before the superficial stitches are inserted. When the gap is a wide one, it will be necessary to insert a couple of deep *relaxation sutures* at a distance from the lips of the wound in order to permit these to be kept in contact by the ordinary stitches. Very superficial wounds, when there is no gaping, may be treated by painting the skin with a layer of Collodion.

The question of providing drainage will be settled by the depth of the wound and the amount of sepsis to be feared; when in doubt it will be wise to insert a fine tube for 24 hours, especially in fat subjects.

The time for removal of the sutures will be determined upon inspection of the wound; in vascular parts, as about the face, when the wound has been thoroughly sterilised they may be removed on the third day to avoid marking; in other regions they may be left in for 7 days or more.

Punctured Wounds should always be regarded as serious unless the instrument causing the injury has been in a sterile condition, as, owing to the depth of the wound, it cannot be effectively cleansed. If in doubt, the best routine procedure is to enlarge the opening and convert the puncture into an incised wound, so that all clots, foreign bodies and septic organisms may be removed, and the surface sterilised, after which

it will be advisable to provide efficient drainage, the tube being inserted down to the bottom of the wound.

Lacerated Wounds should be treated first by thorough cleansing, as in incised wounds, and then by removal of all tissue which has obviously been destroyed by the tearing, after which thorough irrigation of the entire breach of surface should be effected. As a rule sutures should not be inserted; the gap may be filled in with a light packing of gauze, and after the appearance of granulations and the removal of any sloughs which have formed, secondary sutures may be employed.

Contused Wounds are to be treated on similar lines, and owing to the great danger of septic infection of the extensive extravasation of blood caused by the bruising, as much as possible of the clot should be removed, and free irrigation of the wound carried out by Saline solution: drainage must be provided and no sutures employed.

Post-mortem and *Poisoned Wounds* should be promptly dealt with by applying a ligature or tourniquet on the proximal side of the injury as in Bier's method, or an exhausted suction cup may be placed directly over the wound, or it may be sucked by the patient's lips when small and accessible, care being taken to immediately rinse the mouth afterwards with any antiseptic liquid. Squeezing the wound should be resorted to without delay, and bleeding encouraged by any of the above means, and when these fail its lips should be freely extended by incising with a sharp scalpel, after which thorough irrigation with Carbolic, Boric, or Perchloride of Mercury solution should be carried out. Small wounds should be swabbed with pure Carbolic Acid or by a 1 in 250 Perchloride solution, and dressed with a warm Boric compress (see also under Hydrophobia for the treatment of bites caused by rabid animals).

Should signs and symptoms of acute septic inflammation have supervened when the wound first comes under observation, it should be immediately opened up, and thoroughly sterilised with pure Carbolic Acid or strong Perchloride solution. A safe plan is to inject a few minims of a 1 in 5 solution of Carbolic Acid into the tissues around the wound, after which the injured limb should be continuously immersed in a bath of hot saturated Boric Acid solution.

Abscesses, as soon as the signs suggestive of suppuration appear, should be freely incised and drained, and early Vaccine treatment instituted, the best procedure being to immediately inject a polyvalent antistreptococcic vaccine or serum, whilst an autogenous culture is being prepared. In severe cases amputation may be necessary to save life.

Gunshot Wounds.—In modern warfare the majority of rifle-bullet wounds are found to heal by first intention owing to the great velocity of the projectile through the air causing sterilisation of the small missile, and producing an aseptic wound which tends spontaneously to close and seal its track from the air. There is still some difference of opinion regarding the routine procedure of extracting the bullet when it remains in the tissues, but owing to the efficacy of the X rays in localising the exact situation of the projectile, the danger of introducing septic organisms

in the operation of probing must be avoided, and the tendency is growing to treat all rifle-bullet wounds on conservative principles.

A rifle bullet passing through a limb usually causes little hæmorrhage; all that is necessary is to apply a pad of dry antiseptic gauze to each opening, and thoroughly sterilise the skin, enveloping the entire limb in dry dressing, no attempt being made to inject the track of the projectile with any antiseptic liquid.

Even when the projectile remains in the tissues, the best procedure is to carry out a purely expectant line of treatment, and this was formerly the practice also in thoracic and abdominal cases. Recently the rule has been, in chest cases, first to close the chest cavity as early as possible, even if it have to be opened up again, cleansed, and the edges excised. "Sucking wounds" of the chest must be closed at the earliest possible moment if life is to be saved. In abdominal cases, after the preliminary hypodermic of morphia restoratives in the form of heat, saline, &c., are given, and the abdomen is opened as early as possible, the first step in the operation being the sterilisation of the skin wound and excision of its edges.

In pistol or revolver bullet injuries the closer ranges and lower projectile velocity do not tend to produce aseptic wounds. When the abdomen is penetrated or the skull fractured in this class of injury immediate resort to a surgical operation is often imperative. Where the bullet can be located and easily reached by enlarging the skin opening, it will usually be advisable to cut down upon it and effect its removal, afterwards sterilising the tissues through which it has passed, and providing for free drainage.

The massive injuries caused by shell explosions afforded the most difficult surgical problems of the Great War from the point of view of sterilisation. This was due mainly to two causes—viz., (1) the extensive damage caused to the tissues in the vicinity of the wound, and (2) the virulent nature of the micro-organismal flora present in the ground and on the soldier's clothes. In the early days of the war the aseptic method of dealing with wounds received an extensive and careful trial, the rarity of wound infections in civil surgical practice leading surgeons to adopt similar methods at the front. It was soon found, however, that neither the aseptic method nor the antisepsis in common use at home was effective in the production of healthy healing in the grave wounds characteristic of the trench warfare waged throughout the greater part of the fighting in France.

The first great advance in the treatment of wounds was due to Gray of Aberdeen, who suggested that all damaged and infected tissues around the wound should be carefully but completely excised, great care being taken that no infection should be conveyed from one part of the wound to another by the surgeon's gloves, his instruments, or the swabs. If a complete excision was possible (owing to involvement of important structures, such as nerves, &c., it was not always possible), then a primary suture was performed, and in a fair proportion of cases healing by first intention followed.

When complete excision of infected structures was not possible, then some form of disinfection had to be resorted to. A great variety of methods have been advocated, and the results obtained vary greatly, sometimes appearing to depend as much on the thoroughness with which the method is carried out as on the actual method adopted.

1. Wright's method consisted in complete excision as far as possible of all infected tissues, in opening up and exploring all pockets, in removing all foreign bodies, and in the introduction into each pocket of a small tube connected with a reservoir above the bed. In the reservoir was contained a solution of common salt of 5 per cent. strength, and containing in addition ½ per cent. of sodium citrate. Drainage of the exuded fluids and excess of salt solution was provided for by a tube at the most dependent part of the wound. The saline solution was allowed to escape slowly through the tubes into the recesses of the wound, and so a stream was constantly passing over the infected tissues, carrying away the micro-organisms as they were exuded. At a later stage, when the wound had become clean, the hypertonic was replaced by an isotonic solution. The latter encourages the phagocytes and promotes healing.

This method was modified by Gray, who used "salt packs"—*i.e.*, tablets of sodium chloride placed within the layers of gauze used for packing the wound. In this case the salt is dissolved by the fluids of the wound, and a hypertonic solution is provided, which is less difficult to deal with owing to the smaller volume. This is a point of some importance, especially where patients have to be transferred from place to place.

2. The Carrel-Dakin method may be taken as typical of that applicable to the substances which depend on chlorine for their antiseptic power. Here, again, Gray's excision of wound surfaces is to be carried out, all pockets thoroughly opened up, and all foreign bodies sought for and removed. But here, instead of providing drainage, the wound is made to resemble a basin into every recess of which a fine rubber tube extends (Carrel's tube is a fine rubber tube, closed by a ligature at the end, and having a number of small lateral perforations). These tubes are connected as in Wright's method with a reservoir above the bed level. Within the reservoir Dakin's solution is placed, and every 2 hours or so the nurse attending on the case opens a stopcock and allows a small quantity of the fluid to pass into the wound; excess of the solution and exudations escaping over the edge of the wound are absorbed by the dressings.

Eusol (prepared by mixing 12·5 grammes each of bleaching powder and boracic acid in a litre of water, allowing to stand overnight and filtering), as suggested by Lorrain-Smith, may be used in the same way as Dakin's solution. It is easy to prepare, and appears to be little if at all inferior to the latter.

It is found that many of the wounds so treated can be closed by secondary suture in a few days, the actual time being dependent on the result of bacterial counts and on the infecting micro-organism. As a rule,

where one microbe only per microscopic field is found, other circumstances being favourable, suture may be undertaken.

3. Rutherford Morrison has suggested another method of disinfecting the surfaces left after excision. This consists in smearing the surfaces with what is now everywhere known as Bipp, a paste made up of Bismuth Subnitrate (8 oz.), Iodoform (16 oz.), and Liquid Paraffin (8 fl. oz.). The excess of the paste after lying in contact with the wound for a short time is wiped off and the sutures inserted.

4. Various other methods and materials have been used for the sterilisation of infected shell wounds, such as Flavine, Proflavine, Brilliant green, Alcohol 95 per cent. (Nogier), Ichthyol, Soap Solution (Ratynski), Borsal (a mixture of Boracic and Salicylic acids, Bismuth Carbonate in 1-1,000 Perchloride of Mercury to make a paste (Moynihan), Urea, &c.

Those already described are typical of the others, and are the methods most generally used.

WRITER'S CRAMP.

The treatment of this troublesome affection is to be conducted on the lines suitable for the management of the other craft palsies, such as those met with amongst typists, telegraphists, sempstresses, pianists, violin players, etc.

Drug treatment is as a rule useless; massage and electricity often aggravate matters unless when employed in conjunction with the only real agent of value—absolute rest for a long period from the special muscular movements which have determined the affection.

Less than a three months' course of rest from all use of the pen or pencil is usually futile, but as the victim of writer's cramp is usually entirely dependent upon his occupation for the means of livelihood, this line of treatment is often almost impossible till he becomes entirely disabled, in which case the hopes of a permanent cure are rendered remote. Fortunately for him, however, he can safely employ his muscles in other specialised movements, and it is a good plan for him to commence typewriting. In the intervals of rest from this occupation he should learn to write with his left hand or to practise cautiously mirror writing and to employ massage and the continuous current to the affected muscles. This latter agent should be applied whilst rhythmical movements are being executed by the fatigued muscles at the same time.

As soon as he can advantageously resume his former occupation he should be advised, as suggested by Gowers, to begin practising a bold free hand, such as is produced by the action of the shoulder and arm muscles as in writing on a blackboard with chalk. Often considerable aid may be obtained by resorting to a new method of holding his pen or pencil, and many victims of writer's cramp can work with comparative ease by employing a penholder surrounded by a thick layer of cork or rubber about the middle of its shaft, which minimises the cramped position of the digits.

YAWS, OR FRAMBŒSIA.

This troublesome specific tropical affection has been hitherto only influenced by Mercury and Iodides, though mercurials as a rule have been found to make little impression upon the fungating or raspberry-papules in the early stages of the disease. Though the identity of yaws and syphilis may be said to be still awaiting demonstration, the reports of the specific effects of a single dose of Salvarsan or Neosalvarsan are even more striking than in the case of ordinary secondary syphilis. Dr. J. Eakin of Trinidad has informed the writer that he has observed the change in the sores to commence within 24 hours after the employment of the remedy, and this always progresses rapidly till the entire skin lesions so characteristic of the disease melt away. The local treatment by antiseptics and caustics formerly necessary are now no longer indicated, since by ordinary cleanliness and salvarsan the *therapia sterilisans magna* sought for by Ehrlich can be so effectually carried out generally by a single dose of the new agent.

Alston obtained the serum from cases of Yaws after the application of a blister to a patient who had received a dose of salvarsan. This serum he has proved to be curative when injected into a victim of yaws. The next best remedy is Tartarised Antimony, which may be given in 1-gr. doses with 30-60 grs. Iodide of Potassium.

YELLOW FEVER.

No drug possessing a specific action on this disease has been yet discovered. Remarkable advances have been made in the prevention of the malady, though its exact pathology is still to be cleared up unless the discovery of an intracorpuscular parasite by Seidelin proves to be the final solution of the mystery.

Prophylaxis.—The disease being communicated from the affected to the healthy by the bite of a mosquito (*Stegomyia calopus*), the problem of prevention is allied to that of the extermination of malaria. The breeding-grounds of the insect have been attacked, and the disease has thus been stamped out completely in districts in which it has remained endemic for many years.

As soon as a patient becomes infected, he must be surrounded with fine mosquito netting to prevent the admission of the insects, which otherwise would spread the disease to the healthy in the immediate neighbourhood.

It must, however, be remembered that the mosquito may remain infective for 57 days after sucking the blood of a yellow fever patient, and the next brood of young mosquitoes may be tainted through the virus in the eggs laid by their infected mother. Therefore no possible means should be omitted to prevent the bites of the insect by those living in an endemic zone.

The treatment of the established disease is to be conducted on symptomatic lines as in typhoid and other continuous fevers. The patient is to

be ordered immediately to bed and fed by small spoonfuls of liquid nourishment supplemented by rectal alimentation, or preferably he should be entirely fed by the rectum for the first three days or permitted to abstain from all food.

Fever is to be reduced by cold sponging, baths or cold packs; vomiting by iced Champagne or effervescing drinks and Morphia hypodermically; cephalalgia by the ice-cap; and hæmorrhage by Calcium Chloride. Alcohol will be indicated in a considerable number of cases, such as in alcoholic patients and in adynamic cases; it should not be administered as a routine.

The most successful routine is to administer at first a large dose of Calomel, and after the thorough evacuation of the bowel to commence with large rectal injections of Normal Saline administered slowly at a temperature not exceeding 70° F.; these entirely meet all the needs of the system for the first three days without administering food in any form.

Sternberg's method of treatment has met with most acceptance, and in his own hands has reduced the mortality amongst Europeans to about 7 per cent., whilst in negroes the death-rate fell to almost nil. It consists in the administration of an alkali with minute doses of Perchloride of Mercury, the formula being $\frac{1}{80}$ gr. Hyd. Perchlor., 6 grs. Bicarbonate of Soda in 12 drachms of iced water administered every hour. The object aimed at is to keep the urine alkaline and abundant in quantity. Mitchell doubles the strength of the mixture and reports favourably of the results.

Larger doses of alkali combined with Theobromine, Caffeine or Nitroglycerin will be necessary should the amount of urine continue to decrease, and when these fail Normal Saline solution must be administered by the skin or veins as well as by the rectum, and dry cupping and poultices applied to the loins.

Black Vomit is an indication for the suspension of all food by the mouth and for the administration of 30-min. doses of Adrenalin Chloride solution. Some authorities adhere to a routine consisting of Quinine administered hypodermically.

Strychnine should be given hypodermically as soon as any symptom of heart failure shows itself, and this may be necessary during the prolonged weakness occurring during the convalescing period, when absolute rest in the horizontal position should be maintained, and the strength kept up by concentrated soups and alcoholic stimulants.

WEIGHTS AND MEASURES OF THE BRITISH PHARMACOPŒIA

WITH THEIR METRICAL EQUIVALENTS

IMPERIAL SYSTEM.

Measures of Mass (Weights).

1 Grain	gr.		
1 Ounce (Avoir.)	oz.	=	437·5 grains.
1 Pound (Avoir.)	lb. = 16 ounces	=	7000 ,,

Measures of Capacity (Volumes).

1 Minim	min.		
1 Fluid Drachm	fl. dr.	=	60 minims.
1 Fluid Ounce	fl. oz.	=	8 fluid drachms.
1 Pint	O.	=	20 fluid ounces.

Relation of Capacity to Mass (Imperial).

1 Minim = the vol. at 16·7° (62° F.) of 0·9114583 gr. of water.
1 Fluid Drachm = the vol. at 16·7° (62° F.) of 54·6875 grs. of water.
1 Fluid Ounce = the vol. at 16·7° (62° F.) of 1 oz., or 437·5 grs. of water.
109·7143 Minims* = the vol. at 16·7° (62° F.) of 100 grs. of water.

WEIGHTS AND MEASURES OF THE METRIC SYSTEM.

Measures of Mass (Weights).

1 Milligram (Mg)	= the thousandth part of 1 gramme,	or 0·001 G
1 Centigram (Cg)	= the hundredth ,, ,,	0·01 G
1 Decigram (Dg)	= the tenth ,, ,,	0·1 G
1 Gramme (G)	= the thousandth part of the Standard or International Kilogram (Kg)	1·0 G
1 Dekagram	= ten grammes	10·0 G
1 Hectogram	= one hundred grammes	100·0 G
1 Kilogram	= one thousand grammes	1000·0 G

* Taken as 110 minims throughout the Pharmacopœia.

Measures of Capacity (Volumes).

1 Centimil (Cl) = the vol. at 4° of 1 centigram of water.
1 Decimil (Dl) = ,, ,, 1 decigram of water.
1 Millilitre or Mil (Ml) = ,, ,, 1 gramme of water.
1 Litre (Lit) = ,, ,, 1 kilogram of water.

Measures of Length.

1 Micron (μ) = the 1000th part of 1 millimetre, or 0·001 mm
1 Millimetre (mm) = the 1000th part of 1 metre, or 0·001 m
1 Centimetre (cm) = the 100th ,, ,, 0·01 m
1 Decimetre (dm) = the 10th ,, ,, 0·1 m
1 Metre (m) - - - - - - 1·0 m

RELATIONS OF METRIC AND IMPERIAL MEASURES.

Mass.

1 Milligram	(Mg)	=	0·015 grain nearly.
1 Centigram	(Cg)	=	0·154 grain nearly.
1 Decigram	(Dg)	=	1·543 grains nearly.
1 Gramme	(G)	=	15·43235 64 grains.
1 Kilogram	(Kg)	=	15432·3564 grains, or 35·274 ounces nearly, or 2·2046 pounds nearly.

1 Grain	(gr.)	=	0·0648 gramme nearly.
1 Ounce (Avoir.)	(oz.)	=	28·350 grammes nearly.
1 Pound (Avoir.)	(lb.)	=	453·59 grammes nearly.

Capacity.

1 Centimil	(Cl)	=	0·169 minim nearly.
1 Decimil	(Dl)	=	1·69 minims nearly.
1 Millilitre or Mil	(Ml)	=	16·9 minims nearly.
1 Litre	(Lit)	=	1·75980 pints, or 35·196 fluid ounces nearly.

1 Minim	(min.)	=	0·0592 mil nearly.
1 Fluid Drachm	(fl. dr.)	=	3·5515 mils nearly.
1 Fluid Ounce	(fl. oz.)	=	28·4123 mils nearly.
1 Pint	(O.)	=	568·2454 mils nearly, or 0·5682 litre nearly.

Length.

1 Micron	(μ)	=	0·00003937 inch.
1 Millimetre	(mm)	=	0·039370 inch.
1 Centimetre	(cm)	=	0·39370 inch.
1 Decimetre	(dm)	=	3·9370 inches.
1 Metre	(m)	=	39·370113 inches.

1 Inch	(in.)	=	25·3999 millimetres.

TABLE OF APPROXIMATE EQUIVALENCES ADOPTED IN STATING DOSES (IMPERIAL AND METRIC) IN THE TEXT OF THE BRITISH PHARMACOPŒIA.

Imperial.		Metric.
Grain.		Milligrams.
$\frac{1}{200}$	=	0·3
$\frac{1}{100}$	=	0·6
$\frac{1}{64}$	=	1
$\frac{1}{60}$	=	1·5
$\frac{1}{32}$	=	2
$\frac{1}{25}$	=	2·5
$\frac{1}{20}$	=	3
$\frac{1}{16}$	=	4
$\frac{1}{10}$	=	6
$\frac{1}{8}$	=	8
$\frac{1}{5}$	=	12
$\frac{1}{4}$	=	16
$\frac{1}{2}$	=	30
Grains		Centigrams.
1	=	6
2	=	12
3	=	20
4	=	25
5	=	30
8	=	50
10	=	60

Imperial.		Metric.
Grains.		Decigrams.
3	=	2
5	=	3
8	=	5
10	=	6
15	=	10
20	=	12
30	=	20
60	=	40
Grains.		Grammes.
15	=	1
30	=	2
45	=	3
60	=	4
120	=	8
150	=	10
180	=	12
240	=	16
480	=	32

VOLUMES.

Minims.		Centimils.
$\frac{1}{2}$	=	3
1	=	6
2	=	12
3	=	18
5	=	30
8	=	50
Minims.		Decimils.
5	=	3
10	=	6
15	=	10
20	=	12
30	=	18
60	=	36

Minims.		Mils.
15	=	1
30	=	2
45	=	3
60	=	4
90	=	6
Fluid Drachms.		Mils.
$\frac{1}{2}$	=	2
1	=	4
2	=	8
6	=	24
Fluid Ounces.		Mils.
$\frac{1}{2}$	=	15
1	=	30
2	=	60
4	=	120

The new designations—*Mil*, *Decimil*, and *Centimil*—have been introduced for the first time in official nomenclature. The mil is equivalent to the older term—the millilitre or measure of the volume of 1 c.c., or the measure of 1 gramme of water at maximum density. The decimil and the centimil are equivalent to the one-tenth and the one-hundredth part of the mil respectively, the object of the innovation being to obviate the difficulty arising from the absence of any hitherto recognised subdivision of the litre smaller than its one-thousandth part.

RELATION OF ENGLISH TO METRIC MEASURES.

1	Minim	=	·059	millilitre or	5·9192 centimils.
2	Minims	=	·118	,,	1·18384 decimils.
3	,,	=	·178	,,	1·77576 ,,
4	,,	=	·237	,,	2·36768 ,,
5	,,	=	·296	,,	2·9596 ,,
6	,,	=	·355	,,	3·55152 ,,
7	,,	=	·414	,,	4·14344 ,,
8	,,	=	·473	,,	4·73536 ,,
9	,,	=	·533	,,	5·32728 ,,
10	,,	=	·592	,,	5·9192 ,,
11	,,	=	·651	,,	6·51112 ,,
12	,,	=	·710	,,	7·10304 ,,
13	,,	=	·769	,,	7·69496 ,,
14	,,	=	·828	,,	8·28688 ,,
15	,,	=	·888	,,	8·8788 ,,
16	,,	=	·947	,,	9·47072 ,,
17	,,	=	1·007	,,	or mils.
18	,,	=	1·066	,,	,,
19	,,	=	1·125	,,	,,
20	,,	=	1·184	,,	,,
25	,,	=	1·480	,,	,,
30	,,	=	1·776	,,	,,
35	,,	=	2·072	,,	,,
40	,,	=	2·368	,,	,,
45	,,	=	2·664	,,	,,
50	,,	=	2·960	,,	,,
55	,,	=	3·256	,,	,,
1	Fluid Drachm	=	3·5515	,,	,,
2	Fluid Drachms	=	7·103	,,	,,
3	,, ,,	=	10·654	,,	or 1·0654 centilitres.
4	,, ,,	=	14·206	,,	1·4206 ,,
5	,, ,,	=	17·757	,,	1·7757 ,,
6	,, ,,	=	21·309	,,	2·1309 ,,
7	,, ,,	=	24·860	,,	2·4860 ,,
1	Fluid Ounce	=	28·412	,,	2·8412 ,,
2	Fluid Ounces	=	56·824	,,	5·6824 ,,
3	,, ,,	=	85·236	,,	8·5236 ,,
4	,, ,,	=	113·649	,,	1·1364 decilitres.
5	,, ,,	=	142·061	,,	1·4206 ,,
10	,, ,,	=	284·122	,,	2·8412 ,,
15	,, ,,	=	426·183	,,	4·2618 ,,
20	,, ,, (1 pt.)	=	568·245	,,	0·56824 litre.
40	,, ,, (1 qt.)	=	1136·49	,,	1·1364 litres.

RELATION OF ENGLISH TO METRIC WEIGHTS.

	Gramme.		Centigrams.	Milligrams.
1 Grain	= ·0648 grm.	nearly or	6·479 c.grm. or	64·798 m.g.
2 Grains	= ·1296 grm.	,, or	12·959 c.grm. or	129·597 m.g.
3 ,,	= ·1944 grm.	,, or	19·439 c.grm. or	194·396 m.g.
4 ,,	= ·2592 grm.	,, or	25·919 c.grm. or	259·195 m.g.
5 ,,	= ·3240 grm.	,, or	32·399 c.grm. or	323·994 m.g.
6 ,,	= ·3888 grm.	,, or	38·879 c.grm. or	388·793 m.g.
7 ,,	= ·4536 grm.	,, or	45·359 c.grm. or	453·592 m.g.
8 ,,	= ·5184 grm.	,, or	51·839 c.grm. or	518·391 m.g.
9 ,,	= ·5832 grm.	,, or	58·319 c.grm. or	583·190 m.g.
10 ,,	= ·6480 grm.	,, or	64·798 c.grm. or	647·989 m.g.
11 ,,	= ·7128 grm.	,, or	71·278 c.grm. or	712·788 m.g.
12 ,,	= ·7776 grm.	,, or	77·758 c.grm. or	777·587 m.g.
13 ,,	= ·8424 grm.	,, or	84·238 c.grm. or	842·385 m.g.
14 ,,	= ·9072 grm.	,, or.	90·718 c.grm. or	907·184 m.g.
15 ,,	= ·9720 grm.	,, or	97·198 c.grm. or	971·983 m.g.
15·432 ,,	= 1 gramme	,, or	100·00 c.grm. or	1000·0 m.g.

	Grammes.	Centigrams.	Milligrams.
1 Scruple (20 grains)	= 1·2959 g. or	129·59 c.g. or	1295·97 m.g.
2 Scruples (40 grains)	= 2·5919 g. or	259·19 c.g. or	2591·95 m.g.
3 ,, or 1 Drachm	= 3·8879 g. or	388·79 c.g. or	3887·93 m.g.
1 Ounce (Troy)	= 31·1034 g. or	3110·34 c.g.	

		Grammes.	Centigrams.
¼ Ounce (Av.)	or 109·375 grains =	7·087375 g. or	708·7375 c.g.
½ ,, ,,	or 218·75 ,, =	14·17476 g. or	1417·476 c.g.
1 ,, ,,	or 437·5 ,, =	28·34953 g. or	2834·953 c.g.
2 Ounces ,,	or 875 ,, =	56·6990 g. or	5669·90 c.g.
3 ,, ,,	or 1312·5 ,, =	85·0486 g. or	8504·86 c.g.
4 ,, ,,	or 1750 ,, =	113·3981 g. or	11339·81 c.g.
5 ,, ,,	or 2187·5 ,, =	141·7477 g. or	14174·77 c.g.
6 ,, ,,	or 2625 ,, =	170·097 g. or	17009·7 c.g.
7 ,, ,,	or 3062·5 ,, =	198·4466 g. or	19844·66 c.g.
8 ,, ,,	or 3500 ,, =	226·7962 g. or	22679·62 c.g.
9 ,, ,,	or 3937·5 ,, =	255·1458 g. or	25514·58 c.g.
10 ,, ,,	or 4375 ,, =	283·4950 g. or	28349·50 c.g.
11 ,, ,,	or 4812·5 ,, =	311·8449 g. or	31184·49 c.g.
12 ,, ,,	or 5250 ,, =	340·1943 g. or	34019·43 c.g.
13 ,, ,,	or 5687·5 ,, =	368·5439 g. or	36854·39 c.g.
14 ,, ,,	or 6125 ,, =	396·8933 g. or	39689·33 c.g.
15 ,, ,,	or 6562·5 ,, =	425·2430 g. or	42524·3 c.g.
16 ,, ,, (1 lb.)	or 7000 ,, =	453·59243 g. or	45359·243 c.g.

RELATION OF METRIC TO ENGLISH WEIGHTS.

1	Milligram, or ·001 gramme		=				$\frac{1}{64}$	grain nearly.
1	Centigram, or ·01	,,	=				$\frac{2}{15}$	,, ,,
1	Decigram, or ·1	,,	=				$1\frac{1}{2}$	grains ,,
1	Gramme		=				$15\frac{1}{2}$	,, ,,
5	Grammes		=				$77\frac{1}{6}$	,, ,,
10	,,	(1 dekagram)	=				$154\frac{1}{3}$	,, ,,
20	,,						$308\frac{2}{3}$	,, ,,
30	,,		=	1 ounce	and	$25\frac{1}{2}$	,,	,,
40	,,		=	1 ,,	and	$179\frac{3}{4}$	,,	,,
50	,,		=	1 ,,	and	334	,,	,,
60	,,		=	2 ounces	and	51	,,	,,
70	,,		=	2 ,,	and	$205\frac{1}{4}$	,,	,,
80	,,		=	2 ,,	and	$359\frac{1}{2}$	,,	,,
90	,,		=	3 ,,	and	$76\frac{1}{8}$	,,	,,
100	,,	(1 hectogram)	=	3 ,,	and	$230\frac{3}{4}$	,,	,,
200	,,		=	7 ,,	and	24	,,	,,
300	,,		=	10 ,,	and	$254\frac{3}{4}$	,,	,,
400	,,		=	14 ,,	and	48	,,	,,
500	,,		=	17 ,,	and	$278\frac{1}{2}$	,,	,,
600	,,		=	21 ,,	and	$71\frac{3}{4}$	,,	,,
700	,,		=	24 ,,	and	$302\frac{1}{2}$	,,	,,
800	,,		=	28 ,,	and	96	,,	,,
900	,,		=	31 ,,	and	$326\frac{1}{3}$	,,	,,
1000	,,	(1 kilogram)	=	35 ,,	and	120	,,	,,

RELATION OF METRIC TO ENGLISH MEASURES.

1	Millilitre (1 mil)	=			16·95	minims nearly.
2	Mililitres	=			33·9	,, ,,
3	,,	=			50·8	,, ,,
4	,,	=		1 dr.	7·61	,, ,,
5	,,	=		1 dr.	24·5	,, ,,
6	,,	=		1 dr.	41·41	,, ,,
7	,,	=		1 dr.	58·32	,, ,,
8	,,	=		2 drs.	15·22	,, ,,
9	,,	=		2 drs.	32·5	,, ,,
10	,,	=		2 drs.	48·9	,, ,,
15	,,	=		4 drs.	13·4	,, ,,
20	,,	=		5 drs.	37·8	,, ,,
25	,,	=		7 drs.	2·4	,, ,,
30	,,	=	1 oz.	0 dr.	26·8	,, ,,
40	,,	=	1 oz.	3 drs.	15·7	,, ,,
50	,,	=	1 oz.	6 drs.	4·7	,, ,,
75	,,	=	2 oz.	5 drs.	7·1	,, ,,
100	,,	=	3 oz.	4 drs.	9·4	,, ,,
500	,,	=	17 oz.	4 drs.	47	,, ,,
1000	,, (1 litre)	=	35 oz.	1 dr.	34	,, ,,

RELATION OF FAHRENHEIT TO CENTIGRADE DEGREES.

32°	F.	= 0° C.	100·5°	F.	= 38·05° C.
50°	F.	= 10° C.	101°	F.	= 38·33° C.
60°	F.	= 15·5° C.	101·5°	F.	= 38·61° C.
70°	F.	= 21·11° C.	102°	F.	= 38·88° C.
80°	F.	= 26·66° C.	102·5°	F.	= 39·16° C.
90°	F.	= 32·22° C.	103°	F.	= 39·44° C.
95°	F.	= 35° C.	103·5°	F.	= 39·72° C.
95·5°	F.	= 35·27° C.	104°	F.	= 40° C.
96°	F.	= 35·55° C.	104·5°	F.	= 40·27° C.
96·5°	F.	= 35·83° C.	105°	F.	= 40·55° C.
97°	F.	= 36·11° C.	105·5°	F.	= 40·83° C.
97·5°	F.	= 36·38° C.	106°	F.	= 41·11° C.
98°	F.	= 36·66° C.	106·5°	F.	= 41·38° C.
98·5°	F.	= 36·94° C.	107°	F.	= 41·66° C.
99°	F.	= 37·22° C.	108°	F.	= 42·22° C.
99·5°	F.	= 37·5° C.	110°	F.	= 43·33° C.
100°	F.	= 37·77° C.	120°	F.	= 48·88° C.

RELATION OF CENTIGRADE TO FAHRENHEIT DEGREES.

1°	C.	= 33·8° F.	26°	C.	= 78·8° F.
2°	C.	= 35·6° F.	27°	C.	= 80·6° F.
3°	C.	= 37·4° F.	28°	C.	= 82·4° F.
4°	C.	= 39·2° F.	29°	C.	= 84·2° F.
5°	C.	= 41° F.	30°	C.	= 86° F.
6°	C.	= 42·8° F.	31°	C.	= 87·8° F.
7°	C.	= 44·6° F.	32°	C.	= 89·6° F.
8°	C.	= 46·4° F.	33°	C.	= 91·4° F.
9°	C.	= 48·2° F.	34°	C.	= 93·2° F.
10°	C.	= 50° F.	35°	C.	= 95° F.
11°	C.	= 51·8° F.	36°	C.	= 96·8° F.
12°	C.	= 53·6° F.	37°	C.	= 98·6° F.
13°	C.	= 55·4° F.	38°	C.	= 100·4° F.
14°	C.	= 57·2° F.	39°	C.	= 102·2° F.
15°	C.	= 59° F.	40°	C.	= 104° F.
16°	C.	= 60·8° F.	41°	C.	= 105·8° F.
17°	C.	= 62·6° F.	42°	C.	= 107·6° F.
18	C.	= 64·4° F.	43°	C.	= 109·4° F.
19°	C.	= 66·2 F.	44°	C.	= 111·2° F.
20°	C.	= 68° F.	45°	C.	= 113° F.
21°	C.	= 69·8° F.	46°	C.	= 114·8° F.
22°	C.	= 71·6° F.	47°	C.	= 116·6° F.
23°	C.	= 73·4° F.	48°	C.	= 118·4° F.
24°	C.	= 75·2° F.	49°	C.	= 120·2° F.
25°	C.	= 77° F.	50°	C.	= 122° F.

INDEX

A

C

H

M

T

U

V

BILLING AND SONS, LTD., PRINTERS, GUILDFORD, ENGLAND