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I.—Rolleston on Forms of Animal Life.[1]

PROFESSOR ROLLESTON's long-promised work has at length appeared. This volume, from its intrinsic importance as well as the distinguished position and reputation of its author, demands special examination and candid criticism.

Our first impression is one of disappointment. We had hoped for a book which, while it faithfully reproduced the accepted results of previous workers, should yet bear the stamp of originality; which should be written in a style of clear composition unburdened by needless technicalities, and which, lastly, should be of use, not merely to members of Professor Rolleston's class, but to all persons who can understand the English language.

Now what do we find? Professor Rolleston's book can scarcely, even by the most partial Oxford friend, be termed original: its best points are borrowed from Gegenbaur's ' Grundzüge der Vegleich ende Anatomie;' the style bristles with the most recondite terms of Germanic origin; while each sentence, probably from a laudable desire to save space, has been compressed into so narrow a compass that sense is too often sacrificed to brevity.

Finally, as the illustrative specimens exist in the Oxford Museum only, we fear that few but Oxford men can derive much benefit from a perusal of the book.

We now proceed to consider it in detail. In the preface we are informed what amount of previous knowledge the author

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[1] *Forms of Animal Life: being Outlines of Zoological Classification based upon Anatomical Investigations and Illustrated by Descriptions of Specimens and Figures.* By GEORGE ROLLESTON, M.D., F.R.S., &c., Oxford. Clarendon Press, 1870. Pp. 436.

thinks sufficient for a learner before he approaches the study of his work. This is, in brief, the elements of Human Osteology, and some acquaintance with the digestive, the circulatory, the urinary, and the nervous systems of the human body, to be deduced from the study of specimens under the guidance of any of the current manuals. Having mastered this—the Oxford preliminary course—and thus acquired a certain power of observation, with a small amount of special knowledge, any " person entering for the first time upon the study of anatomy in the Oxford Museum" (Preface, p. 6) is considered competent by Professor Rolleston " to follow such a description as it gives in this work of the dissection of a mammal," the Common Rat. This we conceive a person of ordinary intelligence might do without such a previous course, especially with the preparation alluded to before him. But we are not informed how he is to obtain the additional knowledge he will require to understand the obscure technicalities and numerous statements concerning the anatomy of other animals, often rare ones, which he will find in the introduction to the Class Mammalia.

The author recommends that the study of the described preparations should precede that of the accounts in the introduction of the Class to which it belongs. We think this a wise proviso : for what beginner would not be deterred from advancing further who reads the first sentence of the introduction wherein the members of the Sub-Kingdom Vertebrata are characterised as " animals with bilaterally symmetrical bodies, divided internally into two perfectly distinct cavities, one of which is placed dorsally, and contains the principal nerve-centres, whilst the other contains the organs of vegetative life," although this is for our author simplicity itself. But why the author should advise that " the study of the description of the plates should be taken up only after the attainment of a considerable familiarity with actual specimens by the practice of Dissection," we do not see so clearly. These descriptions are unquestionably the easiest part of the book, and why the study of them should be postponed till the student has learnt for himself all the facts stated in them we fail to perceive.

The book itself consists of three parts : an introduction, a description of a series of preparations, and a description of twelve plates. The introduction occupies nearly 150 pages. It consists of a classification of the animal kingdom, and a condensed account of the anatomical differences on which the said classification is based. Distinct mention is, in general, made of the principal exceptions as to points of structure common to larger groups, found in any of their sub-divisions, or individual species. These exceptions are often great stumbling-blocks

to students, who are apt, in dissecting for themselves, without the assistance of a description of the actual animal studied, to mistake the exception for the rule; or, still worse, to misinterpret the structure of an exceptional form in order to bring it into conformity with the general rule, with which alone they are acquainted. In some few cases, on the other hand, the generality of Professor Rolleston's rules may be questioned; for instance, on page civ, he says of the Arthropoda, that antennæ, eyes, and auditory organs are all but invariably limited to their præoral cephalic segments. Very little is known of the auditory organs in this sub-kingdom, but among Insecta, in those in which they are best developed, the musical Orthoptera; they are situated either in the tibiæ of the fore-legs (*Locustida Achetida*), or along the insertion of the hind-legs (*Acridia*). Certain groups of pores at the base of the wings of some beetles and in the halteres of Diptera are also probably organs of hearing. In the Myriapoda and Arachnida, and in Myasis among the Crustacea, they are found in the endo-podite of the last post-abdominal segment, as Professor Rolleston himself mentions.

The arrangement of this part of the book is in some respects faulty, and renders it extremely obscure to those not previously acquainted with the classification adopted. Each sub-kingdom is first described as a whole: its primary divisions are next briefly stated; and a separate account of each Class is finally given in more or less detail. These accounts contain frequent mention of the peculiarities of the orders and minor sub-divisions of the Classes and even of individual species whose positions in their classes can only be known to the more advanced student, and whose bare names, accompanied by no reference to any work containing a description of them, can only confuse the ordinary reader. A table of the orders at least of each class, with the names of well-known examples, would in some degree remove this defect and might advantageously have been prefixed to the descriptions.

The sub-classes of Mammalia are given, and the orders Ratitæ and Carinatæ of Birds. Of the Reptilia only the existing orders are named, and the three orders of Amphibia are just mentioned, while the six orders into which the class Pisces are divided are separately described. None of the orders of the invertebrate classes are formally given. The description of the class Pisces occupies sixteen pages and is very complete; it is the best we have met with in any text-book, but far too many uncommon species are mentioned without any reference.

The description of other groups appears bare by comparison. That of Insecta, for instance, occupies only about five pages, and

some important points of structure are barely mentioned : thus, the organs of the mouth are dismissed in three lines, and nothing is said of their varieties of form on which all classifications of insects more or less depend. The wings have not even a sentence to themselves, but it is merely said that "each of the two posteriorly-placed segments [of the thorax] has also, ordinarily, a pair of unsegmented appendages, the wings, or the wing covers, articulated to it dorsally."

In treating of the Mollusca, Professor Rolleston differs from Professor Huxley in not admitting Pulmogasteropoda to the rank of a distinct class, not apparently attaching much weight to the character of curvature of the intestine which Professor Huxley possibly somewhat overvalues, although its constancy throughout large groups is apparently inexplicable if it be not due to a common parentage.

On the other hand the author always mentions, apparently attaching much importance to it, the presence or absence of an anus, and familiarises his readers with the little used terms "Proctuchous" and "Aproctous." This is a point manifestly dependent on external circumstances and therefore of little classificatory value.

Professor Rolleston adopts the sub-kingdoms first definitely proposed by J. V. Carus in 1853, and which Professor Huxley practically adopted in 1856, although his opinions have now somewhat changed. In this the author follows Gegenbauer, whose genealogical tree of these seven sub-kingdoms he copies in an amplified and somewhat altered form.

In this arrangement the three sub-kingdoms, Arthropoda, Vermes, and Echinodermata, correspond to the Annulata and Annuloida of Professor Huxley, which causes a considerable discrepancy between the two authors.

The description of the sub-kingdom Vermes and its classes is somewhat confused, the following remarks of reproduction, p. cxxv, being scarcely intelligible.

"Vermes may be either hermaphrodite or dioecious, either viviparous or oviparous; they may reproduce their kind either sexually or asexually, and their embryos may or may not go through a metamorphosis. When reproduction takes place asexually, it may take place either in the way of parthenogenesis, as in Rotifera and *Ascaris nigrovenosa* in its entoparasitic stage; or in that of metagenesis from a part of a protozooid, which is not differentiated as a sexual gland. Metagenesis is observable both in the highest and in the lowest of the vermes.

In some instances, at the time of the setting free of the deuterozooid produced by gemmation, both protozooid and deuterozooid may be in the asexual condition, as is ordinarily the

case with *Nais* and *Chætogaster* amongst Annulata, and with *Microstomeæ* amongst *Turbellaria*. In the case of certain other *Turbellaria* (*Strongylostoma* and *Catenula*), no other than this simple metagenetic form of reproduction has been, as yet, observed. When this form of reproduction alternates, as in the other *Turbellaria*, and in the Annulata just mentioned, with sexual reproduction, we have a series of phenomena before us which has been spoken of as "Digenesis with Heterogony." In some cases, as occasionally in *Microstomeæ* and in the Annelidan *Syllidea* and *Protula*, a sexual protozooid have been observed to give origin by gemmation to a sexual deuterozooid, furnishing thus an example of digenesis with contemporaneous heterogony. In some rare cases, the sexual organs of the protozooid have been observed to be of one, and those of deuterozooid of the other sex. In other cases the protozooid is always asexual, when it is known as a "nurse"; whilst the deuterozooids it gives origin to attain the sexual condition, either while still attached to the parent organism, as in the *Tæniadæ* amongst *Platyelminths* and *Autolytus* amongst Annulata; or subsequently to detachment from it as in *Trematodes*. These forms of reproduction may be spoken of as "digenesis with alteration of generations; inasmuch as the usual forms or stages of metamorphosis interposed between the products of sexual congress and another set of sexually perfect individuals may be regarded as sufficiently distinct and independent to merit the title of "generations."

To one who has not previously mastered the obscure subject of reproduction, with its, if possible, more obscure terminology, in which no two authors appear to agree, this passage can scarcely convey any meaning at all.

In separating the Gephyrea from the Annelida, or as he prefers to call the class the "Annulata proper," the author follows Gegenbaur. The absence in this class of distinct segmentation and of hermaphroditism; the structure of their vascular system which is distinctly analogous to, if not homologous with that of the Echinodermata, the complex convolutions of the digestive tract, and the frequent presence of respiratory trees, appear to afford good grounds for this separation. The subdivision of the Annuloida, under which head the author includes only the Scolecida of Professor Huxley, into the Nematelminthia, Rotifera, and Platyelminthia, is less satisfactory: that of Professor Huxley into six groups appears far better. But we are glad to find that while with Gegenbaur he classes the Chætognatha of Professor Huxley with the Nematelminths, he does not so far follow his views as to introduce the Tunicates and Polyzoa among the Vermes.

The definition of the Platyelminths is careless. After stating

without qualification that they are devoid of an internal peri-
visceral cavity, on the opposite page he says that in the *Nemer-
tinæ* which he includes in this class one exists.   In other
respects also this family fails to come under his general state-
ments and renders the class utterly heterogeneous.

The Echinodermata are divided into four classes only, Holo-
thuridea, Echinoidea, Asteridea, and Crinoidea; the Asterids
and Ophiurids being classed together.   No mention is made of
those extinct forms which are so completely intermediate in
character that they cannot possibly be brought under any of
these heads.   Throughout the book those forms of life which
have ceased to exist are scarcely even alluded to—a serious defect
in some groups.

The author considers the jointed cirrhi on the stern or aboral
surface of crinoids to be obscure indications that these animals
are what Mr. Herbert Spencer would call tertiary aggregates.
We cannot agree in this, they appear to us distinctly homolo-
gous with the similar cirrhi on the arms and not with the arms
themselves; surely the author would not consider the arms to
be tertiary and the individuals quaternary aggregates.   Even
that these cirrhi show the arms to be homologous with the ten-
tacles of Holothuria, as the author asserts, we fail to perceive.
The Ctenophora are wisely elevated to the rank of a distinct
class of the Cœlenterata among the Protozoa; on the other hand
we are glad to find the Radiolaria merged into the Rhizopoda.

In the description of this last sub-kingdom the author dis-
cusses the difficult question of the boundary between animals
and vegetables.   In this he denies the necessity of neutralising
the ambiguous forms as Professor Häckel does under the title
of Regnum Protisticum.   In this we entirely agree with him,
although not on his own grounds; but we fail to find much of
value in the remainder of his remarks, which are devoted to
raising imperfect criteria, only to upset them in the next sen-
tence; while their sole conclusion is a hope that time may
to some extent clear up the difficulty.

These remarks are feeble indeed as compared with the vigorous
and philosophical disquisition of Gegenbaur on this subject
which strikes at the very root of the matter, and, after showing
that all attempts to draw the line by appeals to manifestations
of volition on the part of supposed animals, must lead to differ-
ent results with each observer, as they depend on subjective,
not objective data, points out that no such distinct boundary
ever exists in nature.

The second part consists of a description of fifty specimens
prepared by the Demonstrator of Anatomy in the Oxford Uni-
versity Museum, and most of them exhibited by him in the

Educational Department of the Exhibition of 1862. The author himself seems to consider that this part of the work requires some apology: he is at pains to point out that the animals are nearly all easily procurable even in places away from the sea; and in his preface that "a short statement of the method which has been adopted in the preparation of each specimen, has, in most cases, been prefixed to the description of it; and thus, persons who have not, as well as those who have, access to the series in the University Museum, are able to reproduce for themselves the objects described." In this we can hardly agree with him, for as the statement rarely occupies more than one line, only those persons used to making preparations are likely to hit off the right method without seeing the specimens, and they would in most cases prefer to illustrate the anatomy of animals in their own way, although from these descriptions valuable hints might no doubt be derived.

In the choice of subjects for these preparations, the object has been to exhibit completely the anatomy of a few typical animals, rather than that of many less perfectly. Thus, of the common cray fish five preparations are described. This shows excellent judgment, but the effect of splitting up the description of an animal into several partial descriptions, is to render the whole extremely tedious.

Had the author consulted the interests of that benighted class of readers who have not access to the Oxford Museum, he would have amalgamated all the descriptions of parts of the same animal, combined them with that of the plate where one exists, and in all cases have given figures no matter how diagrammatic, to serve as a map of the organs described. Had he done so, he might have omitted many statements, useful only to a student in the Oxford Museum, as to the exact position of the bristles and strips of paper by which the organs are indicated in the preparations; and have greatly simplified and shortened the descriptions. This part, which forms the body of the work, has, as it stands, far too much the appearance of a mere reprint of a descriptive catalogue of the series of specimens, and as such, however useful it may be to the Oxford student, ought hardly to have been brought forward as a work on Zoological Classification to which title the introduction alone has any claim.

Many of the descriptions form notwithstanding excellent guides to the dissection of the animals, even though the learner may not intend to make the particular preparation described. In some cases, however, the author's language is so obscure that more of the student's time will be taken up in grasping his meaning than in appreciating the points of structure to which his attention is called.

For example, the following is the beginning of his description of specimen 18, the shell of the Freshwater Mussel, *Anodonta cygnea*. It is a fair example of his style of explanation; the object described being of a very simple character:—" When the bivalve shell of the Freshwater Mussel, or of any of the British freshwater species of Lamellibranchiata, is held with its hinge-line upwards, its line of aperture downwards, and its ligament and its umbones, the most convex portion of the valves placed, the one proximally, and the other distally to the observer, he will then have the animal's right valve at his right hand, its left valve at his left hand, the anterior portion of its body placed distally, and the posterior proximally to himself. Such Lamellibranchiata as have the power of moving from place to place by the protrusion of their distensible 'foot,' do so in the direction which the words 'anterior' and 'posterior' as used here imply. The shell of the Anodon is, as in the immense majority of Lamellibranchiata, nearly or quite equivalve, whilst as in all it is inequilateral. By its size, which is in an inverse ratio to the extent of junction of the lobes of the mantle which secretes it, it surpasses all European fluviatile bivalves, and sections, or indeed fragments of it are consequently exceedingly instructive, as to the structure of the various layers of which the shell is composed."

When the reader has extricated himself from the maze of the first sentence, and has discovered that proximally and distally refer to the ligament and the umbones, and not to the two latter as might at first appear, he may be better prepared to discover what " the words 'anterior' and 'posterior' as used here imply;" namely, that these animals walk forwards, not backwards; but his experience will only confuse him when he comes to the next sentence, for, having learnt that the two valves of the shell lie on the right and left sides of the animal, unless he is familiar with the terminology of conchologists, he will have little chance of discovering that the word 'inequilateral' refers to the anterior and posterior parts of each valve. No amount of previous training, however, can enable him to understand how any ratio, direct or inverse, can subsist between two such unlike quantities as the size of the shell and the extent of juncture of the lobes of the mantle. This sentence is we believe intended to state concisely that the shell is very large, and that the lobes of the mantle are only united to a very small extent; which is the case, as the hinge-line of Anodonta is short, and the mantle is only united along it and on either side of the efferent siphonal orifice.

In this, however, as in all the descriptions, the defects are in the manner, not the matter, and every point of real importance

is noticed, and accurately if not clearly described.   We believe that in no other English manual will a person engaged in learning comparative anatomy by the only rational method, namely, dissecting for himself all those typical animals which he can obtain, find so much useful information given in such a manner as to lead him to a scientific knowledge of the subject.

The two tables giving the homologies of the nerve-ganglia and of the post-antennary segments with appendages in Arthropoda in a convenient and practical form, are features of especial value.   This sub-kingdom is amply illustrated by the preparations described.

Attached to most of the descriptions is a collection of bibliographical references, with a statement of what is to be found in each work named.   This is almost the most useful part of the book, but in some cases the student is almost compelled to have recourse to the works mentioned to supply deficiencies in the book itself.

We find from the table of additions and errata that this part of the work was printed off in 1863.   Ample time might surely have been found for the detection of some of the numerous printers' errors by which it is disfigured, of which those mentioned in the table form but a small proportion.   The other parts of the work are no better in this respect.

We now come to the third part, the description of the plates, whose only claim to that title (as they are merely woodcuts) lies in the fact of their being printed on separate sheets of tinted paper.   These are twelve in number: the first ten represent actual dissections, and are with one exception original; they are of well-selected common typical animals, and though very diagrammatic, compare favorably in point of clearness with other drawings of the same subjects to be found in every text-book from Swammerdam's Book of Nature, downwards.   The only pity is that there are not more of them.

The first two, of the Rat and the Pigeon, are maps of their organs likely to be useful to the beginner.   There is no drawing of either a Reptile or a Fish, but plate III of the Frog represents the circulatory system of that animal fairly well, and, to some extent, shows the arrangement of the vessels which enable its skin to serve as an accessory breathing organ, of even greater importance to the animal than the lungs themselves. This is a point which has not as far as we know been previously so well illustrated in any English text-book.

We should like to have seen a subsidiary diagram of the arrangement of the valve-like septum in the elongated *bulbus arteriosus* which partially separates the venous from the arterial blood, and directs the former into the lungs, while the

mixed blood passes into the arteries of the trunk and limbs, the purest arterial blood being reserved for the head.

The next eight plates scarcely call for remark. That of the generative organs of the earthworm is one of the most useful, as it is both clear and accurate, whilst most English manuals contain erronous accounts of these puzzling organs. In the description of the plate Professor Rolleston gives Mr. Lankester's ingenious explanation of the apparent homology of the generative with the segmental depuratory organs, notwithstanding the occurrence of both in the same segments. He assumes that the typical number of these organs is four in each segment, but that the full number only appears in the segments containing the generative organs.

Had the author been as liberal with separate drawings of the various organs of one animal as he is with separate descriptions of them in part two, there would have been no occasion to have attempted to represent all the organs of an animal in one drawing, as in plate X of the star-fish. Nothing but the care with which it is engraved renders it at all intelligible, and this, to a less degree, is true of some of the other woodcuts.

The last two plates contain diagrams of fourteen typical animals. These are most of them already familiar to the student from their having been copied, often inaccurately, into many of the manuals that have appeared since they were severally drawn by Bronn, Carus, Allman, and others. Their errors and omissions are mentioned in a few cases by the author, but if he was aware of them why did he not replace these by fuller and more accurate drawings, especially as many of them are so small and rough that they are scarcely comprehensible ? The error in the lettering of fig. 7, plate XI, mentioned in the explanation, is due to the copyist.

In conclusion, then, what are, in brief, the merits and demerits of Professor Rolleston's book ? Its merits are, that it shows its author to possess a vast fund of anatomical knowledge, an acquaintance with all that has been written in past or present times upon the subjects, considerable originality, and the right method of showing others how to acquire what he knows himself. Thus it is a storehouse of knowledge, but a storehouse of which Professor Rolleston alone has the key : for, the illustrative preparations being all at Oxford, a student must go there to study them, and a teacher must begin his course of instruction by causing them to be made. This is a fatal defect, we submit, and will we fear prevent the work from being accepted as it ought to be by those who are about to make arrangements for the study and teaching of Zoology. The language, moreover, is, as we have amply shown, so needlessly recondite and

obscure, that the work before it can become really useful, must be translated into English. Many of these defects can no doubt be remedied in a second edition; but until that is prepared, a book on which the study of Comparative Anatomy can be used both by teachers and learners remains a desideratum.

II.—On Recent Physiological Discoveries with Regard to the Origin of Contagion.[1]

THAT the air has served as a medium by which extremely minute substances of an organic nature, either animal or vegetable, productive of disease are diffused, is a theory as old as the discovery of microscopic life. In the words of Professor Tyndall, " Nyander held that smallpox, measles, the plague, dysentery, and hooping-cough, are all caused by minute animals. Réaumur thought that the small clouds which sometimes seem to hug the earth in summer weather may be insect swarms. Cuvier speaks of the ' *richesse effrayante*' of insect life. Sir H. Holland thinks that the outbreak of carbuncular boils which occurred some years ago in England, may have had its origin without the system as a virus in some form of organic life. Ehrenberg, whose wonderful investigations have been heard of everywhere, speaks of the ' *milky way* of smallest organization.' The electric beam makes this last figurative expression admirably just. Henle maintained that the material of all contagious diseases is not merely organic, but matter possessing all the characters of parasitic life. Eiselt found pus-corpuscles in a foundling hospital where the children were suffering from conjunctival blenorrhœa, and proved conclusively that such corpuscles spread the epidemic (without contact with the infected persons). Pouchet, the able and ardent advocate of the doctrine of heterogenesis, has devised an instrument called an aeroscope, to catch the microscopic particles of the air. This instrument was employed by Eiselt in the inquiry referred to. Every Alpine man can testify to the correctness of De Saussure's

[1] 1. *Reports to Her Majesty's Privy Council by the Medical Officer*, Mr. JOHN SIMON, F.R.S. 1864—70.

2. *Appendices to the above On Inoculability of Tubercle, and*

3. *On the Intimate Pathology of Contagion.* By Dr. BURDON-SANDERSON, F.R.S. 1868—70.

4. *On Animals in Mineral Infusions.* By C. STANILAND WAKE, Esq. ('Microscopical Journal,' 1870.)

5. *On Dust and Disease.* By Professor JOHN TYNDALL, F.R.S. ' Journal of Royal Institution,' 1870.

remark that a deep blue heaven portends rain, while the air is
rendered turbid by a succession of fine days. De la Nive ascribes
this turbidity to organic germs which swathe the earth as a
light maze. He has devised a photometer for determining the
transparency of such air, and of connecting this with the other
elements of meteorology. He also refers to the bearing of the
subject on epidemic diseases." Such opinions have held an
important place in scientific opinion ; yet it has been left to the
present day to convert these guesses into convictions.

Dr. Burdon Sanderson divides his investigation into three
parts. The first relating to such physical qualities as fluidity,
volatility, density, and solubility ; the second to the presence or
absence of that orderly succession of changes of form which
distinguishes living from dead organic matter, and is "com-
monly termed development ;" the third to the determination of
the chemical composition of contagious matter. This last
division of the inquiry is postponed by Dr. Sanderson until some
further progress be made in the investigation of the first two
questions, and the hope be realized of obtaining contagious
matter in such a state of separation and purity as to render a
chemical examination of it possible.

Much controversy has of late been evoked by the discoveries
of Beale and others of " a germinal substance" in the tissues of
various animals, and to a notable and definite amount in the
alvine liquid of cholera patients.

Dr. Klob of Vienna was the first to describe jelly-like masses
which on microscopical examination were found to consist of
countless multitudes of globular particles not in general exceed-
ing $\frac{1}{20000}$ of an inch in diameter, held together by an intersti-
tial jelly. These were easily identified with the form designated
by Cohn, *Zoogloea.* The objects themselves appear to be subject
to the usual laws of transformation, the particles passing from
the spheroidal into the rod-like form. But the gelatinous mass
in which innumerable particles—micrococci—are imbedded, and
by which they are connected together, has not been formally
identified with the "germinal matter" of Beale, the "proto-
plasm" of Huxley, and the "*schleim-substanz*" of the early
German physiologists. Dr. Carpenter in his researches on the
Foraminifera (published by the Ray Society) has laid great
stress on this primordial mucus, and on the forces by which it
becomes polarized and vivified, and endowed with the facility of
receiving and assimilating extrinsic matter from without, *e. g.*,
has served as the nucleus on which the deposit of carbonate of
lime, which forms the bony envelope or crust of the Foramini-
fera, may be built up. But the distinction between the *schleim-
substanz,* germinal matter, or protoplasm, and the contained

particles which are the real subjects under discussion, is very great. It would be nevertheless an error to represent the "solid particles" of Dr. Sanderson as related to the "germinal matter" which Dr. Lionel Beale has so well described in his work on Protoplasm. Dr. Beale moreover differs from Dr. Sanderson in this important respect; viz., he considers that the hyaline and structureless material to which he gives the name of germinal matter is perfectly homogeneous, and invariably the same in its chemical and physical properties. The opposite opinion is that the appearances of homogeneity is due to the imperfection of our means of observation, and to the circumstance that the matter in question is so intimately mixed up with other kinds of substance in all the tissues in which it occurs, that we are unable to analyse it. Dr. Sanderson has carried his discoveries so far as to prove that infecting matter consisting of "extremely minute separate solid particles" (Simon) is the source of contagion. But he in nowise contradicts the theory of Dr. Beale that these particles of contagion may consist of germinal matter itself. And the manner in which he cites the testimony of Professor Klob with regard to the microzymes of cholera, shows that the differences found in the explanation of the facts by Beale and Sanderson may not be altogether irreconcilable. For all pathological purposes there is no essential practical difference between the theory that contagion proceeds from separate particles, or from one mass of germinal matter which throws off particles that separate from it.

But to the student of natural history the difference is enormous, for on the distinction between these two theories depends the whole genesis of living things : the question whether the primordial *schleim-substanz* or protoplasm is the cause or the result of cell-growth. Whether, on the one hand, the primitively formed cell, having gone through the operations of fusion and nucleation, generates from its substance a mass of matter that may be contagious in its effects, that attaches the various cells together, and is capable of minute diffusion amongst surrounding tissues or substances. Whether on the other hand the " germinal matter" itself undergoes at some period after its formation a change which produces a nucleation, and the ultimate formation of a cell or cells. This problem will be answered affirmatively or negatively according as the views of Schleiden or Oken are accepted. The hypothesis of Mr. Darwin on " Pangenesis" demands our special attention as applicable to the theory of Dr. Sanderson. The " free gemmules" of which Mr. Darwin speaks, although they possess within themselves the power of nucleation, germination, and of reproduction, yet

apparently are presumed to exist independent from the ambient protoplasm or germinal matter which, as Professor Klob has pointed out, connects the particles together. Nevertheless the existence of each of these gemmules implies their distribution in the tissues of animate beings, and their power of self-reproduction. So many various theories of the powers and properties of these free gemmules have been offered by Mr. H. Spencer, Professor Owen, Mr. A. Sanders, and, in the last century, Buffon, Bonnet, and others, that we are certainly at a loss to conclude which of these theoretical bodies can be legitimately inferred to be identical with the "free particles" which Dr. Sanderson has described. We are not disposed to exaggerate the distinction between the primordial gemmules of Mr. Darwin and the "free particles" of Dr. Sanderson; but we perceive that while Dr. Sanderson does not draw any conclusion respecting the mode of reproduction of his solid particles, Mr. Darwin theorises respecting the *genesis* of his gemmules, imagines the mode of their preformation, speculates on the method of their reproduction, and guesses the remainder of his facts. That separate gemmules may exist, that they may be "thrown off," may have a mutual affinity for each other, and may "generate new organisms," is a theory which comprises several propositions, some of which may be identical with those enunciated by Dr. Sanderson, but which are not formulated as lucidly or as distinctly as he has formulated them. The two theories may be identical, but the modes in which each is propounded differ in a marked manner. For while the theory of Dr. Sanderson is based on an elaborate comparison of the microscopical evidences before us, the "pangenesis" hypothesis of Mr. Darwin on the other hand is unsupported by facts. Yet the latter may in some sort be regarded as the precursor of the more accurately defined and more precise theory broached by Dr. Sanderson.

A future hypothesis of pangenesis may doubtless be propounded, which may include the opinions of Owen, Darwin and H. Spencer, and bind them together in one harmonious whole. Such a theory however, presupposes a state of science to which the present generation cannot lay claim.

The controversies between MM. Pouchet and Pasteur respecting the origin of life have re-echoed across the British channel. The trustworthy experiments of Dr. Bastian and the observations of Dr. Lionel Beale, representing utterly opposed schools of physiological thought, have been followed by the researches of numerous painstaking and excellent observers. The results of the most recent contributor to English microscopical science, Mr. C. Staniland Wake, seems to prove that organisms hitherto vaguely classified as micrococci or amœbæ are

merely manifestations or phases of other and various forms of life.

Mr. S. Wake, who has made some very curious microscopical researches, has shown the presence of *amœbæ* in infusions made with powdered marble, coal, and emery, under circumstances which seem to justify his conclusion that the organism was derived from these substances. The existence noted by him of amœbæ in an infusion made with the scrapings of rusty iron, may perhaps be accounted for by deviation from matter floating in the atmosphere. Its presence under certain other conditions however, leads Mr. S. Wake to think that the like may appear in almost any organic infusion, and that the amœbal form is simply that which may be taken by many *Infusoria* before arriving at their ultimate phase of development. A good example of this is seen in the change of the organism classed as *Actinophrys* into *Vorticella stromata,* which Mr. Wake observed ; this confirming the observation already made by Stein. He has also met with the *amœbæ* in the so-called chalk mud from the Atlantic bed. It was produced, moreover, from the residue of burnt milk in marvellous abundance, this infusion giving rise to a green fungoid substance, the connection of which, however, with the amœbal organisms is uncertain. In an infusion made from the common lichen Mr. Wake has recently observed a still more curious phenomenon. Here numerous *amœbæ* were clustered together, forming a stem with protuberances, which were undoubtedly amœbæ.

If these observations are confirmed they will lead to considerable modifications of the accepted views and nomenclature, and it may then be found out that much of the controversies which exist in theoretical physiology originate in logomachies or confusion of ideas.

The discovery by Dr. Lionel Beale, in 1863, of transparent hyaline particles of extreme minuteness in vaccine lymph, these particles being regarded by the author as masses of living or germinal matter, was confirmed by the testimony of numerous subsequent observers, all of whom agree that this liquid, notwithstanding its apparent limpidity, contains minute particles. This fact, however, Dr. Sanderson considers to be of little importance, for many other transparent organic liquids, *e. g.* the *liquor sanguinis,* are found, when examined under high powers, to contain particles of about the same size as those which exist in vaccine.

Dr. Chauveau, of Lyons, had for a long time carried on researches which were wholly independent of those of Dr. Lionel Beale on the minute characters of vaccine lymph. To demonstrate the inertness of the particles in vaccine he invented an

apparatus (une éprouvette) for the diffusion of the substance in water, and to ascertain that the liquid is absolutely free from albuminous particles :

" The next step is to compare the two strata of liquid with reference to their activity. For this purpose children or heifers are vaccinated on one side of the body with liquid from the most superficial stratum, collected in the same way as the first specimen taken for testing, while a similar number of punctures are made in the other side with undiluted lymph, of the same kind as that employed for diffusion. The appearance in due time of a normal vesicle of cow-pox for every puncture made with the undiluted lymph, combined with the complete failure of the punctures made with the diffusate, shows that the latter, although it contains all the soluble constituents of vaccine in sufficient abundance, is wanting in those on which its activity depends."

The instrument of Dr. Chauveau was much improved by Dr. Sanderson, with a view to ascertain the relative proportions of water and vaccine in each experiment, and the results of the joint and several examinations by these two eminent observers is laid before the scientific world in Dr. Sanderson's report.

" The extreme facility with which smallpox is communicated through the air at first sight seems to imply a greater subtlety of the virus, for although not volatile in the acquired and technical sense of the term—that is to say, in the sense in which it is used by physicists as a distinctive property of substances capable of assuming the form of vapour, it must obviously be regarded as in the highest degree volatile, if we are to understand the word in its original and every-day signification, as something which is freely wafted by air. Is it, like the more fixed contagium of cow-pox, also particulate ? The experimental investigation of the virus of smallpox is attended with very great difficulties. Neither human subjects nor animals are available for experiment, the former on account of the gravity of the disease, the latter because the local effects produced by the inoculation of variolous lymph are not characteristic."

Dr. Chauveau, however, has carried on a minute series of experiments on cow-pox, smallpox of sheep, and farcy, which prove, firstly, that in cases where the liquid is diffused in water, to a limited extent, the activity of the matter is not in any sensible degree impaired. When larger proportions of water than ten to one are mixed with it the certainty of success is correspondingly diminished.

" The contagious juice of sheep-pox admits of much greater dilution, so that a degree of dilution which would render vaccine probably inactive would not interfere in the least with the certainty of effectual inoculation of sheep-pox. From these and other like facts, Chauveau concludes that the concentration of the contagious liquid of sheep-pox is about thirty times as great as that of vaccine. They

are, however, of value, not so much as affording a measure of
the infecting activity of the liquid as in their application to
the question at issue.   They furnish strong additional evidence
in support of the doctrine that contagium consists of particles.
They show that, whatever may be the degree of dilution, the local
effect produced, provided that it is produced at all, is always the
same.   In other words, the difference between the effect of inocu-
lating extremely diluted liquid and that of inoculating the liquid
itself, without any addition of water, does not manifest itself as
might be expected in the size of the individual pustule or pustules
produced, nor even in the character of the secondary eruption, or the
constitutional disturbance which accompanies it.   The difference lies
entirely in the numerical relation of successes to failures.   If success-
ful, inoculation with a liquid containing a myriadth of infecting juice
communicates the disease as completely as the pure liquid itself.
The fact is not only perfectly consistent with the notion that con-
tagium is particulate, but is in itself a necessary consequence of its
being so.   If, on the other hand, contagium were soluble, it could
not be explained, for in that case each of the 10,000 drops in which
the one drop had been dissolved would be equally active.   Assuming
it to be particulate, it follows that the myriad particles which were
before distributed in one drop are scattered through 10,000 drops.
And inasmuch as there is nothing excepting the influence of currents
to ensure the equal distribution of the particles, it is clear that in
some regions of the liquid the distance from each other will be
greater, in others less.   Consequently, when a trace of the liquid
thus feebly impregnated with contagium is taken up on the point of
the lancet, the chance that the little drop will or will not contain
particles may be stated numerically by the fraction which expresses
the degree of dilution.   And here it is of importance to notice that
the same explanation applies to a fact of common observation with
respect to all of those diseases which are contagious at a distance.
The question is frequently asked, How does it happen that a person
may be exposed every day for many months to the contagion of
typhus with immunity, and yet be eventually attacked, without any
change whatever being made, either in his own condition, or in that
of the infected media by which he is surrounded.

" If contagium were gaseous, the fact would be inexplicable—as
inexplicable, indeed, as the assertions of the homœopathists. Assuming
it to be insoluble and particulate, the question of mediate contagion
must, like that of direct contagion, be one of chance."

Dr. Sanderson undoubtedly, at the end of his valuable essay
on the physical properties of contagion, affords us strong argu-
ments to prove that the contagious "principle" is neither
soluble in water nor capable of assuming the form of vapour. It
becomes, therefore, necessary, at the commencement of his
second part on the organic forms which occur in infecting
liquids, precisely to define the limits of the inquiry.

" The question has been commonly stated somewhat as follows : If contagium is alive, it may be so in one of two senses, either as a part of the living body which is the seat of the disease, or as in itself a living organized being inhabiting the diseased body. If it is not alive, its actions must be chemical.

" The distinction which this mode of stating the question implies between chemical on the one hand, and living on the other, if not entirely meaningless, is, at all events, too vague to be used for scientific purposes ; for inasmuch as no vital function can be performed without chemical change, and as many chemical changes are constantly attended with vital manifestations, neither term can be applied to any process to the exclusion of the other. *In short, the only character by which the living can be separated from the not living, is that of organic development ;* so that the question may be considered to lie between those who hold that the particles of contagium are living organisms, and those who attribute their infective properties to their chemical composition."

It must here be noted that our idea of development is based on our idea of the individual, and that separate cell life appears to go on in the dead as well as in the living subject. The totality of that number of structures we term the individual may be dead, yet separate cell life may exist in its component parts. Life is merely organisation or structure in action, and condition of development has nothing whatever to do with the matter. A living thing has been defined by Professor Owen as an " object which possesses such an internal cellular or cellulovascular structure as can receive fluid matter from without, and alter its nature and add it to the alterative structure." " Development " is an accidental, not an essential character. There are cells which truly live, but do not pass through any stages of development.

The researches of Professor Hallier, of Jena, are commented on by Dr. B. Sanderson at great length. Professor Hallier considers that the organic forms which are met with in contagious fluids are analogous. He includes them under the general term *Hefe,* a vague word, which is understood to mean a form of fungus which consists of minute single cells, which reproduce themselves with extraordinary rapidity, exist in all substances, undergoing putrefaction or fermentation, and grow and multiply at the expense of those substances. They never lose their unicellular character, and cannot be said to have spores or mycelium, each individual cell being alike an organ of growth and an organ of reproduction.

The musk plant, the yeast plant, and the *Sarcina* are examples of acrite or protozoal forms. They may, according to Dr. Sanderson, be divided into two groups : one comprises the

ferment plants already mentioned, and the other containing those forms which are associated with the commencement of decomposition of the nitrogeneous compounds of which putre-faction is the continuation. The proof that these bodies are living organisms, and not mere particles of protoplasm, is because it is clearly ascertained that under certain conditions they elongate into rod-like bodies endowed with a peculiar progressive and oscillatory movement. So long as these bodies, which Béchamp and Sanderson call " Microzymes," are spheroidal, they are called *Micrococci* or *Microspores*. When they become staff-shaped they are termed *Bacteridia* or *Bacteria*. The generic names *Schizomycetes* (Nägeli, De Bary), *Vibrio, Bacterium, Zooglœa, Nosema, Sarcina,* and other terms, have been employed for these forms. Their precise zoological position cannot be ascertained until we know more of their development. Analogous forms known as Cryptococcus, Hormiscium, Arthrococcus, Oïdium, are known which merely represent the transformation of any of these forms from the circular into the elongated shape. Those for example in the cryptococcus of the yeast plant, when the liquid begins to turn acid, the cells become elongated, and begin to divide by transverse constriction. Hallier expresses this fact by saying that cryptococcus has under-gone transformation into arthrococcus.

" Thus in the fermentation of beer the *Cryptococcus Cerevisiæ is* produced so long as the vinous fermentation continues, but as soon as air is allowed free access the cryptococcus cells bud out into cylindrical processes, which divide by transverse septa ; and finally, if the acid fermentation ceases, giving way to putrefaction, micro-coccus again appears, being formed, according to Hallier, by repeated division of the nuclei of the arthrococcus cells. Thus the series micrococcus, cryptococcus, arthrococcus, micrococcus, cryptococcus, and so on, may recur indefinitely, provided that the growing material be subjected in due order to the corresponding conditions, viz., putrefaction, vinous fermentation, acid fermentation, putrefaction, &c."

In fact, such terms as *Arthrococcus* or *Cryptococcus* merely represent various stages of the same organism.

Two questions are suggested by Dr. Sanderson, the one which relates to the connection which his discoveries bear to the theory of spontaneous generation being prudently dismissed by him in a few words. For the practical import of the discoveries of Pouchet or the speculations of Pasteur is simply nothing, and the pathologist has not to concern himself with the absolute genesis, but with the proximate causes and forms of develop-ment of the microzymes. The endless question of spontaneous generation may be set entirely apart, as it has no immediate

practical import of any kind, and though it has the fascination
which attaches to all mysterious subjects, it may be passed over
on the present occasion without any minute discussion.   As Dr.
Sanderson says, " It is agreed by all (without prejudice to the
doctrine of spontaneous generation) that microzymes, like other
organic forms, do as a rule originate from predecessors, that is
to say, by reproduction."   The modification of the *omne vivum
ex ovo* theory here propounded is so mild as neither to offend
the most ardent evolutionist nor the most fervid advocate of
heterogenesis.

The researches of Professor Hallier, vague though they may
be adjudged, will probably serve as the basis whence we may
draw an enormously vast induction as to the future importance
of the subject.

" The establishment of the doctrine that the microzymes of
contagium are capable of developing to higher specific forms, and
that they can be reproduced from them is the end and aim of all
Professor Hallier's investigations.   They can best be judged of by
the examination of those instances in which the evidence is strongest,
and is supported by the greatest number of facts; for one is more
likely to form an accurate opinion of the value of the whole investiga-
tion by the sceptical scrutiny of one or two examples, than by a
cursory examination of a greater number."

It is distinctly proved that in the alvine liquid of cholera
" microzymes " exist of characters identical with the " micro-
cocci " and " arthrococci " of the zoologists.   Thus, Professor
Klob of Vienna has made discoveries which we have already
alluded to, and which indicate that the change from the
spheroidal to the rod-like form has been observed in all the
specimens which he has described, and which appear to consist
not only of globular particles, but also of an interstitial jelly.
M. Thomé, a botanist in Cologne, cultivated these jelly-like
masses on wheaten bread moistened with lemon juice, and
succeeded in obtaining a filamentous substance, which when
submitted to Professor De Bary was considered by him to be
" oïdium."   In May, 1867, many months after the cessation of
the epidemic, Hallier discovered in some alvine cholera liquid
which had been obtained at Berlin, and preserved for examina-
tion, certain globular cysts, the contents of which subsequently
swelled out into gelatinous masses similar to those found before
in cholera liquids.   By cultivating those microzymes in a suitable
manner he produced from them in succession, first, other forms
of ferment plants (Hefe), and eventually the same oïdium which
Thomé had obtained directly from the cholera liquid.   This
cholera microzyme was afterwards cultivated on rice.

" In the course of the summer of 1867 some rice grains were

steeped with cholera liquid, and sown on suitable soil. The grains became infested throughout with mycelium, but germinated. The young rice plants, however, were weakly, and their leaves were stunted, while other grains, which had not been steeped, and were sown near the infected grains, grew to vigorous seedlings. The leaves of the sickly plants soon showed more distinct evidence of disease. A line of dark discoloration, extending from their bases to the extremities, indicated the presence of one of those fungi commonly known as smuts. On examination of the fructification it was found to present the characters of *Urocystis*.

" These experiments were suggested by a theory as to the origin of cholera, which may be stated as follows :—Cholera originates on the banks of the Ganges, where the rice plant abounds and flourishes. The contagium particles of cholera are manufactured in the cysts of a Urocystis, which is parasitic on the rice plant, by the conversion of the protoplasm they contain into microzymes, so that the same material which, when brought into contact with the germinating grain, produces Urocystis generates cholera when introduced into the intestine."

It is, however, to be noted that Dr. Sanderson points out that

" It is in the first place to be noticed that in the descriptions of all Professor Hallier's experiments, and particularly in the account he gives of this fundamental one, there is a strange neglect of details as to the precautions and methods employed. Thus nothing is said as to the use of any means for protecting the grains from impregnation with microzymes of other than choleraic origin, so that we are bound to assume that such microzymes were present."

The experiments on the rice grains also show that the epithelium which was contained in the fresh cholera liquid was beset with micrococcus in great quantity, in addition to which there were the cysts already referred to in a mature state. A liquid which thus contained both cyst and micrococci leaves us in a state of extreme doubt as to the value of the scientific conclusions which may be drawn, as it is surely quite as reasonable to suppose that the parasitic mycelium originated from sporidia as that it was produced by the germination of microzymes.

The time which has usually, as in the case of Professor Hallier's experiments, elapsed between the collection of the specimens and their examination is also an important factor of doubt.

" Thus the fact of the existence of cysts in the dejection of cholera rests on the examination of two specimens only, both of which have been already mentioned, viz. a bottle of alvine liquid collected in Berlin in 1866, and examined in 1867, and the quantity collected in Elberfeld in June of the latter year. The appearances observed in these two liquids unfortunately cannot be compared, for they are described only in the Berlin liquid. It is much to be regretted that

no comparative experiments were made by cultivating non-specific microzymes, that no attempt was made to pursue the inquiry so as to ascertain whether the cysts in the first cultivation could be made to produce colonies of microzymes by transplantation into a rich soil and a high temperature, that no measurements are given, that the few drawings that exist can only be regarded as diagrammatic representations of the author's ideas, and, above all, that so few specimens of cholera liquid were examined.

" These defects and imperfections, many of which could not have been avoided, from the nature of the inquiry, render it impossible for the present to derive any conclusion from Professor Hallier's researches. Some, however, of the facts related by him are, if true, so remarkable that, although they cannot be applied directly to the solution of the question at issue, they may be of great value in suggesting future lines of research."

These and other objections which have been alleged by Dr. Sanderson and others appear to bear very strongly against the theory of Professor Hallier ; and there can be little doubt that he has advocated the doctrine that microzymes are the micrococci of certain higher fungic forms to an unjustifiable extent. Yet the theory in itself appears, through the researches of Dr. Sanderson, to have a practical and sound basis, and to afford adequate ground to predict the value which may be attached to the subject at a future time. Concluding Dr. Sanderson's lucid summary of the chief microscopical facts which seem to reveal the nature of the contagious process, it will at once be seen that the only inference which the learned author considers to be fundamental is the theorem that every kind of contagium consists of particles. Both Mr. Simon and Dr. Sanderson appear formally to have arrived at the conclusion that this doctrine is *ipso facto* proven. The next step was to inquire to what recognised organic form the living particles of contagion could be referred—a question which, taking into consideration all the facts of the origin and mode of development of these microzymes, Dr. Sanderson thinks can be answered by referring the microzymes to that lowly organized class of acrite life which is ranged under the class *Fungi*. These microzymes, undoubtedly the most minute of known organisms, are probably referable to various species, each producing its own disease, and capable of dissemination, according to the law impressed on each distinct life-form. Thus one of the great pathological difficulties in the history of disease vanishes, and we learn that such extinct, or almost extinct diseases, as the plague, the black death, and the sweating sickness, or such recently introduced forms as cholera or diphtheria, merely represent the life history of this or that species of microzymes.

"As regards the origin of microzymes, two theories have been

adverted to. According to one they naturally exist as particles of
living tissue, and thus take part, not only in morbid processes, but
in the performance of the normal functions. According to the other
they are originally morbid, and are imported into the body from
without, being derived either from the tissues or organs of other
infected individuals, or produced by the transformation of the con-
tents of the reproductive cells of the parasitic fungi inhabiting the
higher plants.''

The objection will no doubt be made to Dr. Sanderson's dis-
coveries that they are purely physiological, and that their
recondite character places them beyond the scope of the legis-
lator or of the taxpayer. Yet the abstract experiments of Black
on the nature of caloric, of Œrsted on the conversion of electric
into magnetic force, and of Priestley on the nature of gas, have
led to the three great discoveries of modern times, the practically
operative steam-engine, the electric telegraph, and the lighting
of towns. So, again, the discovery of *Trichinæ* in pork, although
at first apparently an insignificant fact, has led to the most im-
portant municipal regulations in certain German towns. The
proof of the migration of the *Cysticercus* has led to the demon-
stration of the origin, history, and development of the tapeworm ;
the mode of the reproduction of the Guinea-worm attracted
some years ago the special notice of the scientific departments
of the Admiralty ; and a multitude of topics exist which at first
sight appear to be solely interesting to the microscopist or the
abstract theorist, but which in course of time make good their
claim to practical consideration.

'' Although, perhaps, the whole subject [of this review] is in a
certain sense botanical, inasmuch as it raises questions relating to
the properties and specific character of plants, yet the nature of the
investigation is such as to bring it almost entirely within the sphere
of experimental pathology. The only purely botanical question
involved in it is that of the origin of microzymes from either higher
forms of parasitic fungi.* Even here, when the issue is brought
within its narrowest limits it will be found to be more chemical than
mycological ; for it is not disputed that Professor Hallier has actually
seen microzymes produced at the expense of the protoplasm of the
large reproductive cells of certain endophytes : but it is alleged by
those who are opposed to his views that this phenomenon is a result
of chemical changes in the protoplasm itself, to which it is subject,
not as being contained in a particular cell, but as being putrescible
matter.''

The relations of the present subject with what has been called
Biogenesis and Abrogenesis cannot now be discussed. The laws
which influence the production of microzymes must eventually
be discovered, and Dr. Sanderson's experiments are the first and
most important steps thereto.

III.—Chambers on the Indigestions.[1]

LIKE other works proceeding from the pen of Dr. King
Chambers, this present one is characterised by its essentially
practical character. It is made to teach the pathological and
therapeutical lessons it enforces by records of cases, briefly but
sufficiently detailed for the purpose. The style in which it is
written is colloquial and facile, and, at the same time, vigorous
and calculated to keep up the attention and interest. The
author has decided opinions, and advances them unhesitatingly,
and his practice is marked by like decision. He exhibits great
power in seizing upon the distinctive features of cases, and in so
impressing them upon his reader that he carries him along with
him in his exposition of morbid states, and of the treatment
those conditions require. He does not plunge into recondite
pathological disquisitions, and leave the reader mystified ; but
whilst appealing to the admitted doctrines of modern physiology
and pathology, evolves from them conclusions and principles
which, if not always beyond dispute, at least commend them-
selves to respectful consideration.

He has treated his subject from a functional point of view,
and examined the "indigestions" associated with the several
classes of food, with pernicious habits and with collateral dis-
ease ; has passed under review the symptoms of dyspepsia, con-
necting them with their causes ; and has inquired into the
various conditions provocative of "the indigestions." This
mode of treatment of the subject renders the work particularly
valuable to the practitioner, whilst it equally detracts from its
value to the student concerned in preparing for examinations,
and who is required rather to show his knowledge of the theory
of practice than practical knowledge, and must be able to
describe, not "the indigestions" as interpreted among patients,
but the various real or supposed gastric lesions with which dys-
pepsia and functional disorders of the digestive organs are
associated.

With these prefatory observations we will now turn to the
book itself. In so doing it behoves us first of all to state that
this treatise had a just claim to notice a long time since. From
inadvertence and the demands upon our space always exceeding
the possible supply it has been neglected : but the issue of a
third edition in Philadelphia, in consequence of its well-merited
popularity in America, calls, even after the lapse of time it

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[1] *The Indigestions or Diseases of the Digestive Organs Functionally Treated.*
By THOMAS KING CHAMBERS, M.D., &c. Second Edition. London. Pp. 337.

has been allowed to repose on our shelves, for a review of the work.

The second English edition is, in reference to the first one, entitled 'Digestion and its Derangements,' almost a new work ; but the edition lately published in America, although modified, especially in the arrangement of some of the subjects discussed, and in the composition of many paragraphs, and illustrated by additional cases, differs in no essential particulars from that first named.

The introductory chapter has been rewritten, but not much added to. The third changes its title, " Habits of Social Life leading to Indigestion," for that of " Causes of Indigestions," and various minor changes are met with in the arrangement of matters in the other chapters. But the most material change, and, we would add, improvement, is in the introduction of a chapter on " Indigestions, Acute and Chronic," in which various comments and cases distributed among other sections in the English edition, are brought together into natural alliance.

The leading principle in the teaching of Dr. Chambers is, " that all disease is for the physician essentially a deficiency of life, an absence of some fraction of the individual organization of force, and that all successful treatment must aim at a renewal of vital action." This main point in the physician's consideration so insisted on is, therefore, a reiteration of the idea conveyed by the phrase " Renewal of Life," which served as the title of the first two editions of his clinical lectures ; and he now avers that he is " more than ever convinced, as years roll on, of the soundness of the principle, and of the safety of applying it to practice."

In the lectures alluded to he has largely developed and illustrated this view of disease being always deficiency in vital power ; and, in our opinion, the whole tendency of modern pathology is in its favour. The hypothesis of disease being, in any malady, an exaggeration of vital activity, cannot be maintained. There may, indeed, be augmented growth and increased vascular activity, but the prelude to one and the other is some deficiency or loss in power.

To return, however, to the work on " The Indigestions" :

" The link [writes the author] drawing into one class the morbid phenomena which are the subject-matter of this volume is *a partial defect in the necessary supply of that of which the body is built up, before it arrives at the medium of distribution.* . . . . . The essence of ' digestion' consists in absorption from a canal communicating with the external air into a closed system of tubes, wherein is contained the nutritive fluid. Preparatory to this absorption is solution, aided by nerves and muscles ; and the end of it is assimilation, or the con-

version of the substance received into a like nature with the fluid they float in. Till this has been done they cannot be used for the nutrition of the body."

Descending from the higher aim he at first contemplated,—of seeking an anatomical basis for the grouping of the cases of indigestion that presented themselves in practice, but of which he discovered the impracticability,—he has fallen upon the old-fashioned division of indigestions as slow, defective, or painful. And with respect to the refined distinction into essential, idiopathic, and symptomatic morbid phenomena, he expresses himself convinced that it leads to dangerous practice. A so-called "mere symptom" is often the cause of death; and in chronic pathological states it will happen that the whole duty of the physician is comprised in discovering and relieving some functional disturbance, the curable something in the otherwise incurable condition, and one which, "in a majority of patients, may be found in functional impediments to the entrance of nutriment into the medium of assimilation; and when once nutriment can be got in, a cure is begun." Healthy assimilation must be the basis of improvement or recovery in diseases generally; and, to secure this, healthy digestion and nutritious suitable food must be first sought.

In the opening of his chapter on 'Indigestions, Acute and Chronic,' Dr. Chambers takes occasion to re-assert the meaning of the terms acuteness and chronicity as understood by the Greek physicians who adopted them; and to remark that the word chronic is not expressed by the Latin equivalent 'longus' used in the 'Nomenclature of Disease,' published by the College of Physicians. Acute diseases

"Meant such as have a tendency to progress in a circle towards the recovery of health; each process, however dangerous and abnormal it may be, being a step towards the final arrival at that result, if only the patient's strength held out. While of 'chronic,' the natural road is straight on from bad to worse, unless from the interposition of some extraneous circumstances of accidental or designed origin foreign to the phenomena of the disease itself . . . . This division of diseases is of the most essential importance when we test the value of remedies. Nearly all the fallacies which overload our pharmacopœia, not to mention a variety of theories ending in 'pathy,' which crop up from time to time, flow from watching the acute element in disease as the index of the effect of a drug. A very moderate portion of medical logic will suffice to show that it is only from the numerical comparison of the experience of many public institutions, for many years, that an opinion can be formed in acute disease concerning that effect. While, by observing its action in chronic disease, one cautious man may, from a very moderate number

of well considered cases, come to a rational conclusion as to the value of any really active medication."

These remarks of Dr. Chambers deserve to be carefully noted; not as something never insisted upon before, but as conveying so lucidly the necessity of attending to what has, in more pretentious phraseology, been termed the natural history of disease; of watching the natural course of acute disease when no active medication is pursued. Some investigations have already been followed out in this direction, sufficient to show the mischief resulting from drugging patients in accordance with preconceived notions of what is to do, or should do good, on the assumed action of this or that drug on the functions of the body, either in sickness or in health.

The treatise presents throughout most valuable hints and suggestions to those called upon to deal with disease as witnessed in every day medical experience. Many such might be collected and put before the profession as a volume of medical aphorisms that should have a place in each professional head. The following extract, taken from the author's account of acute dyspepsia resulting from overfeeding, and particularly, from overtaxing the stomach after great fatigue, supplies an example of Dr. Chambers' style and teaching:

" Such attacks as these are not evidences of bad health, for they arise only in consequence of unnecessary exertions. The medical treatment consists mainly in saying, ' don't.' That, however, is more often required than would be supposed; people have a notion that great outgoings demand great immediate incomings, and load their stomachs in proportion to the exercise they are taking. This is wrong; a night's sleep should always intervene between weariness more than ordinary and the reception of even the usual quantity of food. A tired stomach is a weakened stomach. No persons more require this warning than Londoners, even medical Londoners, out for their annual holiday. They make violent muscular efforts, and then eat and drink as usual, till they are really debilitated by a succession of slight indigestions, and return to work weaker than they left it."

Who that has had experience cannot endorse this teaching? The like to it, moreover, applies to the feeding of those suffering from sickness in general, or who are recovering from it, and every day's observation adds to the examples of the injury following upon errors as to the time, quality and quantity of food given to patients.

Dr. Chambers, in the introductory remarks to the section on chronic indigestion, takes pains to re-impress upon the reader's mind his apprehension of what is acute and what chronic in

disease. The chronic state, instead of returning, by a series of idiopathic changes, to the point started from, progresses from bad to worse. He insists, indeed, that the essential classification of indigestion is among chronic diseases, that the morbid state " becomes acute solely by the resistance of the body to it, and by the consequent expulsion of its cause . . . The acuteness is in the patient, not in the disease ; and our efforts of aid are of most use when they elicit that acuteness. We best accomplish our purpose when we bring the body into the state in which it makes the attack an acute one. This can only be done by positive medical interference, and not by *la médecine expectante*, which, avowed or disguised, is so common a refuge of ignorance in the present age."

Each of the sections on acute and chronic indigestion is terminated by a review of the requisite treatment based upon the pathological condition ; a condition due in the instance of the chronic disorder, to " a general deficiency of the vital powers." Consequently, he regards tonics as fulfilling the prime therapeutical aim in the management of chronic indigestion. At times their administration may be commenced forthwith, though sometimes certain prominent symptoms require first to be relieved ; " but without tonics no cure is effected."

Quinine is the favorite tonic with Dr. Chambers, and is often combined with strychnia. The introduction of this latter drug to notice affords the author opportunity to make some useful remarks upon its action, and to express his disbelief in the supposed cumulative property of strychnia ; the phenomena suggesting this hypothesis being readily and naturally explicable without its aid. Scattered here and there throughout the work are similar valuable though brief disquisitions on the properties and therapeutical action of various medicinal agents,—(among which are aloes, alkalies, cod-liver oil, mercury, and pepsin),—which will be highly appreciated by the reader.

The chapter on acute and chronic dyspepsia is followed by one on " indigestion of various foods," considered under the headings of vegetable, albuminoid, fatty, and watery foods. He examines very thoroughly the conditions of digestion of starchy food, and deduces some excellent lessons from the examination. He most justly animadverts upon the easy-going, routine practice of forbidding articles of food that the practitioner or his patient fancies prove indigestible. Little profit is to be derived from such prescriptions given without taking all the circumstances respecting the nature, and the value to the economy of the food forbidden into account.

" A partial repose for a time, and abstinence from an unnecessary excess in the undigested dishes is, doubtless, wise. But that absti-

nence must not be complete or final. What the patient wants, when he complains he cannot eat so-and-so, is not to have ' don't' said to him—his stomach has said so already—but to be unable to eat it like other people."

We must, from want of space to notice them, pass by the judicious remarks on cooking, on the preparation of beef-tea, and on what the writer quaintly calls " the ladder of meat-diet for invalids," and proceed to call attention to the physiological digression, in which Dr. Chambers has indulged, on the relation between fat and puberty. Between these two matters he believes there exists a natural relation, and he advances the statement, too broadly in our opinion, that " girls before the change naturally dislike fat, but afterwards take it instinctively." This circumstance he links with the conclusions derived

" From the researches of MM. Andral and Gavarret, that the excretion of carbonic acid by the lung increases in quantity during childhood very exactly in proportion to growth, the augmentation steadily progressing up to the period of puberty. In boys it would seem but little affected by that new function; but with girls the case is entirely different; the occurrence of menstruation puts a complete stop to the increase in the amount of carbon thus passing away, and sometimes even causes it to make a retrograde movement. . . . After the change of life has occurred, the exhalation of carbonic acid begins to increase again, and in elderly women is much the same as in elderly men. . . . . When, too, from either pregnancy or illness the catamenia are stopped, then temporarily the pulmonary excretion is augmented, and occupies a vicarious position in respect to the other functions. The uterus, then, and vital actions which are expressed by it, play an important part in the decomposition of carbon in the system. . . . The chief practical point of remark is, the importance at that critical period in woman's life, of watching even the digestive organs, especially in respect of their appropriation of fat, then so eminently necessary."

The author apologises for this digression *in re* uterine function and fat; but, being in a physiological mood, presently discusses the hypothesis of Dr. Dobell respecting the presumed relative defect of pancreatic function and the development of tubercle. To this ingenious idea he cannot lend his support; and in this matter, therefore, ranges himself on the side of physiologists and pathologists generally. It could never be substantiated by positive observation, and what little could be once advanced in its favour theoretically has vanished in face of recent researches on tubercle and consumption.

The succeeding chapter of this work is occupied with an examination of the causes of, and of the remedies for the several varieties of stomach pain arising from indigestions. Those

enumerated are :—heartburn, waterbrash, spasms, gripes, weight, constant pain,—and to these is added a notice of pain from other causes than indigestion. As usual, the information conveyed is chiefly by way of describing cases and making comments thereupon.

The primary division of indigestions into acid and alkaline, as adopted by Dr. Brinton and others, Dr. Chambers regards as an arbitrary and artificial one, which it certainly is.

" Acid and alkaline refrigerations are often found on the same day in the same persons ; and the conditions which lead to them in various cases are the same in nature. In fact, neither the acidity nor the alkalinity is morbid, but are both the normal conditions of the secretions evacuated."

All this is indisputable ; but there is another argument against the adoption of such a division, viz., that it promotes empirical treatment, a result that the stomach in innumerable cases has to deplore when plied with alkalies and acids, but especially with the former.

The five chapters next in order deal also with consequences of indigestion. They severally treat of vomiting, flatulence, diarrhœa, constipation, and costiveness, and nerve disorders, traceable to the digestive organs. The author does not accept the doctrine of a reversed, or, as he terms it, an *anti*-staltic muscular act in explanation of the phenomena of vomiting, but attributes, as Majendie of old did, those phenomena to a wholly or partially paralysed and relaxed condition of the œsophagus and stomach, in which the " involuntary peristaltic wave of the stomach ceases, and at the same time the diaphragm and abdominal muscles are degraded from agents of volition to purely automatic instruments," which forcibly compress the stomach and produce the explosive act of vomiting. In this interpretation of the act he assumes the cardiac orifice of the stomach to be passively open and the pylorus like " a collapsed valve," its circular fibres concerned in keeping it open being relaxed. This hypothesis, he urges, accounts for the occurrence of vomiting as—

" An accompaniment of so many states in which there is a diminution, or arrest, or paralysis of muscular action. . . . . In some cases the atony is general, as in vomiting from cerebral diseases of a paralytic character. In others it appears to be more local, as, for example, in the action of emetics, where the force of the agent falls mainly on the stomach, and secondarily on the limbs ; and possibly in some it may be entirely local—an approach to which is made in the quickly acting emetics, such as sulphate of zinc, which, therefore, produces much less depression than most other medicines of the same character. But in all there is sufficient reason to consider

the muscular state in vomiting to be one of relaxation or atony, and to view as the main muscular manifestation of atony in the stomach a tendency to vomit."

We cannot accept these views of the physiology of vomiting in their entirety. We are ready to adopt them in some cases, where, as in cerebral disease, the stomach is a flaccid bag and the fluids poured into it are decanted by the irregular action of the expiratory muscles. The contrast of the peristaltic slow and continuous action seen in the œsophagus of ruminants to the sudden and forcible act of vomiting cannot, we consider, be urged, as Dr. Chambers proposes, as an argument against forcible gastric and œsophageal action ; and, moreover, experience tells us that the pylorus will allow the regurgitation of fluids from the intestines, whilst the observation of the preludes to the act of vomiting, in many cases, indicates a resistance of the cardiac sphincter ; but beyond all this, and that which by itself is a sufficient argument against the theory Dr. Chambers would extend to all instances of vomiting, is the fact that the stomach has been seen to forcibly contract in the act of expelling its contents.

It is of clinical importance to remember that vomiting seems less dependent upon the previous or chronic condition of the stomach, and more upon the idiosyncrasy of the individual ; for some dyspeptics never throw up their food, whilst others do so on the slightest occasion ; and, as a corollary, the mere fact of vomiting affords in itself no clue to the local condition of the stomach.

We should have been pleased to have followed with notes and comments on the other chapters above referred to, but must not further extend this notice of the treatise. We will conclude with a summary of the contents of the last chapter on the causes of indigestions. The chapter is divided into eleven sections, each devoted to the examination of some recognised cause of dyspepsia. The causes enumerated are—eating too much ; abuse of alcohol, opium, tobacco, tea ; inaction of body ; inaction of mind ; exhaustion of body ; exhaustion of mind ; eating too little ; climate ; disease of the lungs ; compression of the stomach ; abuse of purgatives.

The observations on the use of alcohol as an article of diet are marked by good common sense—a quality very deficient with the majority of writers on the subject, who for the most part exhibit it in inverse proportion to their declamation against the beverage. Dr. Chambers's rule for testing whether the amount of alcohol taken is such as to injure the stomach, is a good general one in practice, viz., to ask whether the patient

ever is in the habit of taking it in the forenoon. If so, the practitioner may at once feel sure the stomach has suffered, even though his patient has never got drunk in his life. And the sagacious proposition is made to substitute, in lieu of the usual query in the scheme of examination for selecting lives for insurance, viz.:—whether the proposer is " sober and temperate," the inquiry, "Do you take spirits in the forenoon ? Is that a habit ?" The former question elicits no reply of value. " Nobody is," writes Dr. Chambers, " anything else, of course, and the answer is a mere declaration of opinion ;" whereas the other query requires a categorical statement of facts, which if wilfully false, would vitiate the policy.

The section on compression of the stomach gives the author opportunity to indulge in the vein of satirical humour which must be largely developed in him, as the many sallies throughout the work bear witness. Stays and tight lacing, as a matter of course, constitute the principal topic of the section, and furnish the occasion for the amusing yet valuable remarks alluded to ; but Dr. Chambers also puts prominently forward the mischief done in the case of cobblers by the pressure of the ' last ' against the stomach in the sitting position customarily occupied by those artisans. The interest of Dr. Chambers has evidently been evoked in behalf of these workmen, and it is apparent that it gives him satisfaction to point out a means of obviating the injury by the use of Mr. Sparkes Hall's " upright shoemaker's table." He quotes Mr. Hall's experience with the appliance, and we are quite convinced that the hurtful posture and mode of working followed by shoemakers may be laid aside in favour of some such plan ; still withal, from a large experience with artisans, we much fear that a very long time will elapse before the operatives in question will be brought to change their plans, so strong are the prejudices of workpeople towards the manners and customs of trade in which they have been educated. The manufacture of boots and shoes by machinery has done much in lessening the evils of bygone usages ; but the cobbler, or mender of those parts of dress, cannot have the benefit.

The lengthened review written of this treatise, and the observations made in the course of it, sufficiently attest our high opinion of its value to the practitioner.

IV.—Gheel in the North.[1]

THE insane colony of Gheel has been so often described, both by professional men and by *littérateurs,* that we shall take it for granted our readers are familiar with the mode of distribution of lunatics in that community, with the general details of their management, and with the *pros* and *cons* urged by its admirers and its opponents, since the first, best known criticism of it by Esquirol. So recently as October, 1869, we had occasion to notice in this 'Review' a pleasingly written popular history of the colony " by the Author of 'Flemish Interiors,'" but the treatise of M. Parigot, who was for several years the physician in chief, gives probably the best account of it hitherto published.

The characteristic features of Gheel, as compared with ordinary lunatic asylums, are :—the natural and domestic life afforded its insane residents, and the virtual liberty they enjoy in association with the sane inhabitants—men, women, and children—among whom they are domiciled. The system of treatment pursued in this colony has been variously called, " domiciliary," " domestic," "family," "patronal," " cottage," " boarding-out," and " free-air."

As regards the general success of the " system," no fairer witness could be adduced than Dr. J. Webster, of London, who, holding no official position in connection with lunatics or with lunatic asylums, and having during a long life particularly directed his attention to the management of asylums and the treatment of lunatics, and having, moreover, twice made a prolonged visit to Gheel, the second in 1866, ten years after his first one, may be accepted as both an unprejudiced observer and one eminently qualified to give an opinion. Besides the ordinary routine visits to the churches, the infirmary, and the cottages where boarders were to be found, he explored the whole village ; entered its cafés, where beer-drinking, singing and dancing were going on ; was present at a great fête or fair ; and, in short, acquainted himself fully with the mode of life and the

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[1] 1. *L'Air libre et la Vie de Famille dans le Commune de Gheel.* Par Prof. PARIGOT, M.D. Brussels, 1852.

2. *Gheel : une Colonie d'Aliénés vivant en Famille et en Liberté.* Par JULES DUVAL. Paris, 1860.

3. *Annual Reports of the Commissioners in Lunacy for Scotland,* 1859—70.

4. *Medical Reports of the Murray Royal Institution (for the Insane), near Perth,* 1854—64. By Dr. LINDSAY.

5. *The Insane in Private Dwellings.* By Dr. MITCHELL, Commissioner in Lunacy for Scotland. Edinburgh, 1864.

doings in public and private of the inhabitants of the " Campine." His report tells of well-behaved congregations in the churches, and of an orderly, quiet population.

" Few towns [he writes] of the same population, where the residents were rational, seemed to contain better conducted inhabitants, or appeared altogether so quiet as in the peculiarly constituted capital of Campine, whether at night or daytime."

Although, in his explorations, he encountered lunatics under almost every variety of circumstance, and in all sorts of places, and even without attendants, he never witnessed any unpleasant occurrence.

We should, however, do wrong to represent Gheel as quite a terrestrial Paradise. In all communities of the insane—and may we not add also of the sane—*contretemps* and accidents do and will ever occur ; and to this rule Gheel is no exception. At the same time, it is not more liable to them than are ordinary lunatic asylums, where the chances of their occurrence are supposed to be reduced to a minimum.

No one at all acquainted with Gheel, with the system carried out there, and with the requirements of lunatics, but must feel both a lively interest in such an institution, and a conviction that some lesson may be derived from its study of much value in the resolution of the important question " What to do with our lunatics ? "

The inquiry at once suggests itself, Can we establish a like colony in this country ? So long ago as 1828 Sir Andrew Halliday proposed to copy the example of Gheel, and to found a lunatic colony on one of the Middlesex heaths for the inmates of St. Luke's Hospital, London, and a second on the Mid-Lothian plains, for the insane paupers shut up in the Edinburgh workhouse. But neither this scheme, nor any other based on the example in question in the Belgian territory, has ever yet been practically put to the test. The question therefore still remains for solution (at present restricting its application to Scotland), Is there anything peculiar to the Scotch people or their country that should prevent (what for brevity and distinctiveness is best called) the *Gheel system* being adopted with the necessary local modifications ? And it may more especially be asked, whether the system be adapted to the requirements of such outlying counties as Caithness, Sutherland, Ross, Orkney and Shetland, Skye, and the Hebrides—*i. e.* counties or districts which are remote from public asylums, and which are more or less destitute of proper provision for their insane poor ?

If the small country of Belgium can take efficient care in the Gheel colony of a large proportion of its insane inhabitants, repre-

senting mainly those same classes that occupy our public asylums; and if it can do this at one third of the cost per head of that incurred in the Scotch asylums, with the result, moreover, of from 15 to 25 per cent. of recoveries among the reputedly incurable, may we not boldly discuss the practicability of imitating this example by the establishment of a Gheel in the North?

In examining into this matter, we would recall to our readers' memory the peculiar features of the Belgian colony:

I. The *superior economy* of the Gheel system of treatment.

II. Its *naturalness*—especially as contrasted with the artificialness of life in public asylums.

III. The amount of *personal liberty* that is permissible and enjoyable.

IV. The *economisation of the labour of patients*, not only for their own benefit in a medical sense, but also for the benefit of those who are burdened with their pecuniary support.

V. The *association of the insane with the sane*, and especially the humanising influence of association with *women and children*.

VI. The *diffusion* of the insane in separate dwellings, as contrasted with their aggregation in large numbers in the barrack-like buildings known as public asylums.

VII. The economic application of existing machinery for care and treatment; for the hosts—the Gheel peasantry—do not depend solely on the board of their patients, but live partly also by their trades or by agricultural occupations. This necessarily lessens to the ratepayer the cost of the patients.

VIII. The results as measured by the proportion of *recoveries* and the small number of accidents; as contrasted with similar results in similar classes of patients in public asylums, or in the lunatic wards of poorhouses, in Scotland.

IX. The recognition of the important principle of *individuality or individualisation* in treatment.

Let us now consider which among these features in the "*Gheel system*" of treatment of the insane poor are *worthy of imitation* in Scotland; and how far is it *practicable* to introduce the said features into the asylum system of that country?

The broad general principle on which the treatment of the insane at Gheel is founded is this: that the harmless and incurable insane do not require "sequestration," or confinement, in asylums proper; that they can be dealt with both more economically, and efficiently in a medical sense, in private homes; that they can enjoy, without abuse of the privilege, a large measure of liberty; and that they can engage to a varying extent in the occupations to which they were accustomed prior to the incursion of their insanity, or they can be trained to a

certain measure of usefulness in several departments of industry. The Belgians themselves call this principle of treatment, and the practice which is founded on it, " Le Patronage Familial ; " which being translated signifies the ". family system," a designation which is perhaps as graphic or appropriate as any other that has been applied to it. This system recognises the *individuality* of each patient ; it gives him a status as a *member* of a small family circle ; it surrounds him with all the humanising influences comprised under the general name of domesticity or homeliness : more especially does it offer him the companionship of tender woman and confiding infancy ; his affections are developed, his physique duly cultivated, and those faculties of the mind which remain in a comparatively normal condition are educated so as to yield results useful alike to the individual and to society.

Now there is much less of novelty in the " family system," as applied to the treatment of the insane, than may at first sight be supposed. In the first place it may be called a *natural* system ; and as such it has existed, in some form, in all countries and in all ages. In countries not possessed of lunatic asylums, and in others prior to the erection of such institutions, the insane reside, or resided in private dwellings, either of their own, their relatives, or strangers. In countries, moreover, possessed of the most approved asylum accommodation, there is— and there ever will be, we venture to assert—a surplus of insane persons far beyond the capabilities of such establishments to accommodate ; which surplus is, at present, for the most part, distributed in private homes. Thus in Scotland there are 1500 *pauper* insane in private dwellings officially known to the Board of Lunacy ; while, in addition, there are 2000 insane persons in private dwellings unreported to the Board, but maintained by their friends. In England, of " outdoor pauper " lunatics residing with relatives or strangers in private dwellings there are over 7000. In France upwards of 50,000, or more than half of the whole lunatics of that empire, are unprovided for in establishments ; while in the United States of America their number is between 30,000 and 35,000. In the last case a certain proportion of these patients may find accommodation, usually of a most unsuitable kind, in workhouses or prisons ; but there is a large residuum domiciled in ordinary dwellings, mostly scattered through the country. Neither in the States, France nor England is anything of a precise or satisfactory kind known of the condition of the insane poor in private dwellings, because official supervision is most absurdly confined to patients in asylums proper. But in Scotland, where the number of this class of patients is comparatively small, and

manageable as regards supervision, a great proportion at least is under official surveillance, and a good deal is known regarding them that is on the whole satisfactory.

In most countries the dwellings containing insane boarders are scattered chiefly in country districts, though they occur also in villages or towns. There seems, however, a natural tendency to their *aggregation,* uninfluenced by any sort of official encouragement. Thus, prior to the existence of the Scottish Lunacy Board, there was a sort of insane " colony," of natural growth, in the Island of Arran in the Frith of Clyde: an admirable locality for such an experiment on a much larger scale. And we have the testimony of Dr. Arthur Mitchell, Commissioner in Lunacy, that this remarkable colony flourished without any material abuse. At one time (1864) the number of chronic insane persons boarded in private dwellings in Arran was seventy, forty-two of them being paupers. Of sixty-one in 1865, thirty-six were boarded with strangers. In 1863, there was a " large number," of whom thirteen were officially known to the Inspecting Deputy Commissioner in Lunacy. In 1865, Dr. Mitchell gave it as his opinion that of insane patients boarded with strangers in private dwellings " there must be more than 200 scattered over Scotland." The Board of Lunacy was the means of breaking up the Arran and other lunatic colonies in Scotland; but under its auspices so far, though accidentally in certain respects, others have grown up; and there are at present at least four on a small scale, viz., in or near the villages of *Kennoway,* Fifeshire; *Balfron,* Stirlingshire; *Gartmore,* Perthshire; and *Loanhead,* Edinburghshire. In both Kennoway and Balfron there are twenty-four insane paupers boarded with different villagers, sometimes two, three, or four in the same house as at Gheel. In most countries there is, however, no proper *organisation* of the domiciliary treatment of the insane poor—no official adoption of it as a system or part of an asylum system. The patients and their hosts are under no systematic or official *supervision,* of a kind at least that is satisfactory; and it is not to be wondered at that occasional defects or abuses should be developed, when we consider the amount of supervision that is (absurdly, however,) considered necessary in England and Scotland to maintain *public asylums* in an efficient condition ! It is, indeed, one of the curious or inexplicable anomalies of the law, in a country whose statutes abound in legal defects and anomalies, that, while the patients *in* asylums require—or are assumed to require—the supervision not only of expensive staffs of officers, and of public boards of directors, but also of boards of lunacy, those *out of* asylums are left to the care of themselves, or their hosts or guardians, who are frequently self-

constituted! The truth is, that the highly paid officers who constitute our boards of lunacy *might* render more *real* service if they were to surrender the care of public asylums to those who are quite competent to their management, their physicians and directors, and devote their energies to the supervision of the condition of patients boarded in private houses in outlying districts! It is only in Belgium and Scotland that these patients are officially looked after at all; and according to the evidence presented by the respective lunacy commissioners or inspectors of these countries, it is only in Belgium — in Gheel—that they are *adequately* looked after. In Scotland, the machinery of the lunacy board is utterly *in*adequate to the proper supervision of all the insane who are not in establishments; unless, indeed, Government were to regard our public asylums as having arrived at years of discretion, and as competent to manage their own affairs; in which case the time and enterprise of four medical commissioners, a secretary, and staff of clerks, would be at once made available for the due supervision of patients *not* in hospital establishments. In proportion as the family system of treatment is thoroughly organized and developed, it may be expected to be successful, and to be free from the defects and accidents to which it is liable in a state of spontaneous growth. It does not follow that it will flourish best under the auspices of boards of *lunacy*. On the contrary, those experiments in this direction which have been successful in Scotland have owed their success to *parochial* boards or their officers. Thus we owe it, largely at least, to the enterprise of the inspectors of poor or parochial medical officers of the city parishes of Glasgow and Edinburgh that it has been demonstrated to be possible, as Dr. Mitchell admits, after twelve years' experience as a Deputy Commissioner, to establish Gheel colonies in Scotland.

On the other hand, we must confess that by far the most eloquent and enlightened pleading we have seen for the application of the family system to the treatment of the chronic insane is contained in the reports of a central board—the still young and enterprising, "Board of States Charities" of Massachusetts. The whole subject is admirably discussed in its fourth "Report" (1868); but as the public document in question is not likely to be accessible to many of our readers, we venture to give therefrom one or two extracts.

"God ordained the *family* to be the fundamental social institution. In it are the roots of individual virtue and happiness, and of national strength and prosperity. All political and social organisations should be shaped, so far as possible, with a view to foster and strengthen

this primal institution, and to preserve intact its essential features : to wit, separate homesteads in which may be constant indulgence of parental and filial affection extending to kith and kin ; natural relations of sex ; and the mutual influence of various ages. Where these are enjoyed in homesteads, with a portion of land, *there* is the *type of the family*. Where such families are multiplied and spread over even an ungenial soil, the people flourish and cling to it with the tenacity and vitality of the grass, and national life is healthy and secure."

" Now, all institutions which ignore or nullify any of the essential features of the family, are in so far unwise : those which persistently nullify them are wrong. Institutions of the natural family *upon a large scale* are not only by necessity imperfect, but they are always difficult and sometimes dangerous and pernicious, especially when they involve permanent separation of sexes and ages."

" The family is, moreover, the most powerful *remedial* agency which exists in any community." . . . .

" The Board hold that the family treatment, as a rule, would be better :

" 1. For the patients themselves.
" 2. For those who have the charge of them.
" 3. For the commonwealth itself. . . .

" We have dwelt much elsewhere upon the evils inherent in the system of *congregating* together, for long periods and in large numbers, those of one age or sex, or of peculiar temperament, or of *morbid condition*. Those evils cannot be avoided or corrected by any method of administration. . . . They are manifest to every reflecting mind, and are only justifiable on the assumed ground of *economy* or of necessity. . . .

" The scheme of Divine Providence implies no such contradiction as that we must cheat instincts and starve affections planted by God in the very depths of our nature. . . .

" The *aggregation* of persons in morbid conditions of mind is a rotten stone in your foundation. The principle is false, and most of your daily work is to counteract the evils flowing from it. It should be followed no further than is absolutely necessary. *Diffuse, not aggregate*, your morbid material ! Surround the insane by *sane*, not by insane, social influences !

" Mercy will second the appeal of common sense, and say that harmless insane men and women ought not to be restrained of their personal freedom. Sorely smitten, they ought not to be further afflicted by *segregation into a class apart*, but tenderly taken into the bosom of society."

The *principle of family treatment* is now being recognised both in England and Scotland in the provision made by parochial boards for the residence of various classes of the dependent poor, such as orphan children, as well as by the directors of educational hospitals for the young ; and it is being daily more and more fully acted upon. Current ideas are altogether opposed

to monasticism ; or to aggregations of large bodies of persons in an artificial form of existence. In Scotland the " *boarding-out* " of pauper children has been successfully applied for the last thirty years, especially under the auspices of Mr. Greig, of the City Poor Board of Edinburgh ; and his example is now being equally successfully followed in England. The scheme, both in England and Scotland, was objected to on various grounds ; and, inasmuch as the same classes of objections have been raised—and will continue to be raised—to the boarding-out of the *insane* poor—especially the hackneyed objection of the difficulty of securing proper custodiers—we venture to quote from the experience of the Chorlton Guardians (England) the *practical refutation* of all such *merely theoretical* objections. The system of boarding-out orphan children (paupers) had been in operation in the Chorlton Union for a year. Forty-seven children were placed in private homes—transferred from the workhouse.

" Of the foster-parents [= hosts or custodiers], twenty-eight are married couples, of whom ten have one or more young children of their own ; eighteen are couples either childless or whose children are grown up ; five are unmarried women ; and three are widows. Of the married couples, twenty-two of the husbands are artisans and warehousemen, three are shopkeepers, one a city missionary, one a policeman, and one a schoolmaster. The single women are of a somewhat superior class."

So much for the character of the persons found willing, for the paltry pittance of 3s. a week, to receive children of the most neglected and degraded classes. The *result* of such guardianship is this — and be it remembered we have before us only the dry details of the annual report of a parochial board, a class of public bodies not given to enthusiasm or imagination :—

" In a great majority of cases the foster-parents have taken the children *to their hearts* as well as to their homes, as is shown by unmistakable signs, which only the witnesses can appreciate. And, if we may trust their simple, natural expressions of interest in the children, the latter have probably all found *real homes*. In almost, if not quite, every case, the foster-parents spend on the children, both for food and clothing, *more* than the Union allowance, and they are proud to show the clothes they have provided, and the comfortable appearance of the children. The *health* of the children was one of the points as to which some anxiety was reasonably felt, and many of them were exceedingly delicate at the time they came out of the workhouse. . . We have been greatly struck with the patience with which the foster-parents have borne the annoyances—sometimes very serious—the labour, and the watching involved in these attacks" [of children's disorders, such as whooping cough, scarlet fever, and skin eruptions]. " It has seemed to us that, had the children been their own, greater care and solicitude could not have been bestowed

upon them! The general health of the children has decidedly improved. The explanation seems to be found in the *increased vitality* — physical, moral, and intellectual — which is generated by the *freer, more varied, and more natural life* into which they have been transferred from the dull, monotonous life of the work-house. . . .

" Your Committee therefore feel justified in expressing their conviction that a good work is being done in providing for these poor children the blessing of real *homes*—in which their energies, their affections, and their higher nature will be likely to be developed as they never could be in the absence of that *individual* care and attention which are simply impracticable for the numbers massed in the workhouse or district school. . . .

" The year's experience has settled several points previously in doubt. It has shown that the boarding-out system may be carried out successfully *in town* as well as in country districts. The process of placing-out children is steadily going on, quite as fast as could be expected. Without any action on the part of your Committee, fresh homes are *continually being offered*, and the probability seems to be that during the ensuing year many more children will be thus provided for."

These quotations, and the experience to which they refer, are of importance, for there is a parallelism between the cases of poor *children* and poor *lunatics* much closer than may at first sight appear. If there is, in one case or the other, a greater difficulty in the procedure of boarding-out, the difference is, we believe, *in favour of the lunatic.* If there is in England and Scotland no lack of persons willing to charge themselves with the nurture of neglected children of the lowest class, and ready to bestow upon them a large measure of their best affections, assuredly there will be at least equally little want of those willing and able to act as suitable hosts to the harmless and incurable insane poor. We dwell a little on this point, for one of the stock arguments used by those who are opposed to the introduction of the Gheel system into Britain consists in the confident assertion that it will be *impossible to obtain proper custodiers.* They point to the facts that Gheel has existed for 500 years ; that during that period a race of *hereditary* " nourriciers " has arisen ; and they argue that, since the origin of the insane colony in question was *superstition* of a character that cannot be developed among any English-speaking people of the present day, it is in vain to look for a second edition of Gheel in Britain or her colonies. There is, however, *no essential* connection between the superstition of St. Dymphna and the great duration of the peculiar colony developed under its auspices. We have seen that the system of *boarding-out* is a natural one in all countries ; that it was never more popular than at the pre-

sent day; and that the principle is being extensively applied to the
treatment of various *other* groups of the dependent classes than
the insane.

The same objection—the supposed absence of suitable cus-
todiers—has been offered to the introduction of the Gheel
system into America and Australia; and one can easily under-
stand that, if such an objection is anywhere founded on reality,
it should be so in *new* countries, where the population has
scarcely become settled, and where persons exactly equivalent
to the cottars of Belgium, England, and Scotland, do not exist.
But, as regards America, we have the evidence of the Board of
State Charities of Massachusetts, that the assertion is utterly
untrue, and the argument based thereupon thoroughly falla-
cious. Thus the fourth report of the said board (formerly
quoted from) remarks on this head:

"The common objection is that suitable families, who have the
requisite knowledge, and who are willing to enter upon such work, do
not exist. We believe that this is a mistake. Experience shows
that Massachusetts abounds in the material for all works of benefi-
cence that may be possible and desirable. The families for such
work have not been found because they have not been called for.
If called for they will come, and, entering upon the vocation, will
become worthy of it . . . . . There are in the remote parts of the
state *many* families whose material condition is such as to make some
arrangement of this kind desirable, both for the sake of having an
honorable and useful occupation, and for the *profit* it would bring.
· . . . . In this, as in every other market, we should get what we are
ready *to pay for !* If, besides maintaining the state's wards in life by
food and shelter, we demand from them kindness, sympathy, and moral
and religious influences, we must offer the higher compensation."—

The *colonisation* of the *sane* poor—the application of their
labour to the reclamation of waste lands—has been tried, and has
proved successful in some foreign countries, of which the colony
of Fredericksoord, in Holland, is a familiar instance. And in-
asmuch as there is no such essential difference between the sane
poor and those of the insane poor who are chronic, harmless, and
able-bodied, as to render a mode of life and class of occupation
that is suited for the one necessarily unsuited for the other, the
colonisation of the latter may be expected, when conducted
under favorable circumstances, to be equally successful with
that of the former.

Again, one of the prevalent tendencies of the age, as regards
the treatment of the *sick* poor, is to *break up hospitals*, and treat
them in cottages, tents, or even in the open air. The advan-
tages even of the latter apparently " rough-and-ready" form of
treatment have been illustrated on many a modern battle-field.

Village hospitals for the sick sane poor have proved very successful in the south of England, and they are consequently being there multiplied in all directions. It is one of the chief aims of the Board of State Charities in Massachusetts—

" To show that the system of providing large public institutions for the permanent dwelling of special classes of the dependent is unsound in principle ; that such establishments are only tolerated as a choice of evils ; and consequently that they should not be multiplied, and those existing should not be enlarged, without pressing necessity. . . . . . It is better to *separate and diffuse* the dependent classes than to congregate them" (Second Report, 1866).

If, as we have endeavoured to show, the " Family system " of treatment is a natural one, applicable alike to certain classes of the sane and insane poor ; if it has existed in some form in all countries and ages ; if even without proper regulation or supervision it has been wonderfully free from abuse ; if, when properly organized, it is so successful on a large scale at Gheel, both as regards economy to the ratepayer and advantage to the patient ; if it is in accordance with the genius of the age to break up hospitals for the sick, and to board out pauper children and adults ; if diffusion, not aggregation, of the dependent classes be the order of the day ; if individualisation, not what the Germans call " Casernirung,"—" Barracking "—be prominent features in our modern hospital system, how comes it, our readers may naturally inquire, that Gheel has never found an imitation in other countries ?   Our answer is, shortly and simply, the old, old one that has had to be urged in many other similar cases, viz. the too common obstacle to progress or reform, which embraces public or professional prejudice, ignorance, apathy, or inertia !

It is not a little curious that in all civilised countries which possess a well-developed " asylum system" the prevalent feeling of alienists has been adverse to any imitation of Gheel.   There are, however, certain signal exceptions. Thus, Professor Parigot, of Brussels, who was for some time Physician-in-chief of Gheel, after visiting England and Scotland and inspecting their asylum systems, specially in order to a consideration of the question how far the Gheel system might fittingly be introduced into these countries, gave it as his deliberate opinion in 1863 " that a Gheel—a pure colony even—could be very easily instituted in *Scotland :* " while he had " not the slightest doubt about the practicability of erecting the best possible Gheel in *England.*" Nor have *we,* as regards either Scotland or England !   Again, Baron Mundy, than whom no living authority has a more thorough knowledge of European asylums and asylum-systems, and

who spent several months at Gheel, leisurely studying all its
features—its defects as well as its advantages—visiting it, more-
over, at different times, is most enthusiastic and sanguine re-
garding the adaptation of the Gheel system to the requirements
of the insane in *all* civilised countries. Those who visited the
Paris Exhibition of 1867 might have seen, as we did, in the
Austrian section, a model of a "village asylum," with a com-
plete scheme for a new Gheel colony—on too magnificent a
scale, however—suited, we fear, only for the *very* affluent insane!
In Scotland the adoption of the Gheel system, as part of the
state policy in providing for the insane poor, has been for a long
series of years persistently and temperately advocated by Dr.
Lindsay, the physician to the Murray Royal Institution [for the
Insane], near Perth, both in his annual reports, and in various
articles in the public journals. Thus, in 1858 he writes:

" Justice has not been done, as regards treatment, to the incura-
ble but industrious, well-behaved, and harmless insane of Scotland.
We have over and over again, and long prior to recent agitations
regarding Gheel, advocated the advantages of the cottage or *home
principle* of treatment as applicable to them. . . . . . We would
introduce all that is admirable in the Gheel system, while we would
avoid all that is to be condemned in it. Suitable occupation, amuse-
ment, and open air exercise *at home*; the advantage of homely sur-
roundings; the society of kind relatives or friends; the possession
of all the social ties that make life a pleasure instead of a burden—
these we would place at the command of the classes of the insane
we have indicated. The principles we advocate are not altogether
new to Scotland; they have been, to a certain extent, already acted
upon. Hitherto many fatuous and idiotic harmless patients have
been allowed by the Board of Supervision" (there was then no
Lunacy Board) " to be kept at home by their own relatives; or they
have been boarded with attentive peasants or cottars, and in many
of these cases the patients have been altogether better placed than
in asylums. Doubtless there have been cases of abuse, but these
have arisen from negligence on the part of the authorities, and igno-
rance of the proper treatment of the insane. These exceptional
cases, however, must not be allowed to invalidate all we wish at
present to urge—*the principle of home treatment.* . . . But though long
recognised, and hitherto acted on to a considerable extent, its advan-
tages have never been fully recognised by the public, without whose
sympathy and assistance little on the great scale can be achieved.
The subject is of special interest at a time when Scotland is exerting
herself to erect establishments for the proper treatment of her whole
insane population on a scale commensurate with her necessities, and,
we trust, with her liberality and enlightenment. . . . . If Scotland
would agree to establish a Central National Institution for all her
incurable, harmless, but industrious insane, we are convinced the
industrial or *colony* plan might be carried out with signal success.

. . . . There is abundance of *unreclaimed land* in Scotland to work upon. . . . . It is a pity, at so favorable a juncture, that Scotland is indisposed to deviate from the beaten track in regard to the construction of her asylums and the treatment of her insane, and that the golden opportunity should hence be allowed to pass!"

In 1861, reverting to the subject, he remarks:

"Nearly seven years ago, when we were first charged with the responsibilities of the management of this institution, our attention was attracted to the *home treatment* of insanity. It was still more closely directed to the same subject by the investigations of the Royal Lunacy Commission for Scotland in 1855, and by particulars which we learned about the same time as to the chief features of the *Gheel* settlement in Belgium. Our deliberations led us to adopt and publish views, in which, so far as we are aware, we were at the time comparatively unsupported, but which, we are glad to find, are *now* being generally advocated by most of the competent authorities on such a subject throughout England and Scotland. We recommended essentially the restriction of hospitals or asylums proper to a limited class of cases, and advocated *home treatment* in cottage-like buildings for another class. . . . . Our suggestions are intended more immediately for the parochial authorities of our own county" (Perthshire), "but we believe they are equally applicable to, as they are assuredly equally at the service of, every parish in Scotland which has any of its population insane."

In 1869 he writes (on this occasion in the Blue Book of the Board of Lunacy):

"Experience has proved that to separate the present generation of the insane poor from their hovel-like, theoretically unhealthy, homes, massing them in palatial buildings superabundant in light, air, and all so-called 'sanitary' advantages, increases, and may even double their mortality; and produces a degree of discomfort or disease which may be safely measured by this mortality. In other words, there are many insane patients who can be much better treated, if domestic contentment and freedom from physical disease are the indices of success, *in ordinary private houses, even of the humblest cottage class.* . . . . For the poor insane there is no good ground, of a medical character, why the *Gheel system* should not be, with proper modifications, adopted in Scotland."

Now, what is *possible* in this direction in Scotland may be estimated by what *has been already accomplished.* It is an evidence of the vitality and ready applicability of the family system to existing requirements, that while certain forms of colonisation of the insane poor, which flourished under the Board of Supervision, were broken up by the Board of Lunacy, certain other equivalent forms have taken their place. We have already mentioned that in at least four different localities in Scotland

there are rudimentary colonies of insane paupers, numbering at each of two points twenty-four persons. Of these embryo colonies the best known is that of *Kennoway*, Fifeshire, which we lately took the trouble of visiting.

We were fortunate in securing as guide the intelligent Inspector of Poor, Mr. Smith, who evidently takes a warm interest in the welfare of all the insane boarders in the village, though most of them are not in his special (parochial) jurisdiction. The patients are boarded in groups of two to four in the houses of the villagers, only persons of one sex being resident in each house. The dwellings are of a much better class than those, probably, to which the patients had been accustomed in their own homes; the bedroom accommodation is superior to that of the hosts, who are sometimes married couples, sometimes widows or elderly single women. The diet is ample, though simply of the character of that generally used by the cottar class in Scotland. We saw some of the patients at dinner, which consisted mainly of abundance of wholesome Scotch "kail," well thickened with barley, potatoes, and greens. The hosts struck us as being most kindly and attentive, taking quite as much interest in their charges as if they had been relatives. In every cottage visited there was perfect liberty of action on the part of the patients, though only a few were able or disposed to take advantage thereof to any extent. So far from being subject to annoyance from the children of the village, the patients are universal favorites, and go freely about without attracting notice. Testimony was unanimous among the hosts that the patients give no trouble, unless in the same way that children do—requiring looking after as to washing and dressing. Accidents of any kind are seldom heard of, either to or from patients. The only *contretemps* reported to us was an outburst of temporary furiosity in a woman, during which she broke several panes of glass; she was, however, at once, and perhaps unnecessarily, transferred to the district asylum, and this is the procedure adopted with all who prove unsuitable for this free-air or domestic treatment. Practically, such transfers rarely occur, a circumstance that argues a wise discrimination in the selection, on the one hand, of the patients boarded out, and on the other, of their custodiers. There *are* circumstances connected with this family treatment, however, to which cavillers will probably take objection; but we may venture to remark that that scheme to which objection cannot be taken by cavillers must have a more than human perfectness! Persons of prurient imagination will probably look aghast at and reprobate the fact, that the bathing of adult males is occasionally in the hands of adult *females !* This arrangement, if really or seri-

ously objectionable, could easily be altered in favour of *male* bath attendants; but it is questionable how far such a change would be a benefit. Indubitably women are far kindlier and more efficient nurses than men; nor should greater objection be taken to this department of a nurse's duties than to the similar labours of female nurses or friends not only in all hospitals, but in private homes, where woman ministers, and has always in all countries ministered, to *all* the requirements of the male sick, dying, and dead! Indeed, one of the chief advantages of the family or Gheel system is that the patient is consigned mainly to the care of kindly *woman.*

The general impressions produced by our inspection of the Kennoway insane colony were decidedly favorable, and yet the experiment is a most unambitious one, and on quite a trivial scale. The *theory* of the treatment at Kennoway is thus expressed by one of the Commissioners in Lunacy (Dr. Mitchell):

" If we get kindly and sensible people as guardians, belonging to the grade to which the patient belongs, and living as respectable people of their class generally do; and if the patient be treated as the other members of the family are, and be incurable and harmless, then we may be satisfied that we have made a reasonable provision for his care and comfort."

There can be no doubt that the accommodation and guardianship provided come fully up to *this* very moderate standard of requirements—a standard which is, however, markedly at variance with that set up by the Scottish Board of Lunacy for the treatment of the same classes of pauper lunatics in poorhouses! The paltriness of the scale on which this phase of the Gheel experiment has been adopted in Scotland is evident when we contrast with the 1000 boarders of the Belgian Gheel the fact that in all Scotland there are only about 100 insane paupers distributed in licensed private houses!

The *origin* of the Kennoway colony was this. Some years ago an Assistant-Inspector of Poor of the City Parish of Edinburgh was spending a holiday at this out-of-the-way, somewhat decayed and deserted, village. The subject of " boarding out " insane, as well as other classes of, paupers, had been occupying the attention of the City Parochial Board of Edinburgh, and its officers were on the outlook for guardians to their charges. It occurred, then, to this assistant-inspector on his holiday to put the question to his brother inspector in Kennoway whether any of the villagers would take imbecile boarders. Inquiry was made: several of the villagers expressed their willingness to make the experiment; this fact was reported to the Board of Lunacy; the cottagers and their dwellings were visited and approved of by the Commissioners, and their official

sanction was given to the inauguration and subsequent gradual growth of the little colony. Its beginnings were very humble, the number of boarders very small, and even now it is only twenty-four.

In this case the organizers of the experiment were the authorities of the city parish of *Edinburgh,* who have in various other ways successfully carried out in practice the admirable principle of " boarding out " the dependent poor. Accident determined the locality of the experiment. The authorities of the parish of Kennoway, in which the experiment has been, and is still being, made, especially Dr. Small on the one hand, and Mr. Smith (Inspector of Poor) on the other, soon took, and continue to take, a warm interest in its development; while the Commissioners in Lunacy have extended to it their fostering care and encouragement. In the cases of Balfron and Aberfoyle (Gartmore), again, the agents by whom an equally successful experiment is being gradually more and more extensively developed are the authorities of the city parish of *Glasgow,* and especially their medical officer, Dr. Robertson, and their inspector of poor, who harmoniously co-operate. To them is due the proper selection and supervision of the cases; upon which the success of such experiments necessarily depends.

There can be no doubt that the boarding-out—the family system of treatment—of insane paupers, as practised at Kennoway or Balfron, Gartmore or Loanhead, is capable of great extension. There is no reason why equally qualified custodiers should not be found in *every* village in Scotland; and there is equally little reason why *all* parochial authorities should not take as active an interest in the boarding out of the insane poor as those of the city parishes above mentioned, who are deserving of great credit for the prominence they have taken in inaugurating a reform which, we venture to think, is destined in other countries, even more than in our own, to be one of the most important that has ever characterised the history of the treatment of the insane!

The boarding-out scheme as adopted at Kennoway and other Scottish Gheels is only *one* development of the Gheel system of treatment, which is susceptible of *many* modifications. It is obvious that Baron Mundy, Professor Parigot, and Dr. Lindsay, in their advocacy of the Gheel system, had something more in view than the mere boarding-out of two or three dozen insane paupers in existing villages. Their theory of treatment —even of the poorest and most hopeless of the insane—is of a much more ambitious kind than that of the Scottish Commissioners in Lunacy. They are not content to take cottars or peasants, and their squalid homes, as they find them; but they

aim at a higher kind of homes, a more cultivated class of
custodiers, and a mode of life more in accordance with modern
medical views as to the nature of insanity, and its proper treat-
ment.   Hence they would establish *new Gheels*, the first step
being the purchase of sufficient areas of reclaimable waste lands.
Then they would establish a colony such as that of Gheel,
possessing a central village, with its hospital, churches, schools,
public recreation-hall, stores, and so forth ; and scattered over
the domain, they would place hamlets, or isolated houses of a
farm character or otherwise, all having reference to the indus-
trial requirements of the place and the people.   There is no
more difficulty in constructing such a colony than in establishing
a District asylum.   The same elements are present ; but while
they are *concentrated* in the one case, they are *diffused* in the
other.   Of course, the foundation of a new Gheel is more
expensive than the mere development of the family system in
existing villages, where existing machinery is economically
rendered available.   But the new Gheel would be complete in its
organization ; and its theoretical advantages at least are very
much greater than those that can attach to a mere irregular
aggregation of boarders such as characterises Kennoway or
Balfron.   We have no desire to depreciate the humble experi-
ments that have there been carried on (in Scotland) for the last
seven years : they are admirable developments of the Gheel
system, *so far as they go*, and in the circumstances.   Above all,
village colonies have been proved to be *practicable*, which the
establishment of new Gheels has not hitherto been shown, by
any example, to be.   But if there is any reality in the advantages
the Board of Lunacy attaches to the sanitary condition of
asylums ; to light, air, dryness, drainage ; to the features of
moral or other treatment in all classes of the insane, including
the reputedly incurable, [*e. g.* to variety of occupation and
amusement ; to the suitability of diet ; to the requirements of
each patient ; to the careful medical treatment of every
individual,] there can be no comparison between a Gheel con-
structed and organized *de novo*, and the old-fashioned domiciles
of decayed Scotch villages !   If, on the other hand, we are, with
Sir James Coxe, to take private dwellings for insane paupers,
" as they are and not as we might wish them to be ;" if we are to
regard insanity as constituting no peculiar claim on our
liberality, and chronic insanity as requiring no special treatment;
if we are to speak with him of " other sufferers, who frequently
possess claims of much higher value, as being at once morally
more deserving, and intellectually more capable of appreciating
the sacrifices made for them"—doctrines, to say the least, of an
extraordinary kind, proceeding from such a source — what

becomes of all the ambitious arguments used by the Scotch Commissioners in Lunacy when they advocate improvement after improvement in our expensive public asylums? It is surely absurdly inconsistent, on the one hand, to regard the insane as inferior to their neighbours, or as deserving at least no better treatment; and on the other, to endow them with privileges not possessed by the sane of equal rank or status in society!

What is really wanted, as regards the development to a due extent of the experiment of "boarding out" the insane poor in Scotland, is *the will* on the part of its parochial boards, for where the will exists *the way* will soon present itself. What has been achieved by the parochial authorities of Edinburgh and Glasgow might be equally accomplished by those of *any* county in Scotland. Convinced of the expediency and practicability of the scheme, and possessed of the necessary earnestness of purpose, parish officers will encounter no difficulties—that are not surmountable by patience, perseverance, and liberality—in carrying out for themselves an experiment of a similar kind to Kennoway and Balfron, and, it may be, on a much larger scale. There will be no *real* difficulty where the disposition exists to give the experiment fair play, where there is an honest and hearty co-operation of the different authorities whose interests are involved. We do not profess to be able to submit to our readers

> " *Proofs*, as clear as founts in July, when
> We see each grain of gravel,"

that such an experiment *must* in all circumstances succeed. But we have, we trust, submitted sufficient evidence to show that there is room for great development, in various forms and to various degrees, of the " Family system," as applied to the treatment of the Insane Poor in Scotland!

V.—Obstetrical Tranasctions.[1]

THE eleventh volume of the 'Transactions of the London Obstetrical Society' is, like its predecessors, rich in valuable facts, and contains several memoirs of interest. Nothing is of more importance to medical science, and, we may add, to the personal reputation and security of the medical practitioner, than the placing on record of typical and extraordinary cases. Typical cases, by their accumulation and comparison, test the value of current scientific dogmas, and supply the materials for

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confirming or correcting those dogmas ; and it is of the highest necessity that this double process of confirming and correcting current opinions should be constantly going on. On the other hand, extraordinary cases, apart from their value as illustrating physiological and pathological laws, have this special interest : they afford the means of explaining unexpected casualties in practice, and of removing unjust suspicions of malapraxis.

We happen to know that the 'Obstetrical Transactions' have, in more than one instance, furnished cases which have vindicated professional character. Few greater services to medical science and to those who practise it could be rendered than to gather up into one focus, say, all the authenticated cases of ruptured uterus. No case of this kind ever occurs without throwing at least temporary doubt upon the skill of the medical man who happens to be concerned. The public and the law always look for "cases" in explanation of a particular catastrophe. They look with distrust upon mere doctrines and opinions of experts, who may be suspected of partiality. But an analogous case recorded in a book is open to no such doubt of being moulded to suit the occasion. It is often decisive.

In connection with this subject we may cite two cases of ruptured uterus. The first is related by Dr. Greenhalgh, and is a very remarkable one, possibly, as the note of interrogation suggests, erroneous in diagnosis :—A woman, seven months gone, in her sixteenth pregnancy, while lifting a heavy weight, was suddenly seized with the most agonising pain in the belly, as if something had given way. Shock and collapse followed. From this she rallied. Peritonitis set in, and signs of blood infection. The membranes were ruptured by a stilet, and a large quantity of putrid, stinking liquor amnii flowed, followed by the expulsion of a fœtus far advanced in decomposition. From this time the vomiting ceased, and the patient began to recover.

Another case is recorded by Mr. Mitchell :—A woman, æt. 42, pluripara ; had mollities ossium, when she was delivered by forceps after great difficulty. Again pregnant; it was found when she was gone five months that the pelvic deformity had increased. It was arranged to induce labour at seven and a half months. Being about seven months gone, she was subjected to severe terror and shock by a flash of lightning. She instantly felt agonising pain in the pelvis, fainted, and on reaction felt a continuous pain in the same region. Next, hæmorrhage set in. On examination a rent was found in the uterus, three inches above the os. The fœtus was extracted footling, dead. As the knee of the child lay in juxtaposition with the rent, it is probable that the uterus was torn by the violent contraction upon this projecting portion, which occurred under the influence of fright.

She died next day. No autopsy. The main interest in the case lies in the fact that mere emotion may produce rupture of the uterus.

Cases of extra-uterine fœtation, terminating fatally, should be collected for the same reasons as cases of rupture of the uterus. The volumes of the 'Transactions' now contain many valuable cases. The present one contains a case by Dr. Martyn, the preparation being reported upon by Drs. Martyn, Madge, and Phillips. They believe the case to be an example of an ovarian fœtal cyst, the possibility of which has been, we think, too absolutely denied.

Two cases of tubal gestation are related by Mr. Andrew Brown and Mr. Worship.

A case of rapid hydramnios, with twins, is related by Dr. Graily Hewitt, and a somewhat similar case, also with twins, by Dr. Rasch.

There are some curious contributions to the history of twin-pregnancy. Mr. B. Curgenven gives the history of an hereditary twin-bearing family, in which the tendency to double birth was remarkably manifest. Dr. Brunton gives a paper which appears to supply evidence against the doctrine that twins contained in one amniotic sac are always of the same sex. Of ten cases in which the children were of different sexes, in nine, he says, there was only one sac. This is so directly at variance with the observations of others, that further evidence is desirable. It was remarked in discussion by Dr. Playfair that in all the cases of united twins they were of the same sac. In these cases necessarily they were contained in the same amnios. This was exemplified in a case of united twins exhibited by Dr. J. R. Rogers.

The important subject of the complication of pregnancy with ovarian tumour is illustrated by several unusually valuable contributions. One case, reported by Mr. Tarn, terminated fatally by bursting of the cyst. Dr. Hall Davis related another, in which the patient was safely delivered at term by the forceps. Dr. Hicks had seen six cases which went through labour without trouble. Dr. Barnes referred to one case in which the tumour burst and caused death, and another in which the tumour became rolled over on its axis, twisting the cord and causing fatal hæmorrhage and peritonitis. He contended that these accidents might occur at any time ; and as there was no security against them, it was generally best to reduce the case to its simplest expression by eliminating the pregnancy. He advised that labour should be induced in the gentlest manner; but admitted that it was in some cases preferable to act upon the tumour by tapping, or to let things go on. When ruptures of

the cyst occurred the important question arose whether gastrotomy should not be performed to remove the tumour. This and other questions are discussed in a memoir by Mr. Spencer Wells. He relates one case in which premature labour came on, and the cyst burst, causing immediate death some time afterwards. Another case ended fatally, it is presumed, through bursting of the cyst during pregnancy. He relates a case in which rupture of the cyst having occurred at the fourth month of pregnancy, he performed ovariotomy with perfect success, pregnancy being uninterrupted. Mr. Wells is, upon the whole, in favour of tapping in preference to inducing labour.

Difficult labour receives several valuable illustrations. The relative merits of the French and British cephalotribes are discussed in communications by Drs. Matthews Duncan and Hicks, and Dr. Barnes exhibited the head of a child in the grasp of Dr. Hicks's cephalotribe, recently delivered from a pelvis measuring 2″ only in the conjugate diameter, to show how the base was canted, and the remains of the calvarium crushed in upon it. Dr. Barnes also demonstrated to the Fellows his new mode of performing embryotomy by making sections of the head with the wire-écraseur. A case of hydronephrosis of the fœtal kidneys, impeding labour, is related by Dr. Madge. A case of Cæsarian section is related by Dr. Hicks. The pelvis was obstructed by a large myoma firmly attached to the pelvic wall. Blood was poured out very freely from the whole placental site and from the cut sinuses. Perchloride of iron stopped the first; to stop the latter,

" A needle armed with silver wire was passed through the uterine wall a quarter of an inch from the margin of the incision, and brought out again about half an inch lower down, thus enclosing the opening. The wires were thus carried from within through the abdominal parietes, and then fastened with those of the opposite side. To make a more complete apposition, another suture, an inch lower down, was passed through uterus and abdominal walls. Elsewhere the abdominal parietes only were transfixed."

There were large masses of fibroid tumour in the uterine walls. Violent vomiting harassed the patient after the operation, and she died three days after it. No extravasation was found in the peritoneal cavity, thus telling in favour of Dr. Hicks's plan of stitching the uterus and abdominal wall together.

Dr. Protheroe Smith and Dr. Woodward exhibited and described their apparatuses for giving mechanical support to the abdominal muscles during labour.

The causes and treatment of hæmorrhage are illustrated by a case related by Mr. Houghton. The subject was eight months pregnant, when she suffered a fall. Violent hæmorrhage imme-

diately set in and destroyed her in forty minutes before help
could be given. The source of the hæmorrhage was not clear;
it was conjectured to be from a ruptured varix, but the orifice
could not be found. The case is at any rate instructive, as proving
how rapidly fatal hæmorrhage may be under lesion of the turgid
vessels of pregnancy. A remarkable cause of *post-partum*
hæmorrhage is recorded by Dr. Graily Hewitt. Peritoneal
adhesions on the surface of the uterus prevented the organ from
contracting and casting the placenta. One case was verified by
post-mortem examination. Dr. Barnes discusses the means of
arresting hæmorrhage in an elaborate memoir. As his views
have since been more widely made known in his 'Lectures on
Obstetric Operations,' it is unnecessary to do more than take
note of the great fact pointed out by him, that hitherto all the
means trusted to for the arrest of uterine hæmorrhage depend
for their efficacy on their power of inducing contraction of the
uterus ; and the corollary that, when contractility is exhausted,
the art of the physician was exhausted too. Dr. Barnes insists
that, even after contractility is gone, hæmorrhage may be stopped
by the topical application of powerful styptics, the most conve-
nient being perchloride of iron. Abundant evidence shows that
this method will rescue women who must otherwise perish.
Those over-timid persons who shrink from using it, in the vague
fear that the perchloride may do harm, must be prepared to
justify their inaction, or their wrong action, if their patients bleed
to death.

Puerperal convulsions receive systematic examination from
Dr. Hall Davis. Most of the leading questions arising out of
the study of this terrible complication are discussed and illus-
trated by cases. He believes the mortality from convulsions has
been much diminished since the days of Hunter, stating that in
the practice of Ramsbotham it was only one in fourteen, and in
his own one in eleven. He attributes this to the better modern
treatment, and especially to chloroform. It is, however, certain
that Ramsbotham's cases were not treated with chloroform, and
we may fairly ask for more evidence of the beneficial action of
this agent than any Dr. Davis adduces. In the sthenic form,
Dr. Davis, agreeing with nearly every man of experience, is in
favour of venesection, and attributes some of the greater modern
success to this practice. If labour have begun, he advises rup-
ture of the membranes only when there is reason to believe that
the liquor amnii is greatly in excess. Otherwise he recommends
first to dilate the os by Barnes's dilators under chloroform. We
will not dispute the propriety of this course in some cases ; but
experience has led us to doubt whether we are not rather impelled
to the common practice of hurrying on labour by over anxiety to

do something, than by conviction drawn from observation of
the effects of interference. After narrating 35 cases, Dr. Davis
subjects them to a process of statistical analysis. In 15 the
convulsions occurred in the first pregnancy, in 8 convulsions set
in before labour, in 15 during labour, and in 9 after labour.
Of 30 cases 18 were treated by venesection, 7 by chloroform, 3
by purging and sinapisms, 1 by opium. Of the whole 30, 27
recovered. The 7 women who took chloroform recovered.

One of the most important contributions is a case related by
Dr. Tyler Smith, in which he injected ammonia into the veins
of a woman apparently sinking from puerperal fever. Follow-
ing Dr. Halford, Dr. Smith injected a solution of one part of
liquor ammoniæ to three of water to the extent of half a drachm
into one of the veins of the forearm. When the operation was
over the patient complained of great pain over the whole body.
She began to mend soon after; the pulse fell from 135 to 100;
a small ulcer formed at the seat of puncture. She was con-
valescent in ten days and recovered. In the discussion upon
the case Dr. Barnes suggested that it would be better to inject
a larger quantity of fluid after the manner of Dr. Little in
cholera. Mr. Wells related a case in which he injected half a
drachm of liquor ammoniæ into the veins of a woman two days
after ovariotomy. Scarcely more than a momentary revival
followed. A large fibrinous clot was found after death filling
up the left ventricle.

Numerous minor communications illustrate the history of
diseases of the non-pregnant woman. Tumours of the uterus
and operations for their removal form the subject of several
papers. In one case an enormous fibroid polypus complicated
pregnancy. It was removed after labour by Dr. Gervis.

Mr. Lawson Tait relates an interesting case of chronic inver-
sion of the uterus, which was reduced after failure of other
means by sustained elastic pressure. The patient's condition
seemed hopeless when the pressure was begun, and she died
under symptoms of fibrinous deposit in the heart, forty-eight
hours after reduction.

The volume also bears testimony to the political life of the
Society. Mindful of its duty to promote the social and pro-
fessional claims of those who practise obstetrics, the Society
urged by deputation upon the Home Secretary the necessity of
securing representation on the General Medical Council of
Obstetric Science. The public is deeply concerned in regulating
the practice of midwifery. At present this is in utter confusion;
and amendment can hardly be looked for from a body whose
members know little of the subject, and therefore are not alive
to its importance. The volume also contains the discussion

which took place on the question of amalgamating the metro-
politan medical societies.

The transactions of the Edinburgh Obstetrical Society are
now for the first time published in a separate form. They are
reported regularly in the 'Edinburgh Medical Journal,' and the
most interesting memoirs have been analysed in our own
Obstetric Reports. It is therefore not necessary to discuss the
present volume in detail. We cannot, however, omit to welcome
this collected work. The plan of issuing transactions of societies
in annual volumes is one eminently worthy of being followed.
Important facts are thus more surely rescued from oblivion, to
the great convenience of authors and the benefit of science.

Differing from the London Obstetrical Transactions, in which
the memoirs are arranged in chronological order, in this volume
something like a natural order is followed. The matter is
classified according to the relation to pregnancy, delivery,
puerpery, instruments, diseases of women and children. This
plan has its advantages ; and it may be worth the consideration
of the London Society whether they might not secure these
advantages, without departing from their present plan, by giving
a classical table of contents, as is done in the 'Pathological
Transactions.'

Dr. Young narrates a case in illustration of the question :
" How long may a dead fœtus remain in utero ? " In this case
it seemed highly probable that the fœtus died at five months,
and was expelled two months later.

Dr. Cuppis narrates two very interesting cases of complete
detachment of the placenta before labour.

Dr. Matthews Duncan institutes an elaborate and ingenious
theoretical comparison between the cephalotribe of Baudelocque
and the English model. He endeavours to show that we ought
to adhere to the French instrument. Given his postulates, his
conclusions may be allowed to follow. But experience at the
bedside in London and Dublin amply attests the efficacy and
superior convenience of the English modification. It is scarcely
likely that the cumbrous French instrument, which requires at
least one assistant for its application, can ever make its way in
English practice in preference to an instrument which is as
handy as the forceps, and certainly not less effective than its
prototype. Dr. Buller in this volume relates a case showing
the value of Simpson's cephalotribe in head-last labour.

VI.—Sanitary Organization in Englnnd.

(*Continued from* vol. xlvi, p. 311.)

2. *Scientific and Medical Officers.*

IN the preceding number of this 'Review' we examined many complex questions concerning districts and authorities, on which a variety of suggestions and remarks had been made by the seventy persons whese evidence is published in the first volume of the Report of the Royal Sanitary Commission. That article will be referred to throughout this, as Part I. Our present object is to draw attention to those portions of the evidence which more immediately affect the medical profession and may influence the final decision of the legislature as to the rôle which medicine, whether as a science or a profession, is to play in the future administration of public-health laws.

It was, however, impossible to enter with any satisfaction upon this question until some general conclusions had been drawn from the evidence and other publications, as to the local and central authorities under which men well educated in medicine and other sciences relating to public hygiene would have to act. For it would be visionary indeed to speculate on the possibility of regulating the health of the country by a hierarchy of legal, medical, and engineering officers, under central direction, without local or county boards. This is not the nation to be governed by Crown nominees. Parliament, it is true, might require existing county authorities, that is to say, magistrates in Quarter Sessions, to appoint medical officers of health over groups of existing town and rural districts, from which they might be authorised to claim information of various kinds, and to which they should be required to afford assistance and advice. Yet to be driven to this alternative would be an acknowledgment of legislative incompetence and of the invincibility of local *vis inertiæ*. So, in discussing the appointment of inspectors and medical officers, we will assume that the local authorities admit of reformation, and that their areas of management may be revised and arranged on rational principles.

In the first place, as to scientific advice rendered to the central department. Are the public and the profession for the future to look to one master mind, or to a council of eminent men ? Doubtless each method has its advantages, and either would be compatible with the organized co-operation of all public departments concerned in sanitary management and medical administration, under a single minister of health. Such a chief might decide on having one responsible adviser ; or Parliament might determine that he should have a board of advisers ; or,

indeed, he might be aided in both ways. The country could not fail to benefit greatly by the permanent co-operation of men like Mr. Simon, Dr. Farr, and Dr. Parkes—if, indeed, their equals should be found when the flux of time and change shall bring their successors on the stage. Dr. Farr strongly advises the appointment of a council, as a deliberative body, to be consulted as occasion might require by the minister, but not to be entrusted with any executive or administrative duties. He quotes the following passage from a letter written by Sir Benjamin Hall, when President of the Board of Health, to those distinguished men whom he called together as a Council during the prevalence of cholera, in 1854 :

" Upon scientific matters connected with the sanitary administration of the country, when the medical profession are to be consulted, advised with, laid under contribution for science or information, or called upon to act, I wish to have the aid of a medical council to whom I may submit questions for consideration, and whom I may ask to suggest or undertake such inquiries as may from time to time be necessary."—(Ev. 5048.)

Dr. Farr thinks that this council should never have been superseded, and suggests its revival. A far better constitution might, however, be devised for a permanent board of health ; and it may be as well to call to memory a scheme anterior and in some respects superior to that of Sir Benjamin Hall.

The bill for regulating the profession of physic and surgery, proposed by Sir James Graham, and repeatedly amended during the sessions of 1844 and 1845, would have established a council of health and medical education, to which the Government might at all times resort for advice on questions affecting the causation and prevention of disease.

But the vehement opposition which that bill encountered, in whatever form it appeared, determined that great statesman to abandon all further attempts at medical legislation. No subsequent measure for the regulation of the profession has even professed to meet the necessities of the public health. That the General Medical Council established in 1858 is likely to be so amended in composition and mode of selection as to be available for a Council of Health is very problematical.

We are disposed to conclude, as in Part I, that the time is ripe for the creation of a central department, consolidating, by representation or otherwise, the medical and sanitary powers now vested in the Privy Council, the Poor Law Board, the Home Office, including the Local Government Act Office and the General Register Office, the Board of Trade, and the Inclosure Commissioners. This new department should be under a Minister of Health, with a seat in Parliament, who would be

" empowered to call for information from other departments, to institute inquiries by inspectors, as well into matters of abstract science as into local conditions; to indicate the nature and extent of measures required under varying circumstances of public health; to receive and adjudicate appeals on disputed points, unless these are referred to courts of law; and in extreme cases to enforce the law at the cost of the recusant authority."

II. To proceed to the question of inspectors employed or to be employed by Government in various matters of medical or sanitary supervision. Three methods or systems of inspection claim to be considered.

(*a*) That there should be, as at present, separate staffs of inspectors under different departments, each inspector being specially qualified for the particular object of his department.

(*b*) That investigations into local causes of disease and mortality; abstruse researches in physics and chemistry bearing on ætiology and pathology, human and comparative; inspection of vaccination and other local medical duties; visitation of hospitals and public institutions for medical relief; inspection of various industrial establishments and commercial processes; direction of measures for preventing the importation of disease, and superintendence of the food provision;—that all these and perhaps other inspections should be performed by one numerous staff of scientific men, travelling in circuits or working in the metropolis, yet all guided by the same directive mind. This seems to be in substance the view taken by Mr. Simon. It amounts simply to an extension of his present machinery. It would certainly enhance his authority and involve a large addition to his staff.

(*c*) That the greater portion of the inspections above named be consolidated in wide districts like those of the Poor Law Inspectors—say, one for the metropolis, and from five to ten for the provinces, according to the divisions (corrected) of the Registrar General,—reserving only a few inspectors at head quarters for particular or exceptional inquiries.

If the last of these methods should appear to want somewhat of the administrative unity which characterises the second, it holds out, perhaps, the more than equivalent advantage of securing a greater degree of independence of opinion and action to the inspector, more intimate relations between him and the health officers, and more thorough experience of the working of sanitary laws within his circuit. This kind of organization was recommended by several examinees, for instance, Mr. Pemberton, of the Parliamentary bar (4775).

Throughout the evidence one detects some confusion of thought and expression about the two orders of officers, viz.

inspectors of circuits (or groups of counties), and superintending health-officers of counties (or groups of districts). Both appear to be essential to a complete organization. It has, nevertheless, been proposed to combine these orders by the establishment of a numerous corps of Government inspectors—at least, so to multiply inspectorships as to supersede the necessity for a higher grade of health officers.

Now, if all the functions, which, as will be shown, ought to be performed by superintending health officers, are to be committed to state-appointed inspectors and sub-inspectors, not fewer than one hundred of these officials will be required for England and Wales; and the cost of the staff would have to be met solely by national taxation; for it could hardly be charged, even in part, upon local or county rates. The title of the office is, in our view, a matter of perfect indifference. Should Parliament agree to pay out of the consolidated fund for the requisite number of inspectors, by all means let such a staff be organized. But we protest, with Dr. Budd, against the committal of certain higher functions (to be hereafter described) to poor-law medical officers and existing health officers of small local boards.

Before taking leave of inspectorships under central authority, we may observe that this evidence amply confirms many previous accounts of the loss of time, labour and money, occasioned by sending inspectors with different qualifications—perhaps an engineer and a doctor—from different departments of government on the same errand. It is obvious that much of this waste of skilled labour might be prevented by harmonious action under a single department.

On the other hand, the Poor Law Board may be taken as an example of the administrative disadvantage which arises from incompleteness in an inspecting staff. It is not too much to say that in most districts half of the time and thought of the Poor Law Inspector is occupied in the investigation of complaints relative to medical neglect or *malapraxis* or the health-management of workhouses. Yet of the dozen or more existing inspectors there are only two or three medical, and these have but partially and unsatisfactorily supplied the want of medical supervision. Thus, every circuit placed under a barrister must now depend, in many appeals, on a medical colleague, who has to be called away from another circuit or sent specially by the central board. On the other hand, any district over which a physician-inspector may happen to preside, must require, for possibly the greater part of its official superintendence, a lawyer or a financier. It is quite unnecessary to refer to well-known instances of dissatisfaction under the present defective system of poor-law inspection.

The practical inference to be drawn from these facts and considerations is, that medical inspection under the Poor Law might be combined with that required for the general sanitary administration of the country, and committed to a medical staff under a central department of public health, of which the Poor Law Board would, *quâ* medical relief, form an essential constituent; all legal and financial superintendence being left to the original staff of inspectors. How many inspection circuits should be formed in England and Wales, is a question to be decided mainly by official experience. The eleven Registration Divisions suggest themselves as a statistical basis of organization; but probably one medical inspector might suffice for two of the provincial divisions. At all events, every health area should be within the circuit of three inspectors of different qualifications, legal, medical, and engineering; thus supplying all that is necessary in the way of itinerant inspection for all the central departments now concerned in sanitary and poor-law administration. The existing staffs reorganized would, according to our calculation, supply the *personnel* required.

III. We come now to that element of sanitary organization which most plainly proclaims the principle, that measures of public hygiene must either rest on the foundation of scientific inquiry *in each locality*, or fail in their object.

The medical officer of health is the mainspring of any real sanitary machinery. So much, however, has been written on this subject by men of large experience in matters of state medicine, that we hardly need treat the subject systematically. As to the functions of this office, and the qualifications necessary for its holder, the popular, and indeed the legal, notion is strangely inadequate, depending mainly on an original misconception of the meaning of the words " sanitary " and " public health." The same narrowness of view about the limits of public action in measures for the prevention of disease, which we have already noticed, has led to mistaken conclusions respecting the health office. In accordance with Mr. Thring's idea of the objects of a sanitary code, Sir J. Heron, of Manchester, thinks that it is not at all necessary that this officer should be a medical man (2521), and supports his opinion by mentioning duties which belong really to a nuisance officer, whom again he would make absolutely free from the control of the medical officer! (2525). In fact, the main qualifications for the health office—as most lawyers and town councillors seem to think—consist in the possession of a keen sense of smell, a quick eye, and the tact of a good " detective " in plain clothes,—above all, in a prudent appreciation of what is due to the owners, manufacturers, and tradesmen who appoint the officer.

Of course the medical members of the Commission do not fail
to correct any such misapprehension of the nature and objects
of the office ; and we are particularly pleased with the just esti-
mate which Sir Thomas Watson has formed and expressed ; for
instance, in his questions (1899-1903) as to the value and real
economy of a highly-educated body of official advisers, suitably
remunerated, " precluded from any distraction from their public
duties," and bound to devote themselves entirely to those duties
throughout the country.

Three only of the medical officers of health examined
belong to that part of the kingdom to which the inquiry was
at first limited, but their evidence as to their functions is very
important, as is that also of other distinguished officers.

Surgeon Hewlett, of Bombay, has under his charge a popula-
tion of more than 800,000.   The native town alone contains
450,000 inhabitants.   This health officer has absolute power
of direction in the removal of nuisances, and commands an army
of 3000 scavengers.   He says :—

" Besides the conservancy of the City, I have the superintendence
of the markets, embracing the inspection of animals brought for
slaughter, the slaughter-houses, the conveyance of the meat from the
slaughter-houses, which are ten miles from the city, and also all food
in the markets and shops. I have to inspect and to regulate offensive
and dangerous trades, as to their locality, conservancy, &c.; and I
cause the provisions of the Act, requiring sanitary operations on
property, such as houses and land, to be put into force, and I appear
against offenders in the police courts. I superintend the registration
of births and deaths, and I have the superintendence of different
places for the disposal of dead under me as well.   All those duties
are under the Municipal Act " (5718).

He is also empowered to remove all houseless persons suffering
from epidemic disease to a sanatorium, thus discharging con-
stantly and regularly the duties which in England are imposed
by the Privy Council only in emergencies under the Diseases
Prevention Act.   He also expects to have to superintend the
working of the Contagious Diseases Act.   In addition to this
long category of sanitary duties, he is coroner of the city, and
in the arduous duties of that office he is aided by the " chemical
analyser " appointed by Government.   How any man, even
one endowed with Surgeon Hewlett's energy, can execute all
these functions in so vast a population exceeds our comprehen-
sion.   It would be simply impossible for one officer, unaided by
fully qualified deputies, to thoroughly accomplish so much in
any European city of half the size.   Mr. Hewlett's opinions on
the nature and duties of the office deserve notice.   He insists
on the necessity of his superintending a registration of sickness,

as he believes, with most who have examined the question, "that the death-rate is no true test of the health of a place" (5740). He admits that analyses of water and food, as well as medico-legal investigations, should devolve on another officer acting as technical assistant. Viewing the duties of the health officer from his Indian experience, he insists that they should be executive; that he should not merely advise, but carry into effect his own recommendations. Probably this principle of sanitary administration would not be tolerated here. The despotic powers which he wields would not be conferred on any English officer.

In Liverpool, the duties of the health officer are determined by its local act of 1846, from which the well-known clause relating to that office was copied into the Metropolis Management Act. Some additional duties have been imposed on the Liverpool officer by subsequent local acts. That of 1864 is said to be the model on which Mr. Torrens's act was framed. "It has enabled me," said Dr. Trench, "to order the total demolition of 424 houses which were in a state injurious to health, the partial alteration of 47 houses, the demolition or structural alteration of 339 outbuildings including privies, and the construction of 644 trough or syphon water-closets" (7757). During the cattle plague the veterinary inspectors were under his orders, as are also the inspectors of bakehouses.

It will be seen at a glance that the Liverpool programme is considerably shorter than that of Bombay. Not to mention minor differences, Dr. Trench appears not to concern himself with any duties connected with legal medicine, or the registration system, or the coroner's court. Yet, having no other medical engagements, the whole of his time and attention is devoted very zealously and efficiently to the performance of those which legally devolve on him; and he has the advantage of a complete and numerous staff of inspectors and all the machinery of a well-organized department.

In Manchester "there is no attempt to define the duties which are assigned to the health officer; he is left very much to do what he may think desirable with a view to improving the sanitary condition of the city" (2427).

We turn to Glasgow. Prof. Gairdner is as distinguished in the therapeutic and educational departments of his profession as he is in the public and preventive. It can hardly be doubted that the greater part of his well-spent time and vigorous thought is devoted to the former. He therefore holds the latter office, not without large professional assistance. He has five deputies, district medical officers of health, under his direction, he being more of an administrative officer than an actual visitor of the localities, his deputies also being aided by a well-organized staff

of inspectors and by police officers of superior rank.   He is in fact the chief sanitary adviser of the governing authority of a great city, but his powers of direct interference are very limited (8174-5).   He has nothing to do with statistical or medico-legal inquiries.   His position in the University and in the profession naturally leads him to object to any multiplication of his duties, and he confesses that he would rather contract than extend their sphere (8270).   He ridicules the idea of an officer of health having anything to do with other departments of state medicine.   Here he is in direct opposition to Surgeon Hewlett; although, like the latter, he would remit chemical and microscopical investigations and questions of engineering to technical experts.

From this sketch of the Liverpool and Glasgow appointments it will plainly appear that they do not meet all the requirements of an official sanitary organization, and therefore that they cannot fairly be adduced to prove that a single officer of health is capable of superintending a population of half a million.

We now proceed to examine the evidence of Mr. Simon, Dr. Farr, and Dr. Rumsey, each of whom had much to say on this branch of the inquiry.   Their suggestions may be traced back in great measure to earlier documents.   No one at all versed in the literature of this subject can doubt that Dr. Southwood Smith, Mr. Chadwick, and especially Dr. Strange, of Worcester,[1] were the first in this country to put forth definite plans for a district medico-sanitary service.

Not less certain is it that the two standard official documents on the duties of medical officers of health are those issued by the defunct General Board of Health; the earlier by the original members soon after its establishment in 1848; the second by their successors in 1855, and understood to be the work of Mr. Simon.   This "Instructional Minute" may still be taken to some extent as authoritative; and it has the high recommendation of embodying the experience of one who had himself laboured as health officer in the City of London for some years before his well-merited promotion to the chief medico-political office in the kingdom.

To these papers we refer such of our readers as desire more precise information, merely observing that the earlier document mentions several functions of which no notice is taken in the later; namely, medico-legal duties, inquiries connected with mortuary registration, coroners' inquests and other forensic cases, and the inspection of schools, factories, and workshops.

[1] See an Essay, "On the Formation of a System of National Medical Police and Public Hygiène," by W. Strange, M.D., 'London Medical Gazette,' 1846.

These matters have been generally treated by writers on state medicine as coming within the province of the health officer. But to Dr. Farr belongs the merit of pointing out to the Registrar-General, in 1866, the great importance of an amended system of inquiry into the causes of deaths, to be carried into effect in every district by the aid of a " Registration Medical Officer," who would in fact be an officer of health.   His recommendations are happily reproduced, not only in his evidence, but also in their original form in the appendix to the Report under examination.   We are not sorry, by the bye, to perceive that his obstructive chief has committed himself irretrievably by a rash disavowal of assent to these and other equally reasonable reforms in the registration department.

An interesting series of suggestions made by Dr. Farr (5043-5) on the functions and qualifications of this officer deserves an abstract, as follows :

" He would contribute to make the system of registration perfect and complete ; he would effect a great improvement in the certificates of causes of death, so that the scientific accuracy of the statistical abstracts may be relied on with confidence, as they cannot be at present ; he would be empowered to correct errors in the register, to ask for explanation from the medical attendants in doubtful cases, and, when there had been no qualified attendant, to conduct an independent inquiry—either himself or by the help of a deputy—thus supplementing the duties of the coroner.   He would learn the number, the sex, the age, the occupation, the wealth, the poverty, the temperance, the dwellings and other circumstances, of the population ; and would enhance the value of the decennial census by promoting a more frequent enumeration in towns where the population increases rapidly and irregularly.   [There ought, as Dr. Farr suggested, to be a " population register " in which might be found the main facts of each person's life, from the marriage, birth, and death registers.] This officer would ascertain the facts of disease-causation, and make himself acquainted with the means employed in contagious and epidemic diseases, and in the prevention of injuries to workpeople and others in mines and manufactories.   He would keep himself well informed by weekly returns of prevailing sickness, in connection with the meteorology of the district, the supply and quality of the water and food, the state of wages, employment, and pauperism.   He would supervise the sickness returns, and analyse them in weekly, quarterly, and annual reports.   He would keep the local and central authorities accurately informed as to the health of the district, and would aid in every way the authority under which he acted.   In epidemics he would be armed with ample administrative powers.   At all times general measures for combating zymotic disease would be under his control.   To secure his independence, he should be subject to dismissal only by the central authority. While fully admitting the advantage of separating the public duty from

private practice in large towns, Dr. Farr agrees with those who think that the union of occupations must be permitted in country places."

At the risk of being considered prolix, we have given the substance of these very important suggestions, while we are prepared to show how the difficulty of separating the public appointment from private practice, and of adequately remunerating a highly-qualified officer so debarred, may be met in sparsely populated districts. But the definiteness of any regulation on this point must depend on a settlement of the previous question, whether *one* or *two* orders of health officers should be instituted —in other words, whether a higher order precluded from practice (except perhaps in public institutions) should be aided by deputies not so precluded.

This question applies to several functions which have been suggested for a corps of health officers, and it may be answered by taking them *seriatim.*

(1) Scientific superintendence of the registration of births and deaths, and especially of the certification of causes of deaths (for the details of which we may refer to the previous abstract of Dr. Farr's evidence); also the registration of disease, by collecting, revising, and systematically compiling the weekly returns of cases of sickness and accident, made by the poor-law medical officers and by the resident medical officers of public institutions, in which returns should be specified the causes of the attacks and the results of the cases discharged, for the information, first of the local and county authorities, and afterwards of the central department.

(2) Medical evidence at coroners' inquests, and skilful *post-mortem* examinations in certain cases, as recommended also by Dr. Lankester. This might perhaps be left, under certain conditions, to the poor-law medical officers, acting as deputy health-officers.

(3) Sanitary and medico-legal duties under various acts relating to labour, now performed by certifying surgeons. We see no advantage in superseding these officers, who, *pace* Mr. Redgrave, constitute a superior and well-selected body, usefully employed for the detection of physical incapacity and chronic disease among children and young persons employed in workplaces, and who, as Mr. Baker suggests, might be utilised still more beneficially in the periodical observation of persons and places occupied in manufacture. Yet it might be desirable to appoint some of these very surgeons as deputy health-officers; whilst as vacancies occur in their ranks, their functions might be absorbed into a general sanitary organization. The superintending health officer might also, with much advantage to the factory workers, co-operate in some of the duties now performed

by the sub-inspectors of factories, who, not being obliged to possess any special or scientific qualifications, may be quite incompetent, without medical aid, to investigate and report on matters of industrial pathology and hygiene.

(4) Food analysis in country districts appears not to be an essential function of the health officer, of either grade. This duty would probably be more satisfactorily and accurately performed by a single County Analyst, for whom a medical qualification might be unnecessary, but who should be required to assist the health officer.

(5) Inspection and certification of the vaccinated, on a different principle from that adopted by the Privy Council. This question does not press for immediate consideration.

(6) In the event, at present improbable, of the " Contagious Diseases Acts " being more extensively applied, superintendence of the medical duties under them. Neither need this be now discussed.

(7) Duties of the Visiting Physician to county justices, in the inspection of asylums, &c., might advantageously be committed, as vacancies occur, to the health officer of a county division. A far more searching and frequent visitation of houses used for the confinement of the insane, and for the care of idiots and imbeciles, throughout the country, might thus be secured. The necessary supervision and protection of the insane in private dwellings, especially paupers boarded out, seems to have been the primary object of Dr. Arlidge's well-considered plan [1] for organizing a corps of district medical officers or inspectors, who might also act as public medical jurists, or as assessors in forensic inquiries, *e.g.* in cases requiring an independent medical opinion, at quarter sessions, or in the county court, or at coroners' inquests.

(8) Inspection of the dwellings of the poor. These duties, as regards common lodging-houses, might be discharged with facility and convenience by the poor-law medical officers, who are now, not unfrequently, inspectors under the Common Lodging Houses Acts. The same officers, in the absence of a special health officer, might also be directed to visit and report on the so-called "tenement houses" of the poor, under the Sanitary Act, 1866; and on the condition of dwellings and premises under the Artizans and Labourers Dwellings Act, 1868. These would undoubtedly be their functions in what Mr. Simon calls the "common health areas" of the country. But the unavoidably dependent position of the great majority of these officers, and the incomplete qualifications of many, were re-

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[1] 'State of Lunacy' (see especially chapter ix, page 169), by John T. Arlidge, M.D., London, 1859.

peatedly urged in evidence as reasons for not employing them universally as health officers. Yet, if backed by a superintending officer, fortifying and encouraging their action, who would also revise and if proper confirm their reports, in cases of proposed demolition or extensive structural alteration of houses unfit for human habitation, we can see no good reason why such duties should not be committed to them.

(9) There are duties to which we have referred in treating of county authorities and river-conservancy boards, which would naturally belong to the higher order of health officers, *e.g.* nuisances arising from commercial or manufacturing processes of magnitude, and involving important interests. The attempts of existing authorities and officers to abate the Smoke Nuisance and the noxious vapours of great towns and mining districts, have often proved abortive.[1] No one gave more valuable information on this point than Dr. Christison himself.

Again, the sanitary state of rivers and streams running through extensive tracts of country could not be satisfactorily investigated by merely local officers. This duty would therefore devolve on the health officer of the county division, in co-operation with the civil engineer and the analyst of the same superior jurisdiction.

(10) General arrangements for medical relief, hospitals— whether county, city, or cottage—dispensaries, houses of recovery, public schools, industrial schools, reformatories, prisons, and other public institutions of the county, might also with great benefit be subject to the occasional inspection of the superintending health officer. Houses, registered for the purpose, in which children are boarded or infants nursed, should be inspected by the deputy health officer. Nursing institutions should also be subject to skilled supervision.

(11) There are certain inspecting duties which are now most imperfectly, if at all performed in ports, harbours, navigable rivers, and among merchant shipping, for the protection of the health of sailors, and for preventing the importation of contagious disease. These functions might be committed either to the poor-law medical staff of the adjacent districts, or to officers acting solely for the water area, yet in administrative correlation with the superintending health officer or officers on shore.

Much more might be said on the various functions of these officers of both grades; but it may suffice briefly to refer to the opinions of other gentlemen, who are known to have fully considered the subject. For instance, Dr. Druitt has advocated

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[1] An excellent paper was read at the Newcastle Congress, "On the Smoke and Alkali Works Nuisance," by Mr. Leonard Armstrong, who clearly proves the necessity for "competent inspectors, unfettered by local interests and feeling."

the comprehension of medico-legal and statistical functions, as suggested by Dr. Farr for his registration medical officer; thus relieving the coroners' court of much needless responsibility, and both simplifying and economising its action.   Dr. Budd also, one of our best comparative pathologists, has recommended in substance, that the duty of advising the county authorities in cattle murrains, the superintendence of cattle-disease inspectors, and the visitation of cattle hospitals and veterinary schools of instruction, should devolve on health officers of the higher order, and thus be connected with the sanitary administration of the county.   This function would make the twelfth, if added to the preceding category of suggested duties.

Dr. Heslop is known to be strongly in favour of such a reform in the appointment, position, and qualification of poor-law medical officers, as shall fit them for recognition as district health officers throughout the country, at all events, as sanitary officers of the first instance.   Their emancipation from depressing local influences, on which he so forcibly insists, might be secured by affording them the support of a superintending order of health officers.

An excellent paper, contributed by Mr. John Liddle to the Social Science Association, containing a plan for health officers, is said to have been reproduced before the Sanitary Commission. Coming, as his suggestions do, from the senior medical officer of health in the metropolis, himself a thoroughly practical man, they ought to carry great weight.   They are so fully in accord with the principles advocated in this article, that we feel it unnecessary to quote them.

We know not why Dr. Ballard has not been examined. Few, if any, monographs on this subject surpass his papers read before the Social Science Association in 1862, and the British Medical Association in 1869.   He has, moreover, shown, by an elaborate contribution to Mr. Simon's eleventh annual report, the ætiological value of a minute observation of natural and meteorological phenomena in connection with a registration of sickness—a combination of records suggested and carried into effect long ago by other labourers in this field.

We have now to discuss the methods proposed for the organization of health officers, and are thus led back to Mr. Simon's recommendations, which, as might be expected, correspond closely with his suggestions as to local administrative bodies. In proposing two kinds of health officers for different sorts of districts, he draws almost the same line of distinction between town and country appointments as between Municipal and Union jurisdictions.   He would also confine the area of the appointment to that of each local authority, however limited;

and as at present there are no special authorities in counties or over very large areas, he does not propose county officers of health, though he suggests (2091) that magistrates in quarter sessions might appoint a public analyst, with certain responsibilities relating to the adulteration of food, the supply of water, and perhaps also in aid of coroners' inquests.

It seems, indeed, to be generally agreed that the purely analytical process might be separated from the medico-legal necropsy, which in public practice would be under the direction of the health officer, and generally performed by his deputy.

Mr. Simon's opinions concerning this sanitary appointment and its relation to the poor-law medical service, are brought out very clearly in the following extract:

" When there is a special health district, I think that the law ought to require that a special health officer should be in action ; but in places where there is not a special officer, functions of that kind, or the rudimentary functions of an officer of health, should be discharged by the poor-law medical officer of the district. . . . . . That would apply to country districts, where I propose that the destitution authority and the nuisance authority should be one. . . . . . . But when you come to large cities, where there is a more developed, a more accomplished, and a more special sanitary officer, you ask what is to be the relation of that man to the poor-law officers ? It must, I suppose, to a great extent, be the relation of voluntary co-operation ; but the sanitary officer ought certainly to have access to the books and records of the poor-law officers, or else their records ought to be published ; they ought to be accessible to him specially, or else they ought to be public documents, so that the whole world should have access to them, as to the quantities and localities of illness." (1924.)

Thus we see that, as to municipalities and local boards of all sorts, Mr. Simon would leave it to each to appoint its own officer of health, independently of any general system. Yet he acknowledges the vagaries to which such an arrangement is obviously liable by providing ('11th Annual Report,' p. 27)—

" That the special ⋅health officer of one town should be free to be special health officer to another ; and that the two parties concerned should so avail themselves of this freedom, that the special health officer might be able to dispense with ordinary professional practice, and that the towns employing him might be able to secure a very high quality of special service."

This optional combination of districts for a particular purpose, like all other permissive enactments, would be neglected by the majority of local bodies. It appears, moreover, that Mr. Simon does not propose to bring the poor-law surgeons into normal relations with the health officers. The hold of the latter upon

the records of pauper sickness, and upon the reports of the former, would depend on their voluntary co-operation, and on that "kindliness and generosity" which Mr. Simon himself experienced from those officers (1924).

On the other hand, in the "common health areas," where the poor-law medical officer would only perform "rudimentary functions"—such we suppose as would satisfy Sir Joseph Heron—there would be no one, unless a Government inspector should be appointed, to whom the Union medical officer might refer on deeper or more elaborate questions,—no such officer as Mr. Simon allows to be necessary in a special health area; no one independent of private practice, and removed from petty local influences, to support and relieve the district officer in the discharge of onerous responsibilities, such as might bring him, if unsupported, into collision with his employers or his patients. It may be granted that these considerations do not weaken the force of the reasons, adduced by several examinees and very impressively by Mr. Lambert, a member of the Commission (4732-9), for making use of the medical-relief corps as sanitary visitors and reporters in their respective districts; for which duties they possess all possible facilities and opportunities. But the preceding argument does apply very closely to the unprotected position of the medical-relief officer in such a scheme as Mr. Simon's, based upon an abrupt distinction between town and country districts. For, in his "common health areas" on the outskirts of towns, and in newly forming aggregations of people, reports on the condition of cottage property would be left to officers who do not generally possess that authority in matters of opinion which is absolutely essential to the weight of an official decision. Thus, then, the discrepancy between Mr. Simon's town and country systems, and the want of completeness in each, are vital objections to his plan, which is open to the further criticism, that only in a comparatively few cases would it be possible to render the officer independent of private practice. Mr. Lambert and many others object reasonably to medical-relief officers being precluded from undertaking such practice. They perceive, as Mr. Ceely demonstrated to the Parliamentary Committee on Medical Poor Relief in 1844, that there are manifest advantages in combining attendance on the poor with that on other classes of the population in country areas. The separation would be equally impossible in the case of health officers in all but the largest "special health areas." Every small local board would claim its right, as several have done, to employ some favorite practitioner of the town, who might deem it prudent to accept an insignificant appointment in order to keep a rival out of it. The health-

officer system on this scheme would be subject to every possible slight and disparagement, and would sink in the estimation of the higher intelligence of the country.

A few words may here be said on the position which existing health officers in the less important towns would take in a complete organization. They need not be displaced. If they have proved their efficiency and gained their experience, they would have a fair claim to promotion to larger spheres. If they should prefer their existing position, and if the town or district authorities decided on retaining their services, they might supersede the poor-law medical officers or the certifying surgeons as deputies to the health officer of the county division. Perhaps every district might be allowed the option either of appointing a single deputy health officer, or of utilising the medical-relief officers for the same duties.

But the main difficulties of this question would be obviated by Dr. Rumsey's proposal, according to which the same principle of organization would be everywhere in force ; the poor-law medical officers or the health officers of small towns, being everywhere made the local deputies of a chief health officer debarred from private practice. Thus, in very large towns, the destitution-doctor might take the same position under the chief as do the five medical officers who assist Dr. Gairdner in Glasgow. In rural districts, again, they would everywhere aid, and in turn be supported by, the health officer of the county jurisdiction.

We come now to the question of the extent and population of the chief officer's districts.

As to municipalities, we adopt the suggestion (4367) that every town, the authorities of which might be willing to pay a salary sufficient, in the judgment of the central authority, to render the health officer independent of practice, should be empowered to appoint its own chief officer. All other places would be included in county divisions, to each of which one chief officer would be appointed ; these divisions being aggregates of local-board districts and unions with revised boundaries (see Part I); and their extent and population being fixed by county boards, subject to the approval of the central authority.

Some have advised that there should be only one chief officer to an undivided county ; and we have heard of clever men, not practically acquainted with the duties of the office, nor aware of their great variety and extent, who have imagined themselves capable of undertaking the sole sanitary superintendence of a large county. Such an attempt, were it made, would generally result in the neglect or perfunctory discharge of duty ; an undue share of responsibility would be thrown on assistants or deputies,

and the skill of the accomplished officer would be most profitably—to himself—employed in managing the county board !

If in the majority of provincial districts a population of more than 150,000 were committed to a single superintendent, it would be almost impossible to provide for the duties to be performed by Dr. Farr's "Registration Medical Officer," including the local revision and compilation of sickness returns.[1]

Yet it is curious to observe how those who have given, perhaps, the longest attention to this subject have arrived gradually at the conclusion that both the public and the civil medical service would benefit more by larger districts and fewer officers than they at first contemplated. Thus Dr. Rumsey, who suggested 300 officers for England and Wales, in his Essays (1856), said in 1868, "the total number of the proposed districts need not for some time exceed 200."[2] This is the precise number more recently named by Dr. Bridges, the new Poor-Law Inspector.[3] Since giving evidence before the Commission, it appears that Dr. Rumsey has further reduced his estimate to 140.[4] Excepting the metropolis, therefore, he would allot an average of about 135,000 persons to each chief officer; the number varying inversely with the extent of the county division, and the whole population of every first-class town being included under one officer. Dr. Ballard has suggested an average population of 200,000, and then 100 officers would nearly suffice. It will not be forgotten that the larger the number of these functionaries the less would be the amount of salary awarded to each, and the smaller would be the importance of the office in public estimation. Yet, as we have said, there are limits beyond which a reduction of the number would frustrate the objects of the appointment.

This leads on to the money question. Liverpool pays Dr. Trench, and we hope, notwithstanding recent threatenings of a storm in that quarter, will continue to pay him, £1000 a year for only a portion of the duties theoretically appertaining to the office. Another £1000 would be required to complete a medical staff sufficient for all purposes of statistical record, medicolegal inquiry, and sanitary visitation in that town, with its half a million of inhabitants.

"There might be a general rule as to the proportion between remuneration and the number of people included within the officer's jurisdiction," said Mr. Simon, "defined by an order" (2119-20). The total remuneration, according to Dr. Rumsey, might be reckoned at the rate of £1 for every 100 persons in a district, of which he thought that half might be in the form of a

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fixed salary to the chief officer, and the remainder made up by
payment for special work, including, perhaps, travelling expenses
and the payment of deputies. But there is some obscurity in
his evidence on this point. Dr. Ballard proposed £400 fixed
salary, probably not including fees and travelling expenses, for
every 100,000 of population, that is, £800 for one of his dis-
tricts, or upwards of £80,000 for the whole of England—an
estimate which corresponds with the *maximum* suggested by
Dr. Bridges (loc. cit.), "half the cost of the Leeds Infirmary,
one third the cost of an ironclad ship." Mr. Baker, the Factory
Inspector, advises a salary of from £800 to £1200. Dr. Farr is
of opinion that the salary should be such as to command the
services of an eminent physician.

Considering these suggestions, and the national importance
of the proposed staff, we are of opinion that the chief officers of
health throughout England and Wales, in number from 100 to
140, should receive, besides some allowance for travelling ex-
penses, not less on the whole than £100,000 a year, of which
at least half, as in the case of the poor-law medical officers,
might be borne by the Consolidated Fund. The county court
judges, sixty in number, divide £90,000 among them, and
inspectors in lunacy are paid at the same rate.

Some of our professional leaders seem to dread the possibility
of shocking the economical sensibilities of Parliament, by sanc-
tioning any proposal for an adequate endowment of the civil
medical service. But we can hardly suppose that any reason-
able project would be stigmatised as "elaborate and costly" by
those to whom the public look for information and the profes-
sion for equitable support. The above estimate would not, we
believe, exceed the total cost of irregular arrangements, either
on the present system, or on Mr. Simon's, if extended compul-
sorily over the country. Whatever the Chancellor of the
Exchequer may have to say on this question, we trust that the
Royal Sanitary Commission will not hesitate to recommend such
a position and such material advantages to the future occupants
of this office as will secure all the benefits which it is capable of
conferring on the people. Nothing could be more fatal to the
efficiency of the organization than the approval by Government
of certain suggestions about half-pay surgeons and retired prac-
titioners in easy circumstances being ready to undertake these
duties on receiving "a moderate addition to their incomes."
What a series of splendid jobs might be perpetrated on such a
principle! Unless the remuneration be fairly proportioned to
the greatness of the function, the appointment, if made compul-
sory, will be subject to the same degrading competition as has
already been so extensively applied to other medical offices. No

profession could resist the destructive tendency of this mode of selection, however attractive to pure economists. For even if bishopricks were conferred on clergymen " in easy circumstances" ready to accept half or a third of the present salaries " for the honour of the thing," the Ecclesiastical Commissioners would, doubtless, be enabled to apply much larger sums annually to the augmentation of small livings. So also many a brisk barrister might be found to undertake a county-court judgeship for fifty per cent. of the present stipend. But what would be the effect of such a method of election upon the character, and dignity, and usefulness of either of those high offices ? Let us hope that nothing of the kind will be again inflicted upon the profession of medicine.

A few words on the cost of the services of the proposed deputy health officers, if poor-law surgeons. It is the opinion of Dr. Rogers, the President of the Poor Law Medical Officers' Association, that the weekly reports of health and sickness to be made by those officers should be paid for, not by additional stipends, but separately for every report, by small fees ; a proper remuneration being also awarded for any special investigations which the superior authority might demand. We are not disposed to question the reasonableness of these suggestions. Whenever the deputy health officer might be required to give evidence at coroner's inquests, or to make cadaveric inspections, he should receive the fees specified by the Medical Witnesses Act. It would be unwise to attempt any composition of fees which, small as they are, nevertheless give the officer a direct interest in the execution of untimely, arduous, often painful and perilous investigations. The same principle might be applied to such other special services as this deputy might be called on to perform at the instance of the local authority or the superior officer.

We have no means of estimating the probable amount of extra payments to the poor-law medical staff for sanitary reports and medico-legal inspections. But should the dispensary system, happily for England, become as general in this country as it is in Ireland, and should the cost of the drugs be separated from that of medical attendance and charged wholly upon the rates of the several localities, the total salaries and fees, for both curative and preventive services, might probably be covered by £200,000 per annum, or double the proposed cost of the higher order of health officers debarred from remunerative practice.

IV. We have now only to consider one more question, on the settlement of which depends in great degree the beneficial working of the health office.   Security will have to be taken for the special qualification and thorough competency of its holders.   How shall this be effected ?   For a reply, we must

refer to proposals which have been for some time before the public. It has been repeatedly stated by writers on this subject, and, indeed, admitted by official and medical authorities examined by the Sanitary Commission—

(1) That a man may be a well-informed and skilful practitioner in any or all of the therapeutic departments of his profession, and may even have attained success and eminence in his calling, without having acquired that exact knowledge of particular subjects or that experience in special pursuits which would qualify him for public duties as a sanitary expert or an official adviser; (2) that while the present system of medical education provides, more and more satisfactorily, for the thorough qualification of the registered practitioner, as regards the principles of his art, it does not provide at all adequately for the special study and cultivation of subjects of state medicine; (3) that no formal assistance, by way of certificate or diploma, is afforded to administrative authorities, whether central or local, to enable them to distinguish the qualified from the unqualified for employment in matters of legal or preventive medicine, and that the inscription of a name on the medical register is no guarantee of the special competency of which we speak; and therefore (4) that almost every appointment is open to the charge of being made the grounds of favoritism or patronage, or private interest, or party preference.

To believe that every licentiate, in virtue of his pass examination and legal registration, is sufficiently qualified, or can by any possible improvement in the educational curriculum become qualified, at the age of twenty-one, for the efficient discharge of duty in the specialities of lunacy, medical jurisprudence, and hygiene, implies an amount of credulity, a deference to conventional prejudices, which we should be sorry to think generally prevalent among intelligent persons.

Statements recently published by Dr. Stokes and Dr. Rumsey show that certain universities are not neglecting this *desideratum* in medical education.[1] We learn that " nearly six years ago it was proposed that the universities should take independent action in this matter, by instituting new degrees or diplomas in State Medicine." As the universities alone are legally empowered to institute new titles of qualification, there appears to be no reason why they should not admit to honours, equal to their highest, those who have most thoroughly prepared themselves for pursuits

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[1] A letter from Dr. Stokes in the ' British Medical Journal,' Sept. 24, 1870, p. 342, introduces a statement of the " Subjects of Study " now required by the University of Dublin for a Qualification in State Medicine. An article by Dr. Rumsey in the ' Lancet,' Nov. 5, 1870, p. 627, gives an account of the progress and prospects of this question.

of supreme importance to the public health and safety.   All
honour to the University of Dublin, which has been the first to
carry this plan into effect.

Cambridge will not be long behind her younger sister.   The
medical-questions syndicate agreed in February last to recom-
mend to the university that "special certificates of proficiency in
state medicine, comprehending forensic medicine and sanitary
science, be granted to such M.D.'s or to such M.B.'s of two or three
years' standing, as may satisfy the examiners" that they deserve
it.   Other universities, doubtless, will now adopt this qualifica-
tion, which the General Medical Council will be expected to
register for the information of civil and legal authorities.

Dr. Acland explained very lucidly the action which had been
taken by the Medical Council in this matter.   He completed his
evidence by the following announcement:

"It is their intention to apply to the Government for a clause in
an amended Medical Act, by which they may be able to inquire into
and to register the qualifications and competency of medical men to
practise in the department of state medicine, as health officers, in-
spectors, experts in forensic medicine, or the like; so that it is
certain that in due course there will be a complete supply of quali-
fied persons for all such offices recognised by the state (6023)."

Seeing nothing of the kind in the measure recently proposed
and withdrawn by the Government, and observing but little
notice of this question in the later debates of the Medical Council,
we fear that the opposition which the state-medicine qualifica-
tion seems to have encountered from certain corporations may
have more than neutralised the support which it had received
from the universities of Oxford, Cambridge, and Dublin.   It
remains to be seen whether Dr. Acland's favorable anticipations
may be realised in some other way.

Dr. Farr, in referring to this movement, urged "the great
importance" of a special examination in public medicine and a
qualification to be required by Government in the case of the
higher order of health officers.   Surgeon Hewlett also stated
plainly his conviction of the necessity for a special training for
such employment (5736-7).[1]   As strongly does Dr. Heslop assert
the importance of a qualification in State Medicine.   No one, he
thinks, should hold the office until he has passed an examination
by a Board of Civil Medical Service; and the candidate's claim
to priority of appointment should depend on his position in such
examinations.   Moreover, Mr. Simon declared it to be "in the
highest degree desirable" that special education and examina-

[1] As to the details of this Qualification, see the recommendations of Mr. Hewlett,
the Bishop of Limerick, Sir W. Bovill, Dr. Bond, Dr. Alfred Taylor, and others,
in the Report of the General Medical Council on State Medicine.

tion should be required for a class of sanitary officers (1961) ; and
the Government, he suggested, might be very usefully em-
powered to lay down regulations as to their qualifications. He
would rightly extend that principle to poor-law medical appoint-
ments also. Indeed, this has now become an essential addition
to the original project. In any amendment of sanitary adminis-
tration, such as we may hope to result from the report of the
Commission, it is most probable that additional and higher
functions will be committed to the poor-law medical staff, and
consequently that a higher standard of qualifications will be
insisted on. It would, doubtless, be unreasonable to compel these
gentlemen to possess a qualification equal to that now conferred
in Dublin. But they might fairly be required to pass a compe-
titive examination, and they ought not to be held qualified for
office *as principals* until the age fixed by the Irish Poor-law
Commissioners, namely, twenty-three years.

"If (said Mr. Simon) our medical examining boards were all that
we hope they presently will be ; if the General Medical Council were
as effective as no doubt some day it will be, there would be a degree
or qualification of some kind given in these branches of know-
ledge, so that a member of the medical profession, wishing to obtain
a certificate of special qualification in health studies, would be able
to obtain that qualification at the London University, or College of
Physicians, or at some other such tribunal ; and then the law could
easily make it a condition directly or indirectly that this special
qualification should be had by every proposed officer of health. I
say, directly or indirectly, because it might be that the best form in
which provision for the special qualification of officers of health could
be made, would be that the central authority should have power to
fix conditions of qualification for the office " (2117).

But Mr. Simon would modify the demand for special prepara-
tion, in the case of his inspectors, attached to the central
authority, by an important condition which applies more or less
to the whole organization.

"They (the inspectors) should certainly be specially qualified for
the purpose, but if by 'educated' you mean that they should have
gone through particular courses of study which you could beforehand
define in precise terms, certainly not. The best of all preparations
for such an office might have consisted in having been officer of
health for a district for a certain number of years (2173). If there
were doctors of state medicine, it is very probable that when such a
system got into operation the Government inspectors would be chosen
altogether out of that class ; but then, within that class, what would
determine the choice of the individual would be a knowledge of his
antecedents, what work he had done, and how he had profited by it "
(2174).

The experience already acquired by many officers of health

would qualify them for taking part in a normal sanitary system ; and the increasing number of men who devote themselves to those studies and pursuits, would in a short time provide adequately for the completion of any staff the country might require.

Professor Gairdner in this evidence, and Mr. Maclagan in the report of the Medical Council, are the only respondents who throw discredit on the entire scheme of special qualification. Hence we may infer that it is not likely to find much favour with our Scottish brethren. On the other hand, something is to be learnt on the whole question of public-health organization from a Welsh officer, Mr. Dyke, who has charge of the populous mining district of Merthyr, and whose energy, fearlessness, and thorough knowledge of his subject, are conspicuous in his reports. He proposes the consolidation of several kinds of local machinery under the management of one elective board, with three chief officials, a lawyer, a medical man, and a civil engineer, each of whom should possess a certificate of special knowledge of the subject of his office, granted by a constituted board of examiners, and each of whom should devote his whole time to his public duties. Mr. Dyke is of opinion that in districts like those of Wales, not more than 100,000 persons should be included under the supervision of one such authority ; and he strongly insists on the abandonment of private engagements by the public officers ; " they should have nothing to do with practice ; they should throw away their lancet and their physic."

Here then we take leave, for the present, of this very interesting collection of evidence, hoping to present to our readers on a future occasion the results of a further examination of the whole report, and of the conclusions and recommendations of the Commission itself.

From these and other inquiries it appears that the prevalent defects and abuses of local government, and a general neglect of duty and obligation, have allowed the masses of our largest cities to drift into something worse than barbarism—a social, moral, and physical degeneracy. If people in comfortable quarters, prosperous in business, or at ease upon means acquired or inherited, could realise these facts, comprehend their meaning, and accept their teaching, they would, if only for their own safety, insist upon a complete remodelling of the administrative machinery of the health laws, a radical reformation in the dwellings of the poor throughout the kingdom, and a great expansion of inhabited areas to relieve the fearful overcrowding of towns. If all this should require an outlay equal to the cost of the Crimean war, it would not, like that, leave us the mere victims of an idea.

Up to this point we have advocated the necessity for—

i. a codification of laws, or portions of laws, directly bearing on the public health ;

ii. a revision and readjustment of the areas of sanitary administration and local government ;

iii. a rational co-ordination, if not consolidation, of various central departments concerned in sanitary inquiry and control ;

iv. a reform in the composition of local sanitary authorities, especially the compulsory addition of an educated and independent element, and the establishment of proper county authorities ;

v. a complete organization of medical officers of health, on conditions which are calculated to secure (*a*) their high qualification and thorough competency, (*b*) an official *status*, combining responsibility with moral independence, and (*c*) legalised co-operation with another staff, now employed for the medical relief of the poor, and hereafter to be utilised as deputy health officers ;

vi. a fundamental correction of our national system of vital and sanitary statistics, by improving the machinery for inquiry into, and certification of, the causes of death, and by the establishment of a registration of sickness,—which, if not to apply, like the registration of births, deaths and marriages, to the whole population, might nevertheless embrace all cases of disease and injury, relieved at the public cost, and from which might be reasonably inferred the total amount, with the nature and causes, of sickness and infirmity among the people of England.[1]

As the good ship of sanitary reform approaches the shore of legislation, some havens are likely to tempt the captain by a specious facility of entrance. Yet around those attractive ports may lie treacherous shoals and sunken rocks, endangering the safety of the vessel. A short but uncertain channel may promise a more speedy arrival. In order to cross a bar it may seem desirable to throw overboard some essential articles of freight or ballast. But to drop metaphor. The Government may be induced to abandon important principles because they are somewhat embarrassing or are not called for by a sufficiently strong party. It may be said, there is no absolute necessity for establishing a comprehensive basis of sanitary operations by amending boundaries and jurisdictions, or by harmonising the areas of county, highway, and poor-law administration, or by defining the limits of drainage and river districts. The framers of the next " Amendment Act " may listen to plausible objections to

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[1] The connexion between the registration of disease and an improvement in the medical and sanitary care of the poorer classes is well shown in a series of propositions lately submitted by a deputation to Mr. Goschen. (See ' British Medical Journal,' Oct. 22, 1870, pp. 448-9.)

the formation of a staff of scientific advisers and sanitary officers, uniform and complete for the whole country. They may, to avoid offence, decline to insist upon guarantees for the competency of at least a portion of the local administrators.

If compromises such as these are to be largely made, and if the measure of legislation is to be marred and mutilated to enable it to " pass," we shall not hesitate to pronounce it more or less a failure.

VII.—Holmes' Surgery.[1]

IT is with pleasure we notice the appearance of the second edition of this work, which, take it all in all, very fairly represents British surgery. It is a work of undoubted merit, and has most justly secured for its editor a name for ability as a surgeon and a man of letters; for the excellence of the essays themselves is one thing, the unexampled regularity and rapidity with which volume after volume of this new edition has appeared are another.

The most important change in this edition is, perhaps, the introduction of illustrations, a feature to which we shall subsequently refer, as for the various treatises they have been subjected to varying processes, some being most carefully revised, others in a less thorough manner. It is, indeed, impossible to avoid inequality in a book of this kind, and that this is not more palpable in the present instance is mainly referable to careful editorship on the part of Mr. Holmes. But to notice each article in some detail, we find first Mr. Simon's on Inflammation.

The distinguished medical officer to the Privy Council is known abroad more for his pathological researches than his administrative powers, and has been characterised by no less an authority than Virchow as one of the most ingenious of pathologists. In this essay, however, he deals mostly with the practical side of the subject, the more abstruse doctrines as to the nature of the inflammatory process being deferred for subsequent discussion. This essay was, indeed, revised by Mr. Simon just when the recent researches of Cohnheim and his resurrection of the doctrines of Waller were most loudly discussed, and when the whole theory of inflammation, apparently fixed on an immutable basis by Virchow, seemed likely to be overturned. Since that time, however, men have had time to investigate the matter, and the conclusion arrived at has been— as usual in such cases—a kind of compromise. We understand

that the concluding portion of this essay has been entrusted to
Dr. Burdon Sanderson, and into no more able hands could the
subject have fallen.   He is inclined to adopt the views of
Stricker lately laid before the world, and these, whilst substan-
tially acknowledging the general accuracy of Virchow's views
as to the origin of inflammatory products in the existing cells
of the part, especially in the so-called connective-tissue cor-
puscles, nevertheless admit the white blood corpuscles to a
share in the change by a migration through the walls of their
containing vessels.   But all this must be discussed hereafter.
Although the subject is here briefly alluded to by Mr. Simon,
the matters discussed are chiefly the symptoms of inflammation,
its causes, and their modes of action, and its treatment.

Abscess is treated of by Mr. Holmes Coote in a very practical
fashion, although there is a want of philosophical unity about
the paper as well as about the subsequent one on gangrene by
the same author.   With the article on Ulcers we are much better
pleased.   From the pen of Mr. Paget we should expect some-
thing more than a repetition of the ideas enforced in every text-
book, and we are not disappointed.   Erysipelas, by Mr. De
Morgan, is also very good.   In his description he includes an
account of erythema which, however, beyond the local redness, has
nothing in common with the much more dangerous disease.   The
essay is a thoroughly practical one.   It is followed by one on
an allied subject, namely, Pyæmia, from the pen of Mr. Cal-
lender.   We never fail to be struck with the unsatisfactory
character of all essays on this subject, even on the most cursory
reading ; and fully admitting the high position of the author,
we must confess that the same feeling comes over us here.   The
fault is in the subject, not the author.   Why the very title
of the disease is a misnomer.   Pyæmia first attracted attention
in connections with phlebitis, and the extensive collections of
puriform matter associated with the malady impressed them-
selves on the minds of its students.   But the whole subject
has been needlessly complicated by the mixing up together of two
distinct forms of disease.   There is the so-called septic infec-
tion, the result of poisoned air, and of which we have frequent
examples in the effects of too close attendance in the dissect-
ing room ; and there is the so-called purulent infection, the
result of such diseases as osteo-myelitis.   There can be no
clear apprehension of the subject until the two are dissevered.
Then as to the origin and nature of these puriform collections ;
in many instances they are partly composed of broken down
tissues, but there are besides the corpuscular elements to be
accounted for.   As to saying they are leucocytes and not pus
corpuscles, this is for the most part nonsense.   These bodies

subjected to similar conditions are undistinguishable, and supposing them to be white corpuscles their origin has to be explained. If we are to believe with Neumann and Bizzozero that the bony marrow is a blood-forming organ, the connection between osteo-myelitis and pyæmia becomes more apparent although not quite intelligible, but in many other cases the explanation is mysterious as ever, although the doctrines of embolism and thrombosis have decidedly helped us on our way.

The succeeding article is by Mr. Croft; it treats of Hectic and Traumatic Fever, and constitutes a fair *résumé* of our knowledge. It is illustrated by a series of temperature charts of a useful kind.

Tetanus is handled by Mr. Poland in a very able article, but the character of the disease too much resembles that of pyæmia as far as a proper understanding goes. *Trismus nascentium* is first alluded to, and Mr. Poland seems to have got hold of the right clue to the cause of the disease in improper ventilation, although he does mention section of the umbilical cord as an exciting cause. He has, however, overlooked the almost crucial instance of the Faroe Islanders, among whom the disease is exceedingly common, and where the cause has undoubtedly been traced to bad ventilation, bad food, and their " rast," *i. e.* a mass of decomposing fish, &c., which they use as a relish. We think Mr. Poland hardly lays enough stress on tetanus the result of exposure. Although not very common in England, it is sufficiently frequent abroad to excite attention. This paper is illustrated by two figure illustrations of the condition of the spinal cord in cases of tetanus, but the appearances are not uniform.

Dr. Barclay contributes the next article, that on Delirium Tremens. It is a capital exposition of the subject, lucid as is everything Dr. Barclay writes, but we think he errs in not more distinctly separating *mania a potu* from the delirium which follows injuries to the habitual drinker. Take the case of the brewers' draymen, who by many are looked upon as types of strength. Rarely do these men suffer from accident without becoming delirious; instead of being the best subjects for an accident they are the worst. Yet it is comparatively rare for these men to become the subjects of delirium tremens, as far as a somewhat extensive hospital experience goes. Dr. Barclay does justice but no more than justice to the value of hypodermic medication in these cases.

The two succeeding articles are by Mr. Savory; they treat of Scrofula and Hysteria. As to the former, although Mr. Savory gives the distinctions now in vogue as to scrofula and tubercle, he does not himself believe in their pathological separation, and a goodly portion of the paper is occupied with an argument on this point, the remainder being devoted to a disquisition on its

causes, treatment, and hygiene (for which, by-the-bye, Mr. Savory uses the English form hygienics). That on hysteria is chiefly occupied with the comparative diagnosis of the malady and those which it simulates, as disease of the spine, knee-joint, and mammary gland, retention of urine, and local pain. Treated of course from a surgical point of view, the article is an incomplete exposition of the subject.

The subject next discussed is Syphilis, in an article second to none in the volume. It is from the pen of Mr. Henry Lee, and contains, perhaps, the most complete and most succinct account of the disease in our language. Mr. Lee heads his article with a quotation from Andral, "La Syphilis devrait servir de clef à toute la pathologie." Well it may be so, and as long as the passion for reckoning every lesion encountered and every obscure symptom detected due to syphilitic infection, many will hold so ; for our own part we do not share in the belief. Nevertheless, it cannot be doubted that the disease is one of the most interesting, as it is one of the most obscure with which we are acquainted. Unlike many others, its origin (at least now-a-days) is well known, but its course varies so greatly that anything like a prognosis is rarely successful. In one patient the disease will assert itself in the form of a constitutional fever and a *roseola*, and there it will stop ; in another it will go on and on in the most intractable way until the patient finally succumbs ; but now-a-days the latter form is rare. Mr. Lee does not trouble himself with inquiries as to the first appearance of the disease, whether it was brought from America, or if it had been endemic in Europe from all time ; he plunges *in medias res* and sets to work on the pathology of the malady. Like most modern surgeons, Mr. Lee is a dualist, and treats in successive chapters of the suppurating and the infecting chancre tersely and accurately. One of Mr. Lee's strong points is the inoculability of syphilitic matter in the subject of syphilis ; he states that " both forms of the syphilitic disease are auto-inoculable, the suppurative form during its whole continuance, the adhesive form during its early stage only, before its specific hardness has appeared." As to syphilization he admits that under the influence of repeated inoculation with infecting matter the skin clears of eruptions, but this he attributes in great measure to the effects of counter-irritation. The chapter on Lymphatic Absorption is, perhaps, the most speculative in the article, that is to say, it is less purely practical than are the others. As to the possibility of transmitting syphilis along with vaccinal matter, Mr. Lee gives in his adhesion to the affirmative side, and gives a figure of a case seen by Dr. Druitt, at Paris. Secondary eruptions are briefly but practically treated ; as a remedy for these

Mr. Lee is a strong advocate of the calomel vapour bath, as, indeed, he is for tertiary symptoms, even when the constitution is much impaired and the health broken. It would be out of place here to enter into greater details, but we may add that this paper is illustrated by some very good chromolithographs.

The next article is on Tumours and Cancer, partly by Mr. Paget, partly by the late Mr. C. Moore, and contains an excellent *résumé* of the subject; but perhaps the most important addition to the article are the admirable plates of morbid growths from drawings by Mr. Arnott. These, indeed, constitute the best illustrations of minute morbid anatomy in the way of new growths we possess. The classification adopted for solid tumours and outgrowths is into fatty tumours, fibro-cellular tumours, myxoma, psammoma, glioma, fibrous, fibro-muscular, and fibro-cystic tumours, cartilaginous tumours or enchondromata, myeloid tumours, osseous tumours, glandular tumours, vascular or erectile tumours, &c.

The article on Cancer is by Mr. Moore; he recognises five varieties, the scirrhous, the medullary, the melanotic, the epithelial, and the osteoid; but he, like many other writers, is apt to mix up the character of malignancy with the histological elements of cancer. No doubt cancer is a malignant growth, the type of malignant growths, so to speak; it concentrates within itself the very essence of malignancy, but the malignancy is a clinical characteristic which it shares with many other growths which do not possess the definite structure by which we recognise a cancer. From his experience in the cancer wards at the Middlesex Hospital, Mr. Moore was admirably fitted for undertaking the task of writing this article, and it is interesting to turn to the results of this extensive experience. As to the local treatment for cancer, Mr. Moore first of all insists on protection by means of cotton wool, and the avoidance of irritating applications. As to removal of the affected part he enters into details, especially enforcing the importance of complete removal, and then points out the value of chloride of zinc as an application to the raw surface; it destroys any cancerous outgrowths left behind, and favours complete cicatrization. He is not greatly in favour of treating a cancer by caustics; when resolved upon he seems to prefer chloride of zinc to any other: he, however, has made use of acetic acid with favorable results. Treatment by pressure, a mode nearly forgotten, he speaks well of, chiefly, apparently, on the authority of Dr. Walshe. The drawings which follow, and of which we have already spoken in terms of praise, include illustrations of oval-celled sarcoma, spindle-celled sarcoma, myeloid growth, enchondroma, fibroma, lipoma, fibro-muscular growth, osteoid growth,

glandular tumour, lymphoma, glioma, myxoma, cancer in its
various forms, epithelioma, osteoid and colloid carcinoma.

The next two articles are by Mr. Paget.   They treat of Con-
tusions and Wounds.   The latter especially is a valuable com-
munication, exceedingly complete and practical ; the different
kinds of wounds are discussed, their complications considered,
the healing process described, with its defects and the diseases
of the resulting cicatrices, among others, keloid (which, by the
way, Mr. Paget spells cheloid), cancer, &c.   Perhaps it would
not have been out of place, and we should have been all the
better for the information, had Mr. Paget given us his experience
as to the obliteration of scars—the matter is not without a prac-
tical bearing to medical men.

An article on Animal Poisons follows.   Mr. Poland is the
author.   First of all he deals with dissecting wounds—a painful
subject, only too familiar to members of our profession, for, as
Travers says, only one in seven recovers.   But here again we
have different affections grouped under one head.   When a man
makes a post-mortem on a person who has died say of subacute
peritonitis, and is seized with an illness the result of pricking
his finger, this is not the same form of constitutional irritation
which sometimes results from dissecting bodies in an advanced
state of putrefaction.   Next, as to animal poisons, he wisely
rejects the conclusions of Halford as to the curability of all
cases of snake bite by the injection of ammonia into a vein.
Hydrophobia and glanders are briefly treated ; the author does
not seem to have known Trousseau's admirable lecture on the
former subject.   The chapter on glanders is illustrated by a
very good chromolithograph, showing the appearance of the
characteristic eruption as well as subcutaneous tumours some-
times found in the course of the disease.   There are other forms
of morbid poisons which would have been alluded to, but these
are all which are here discussed.

Wounds of Vessels and Hæmostatics are next treated.   The
article is by the late Mr. Moore.   It is, perhaps, noteworthy
that he was a strong advocate for acupressure.   The concluding
article is on Collapse, and the General Effects of Shock on the
System, by Mr. Savory ; it is good as usual.

We have briefly and imperfectly, but fairly scanned the
contents of this valuable volume.

In the second volume the changes are mostly immaterial.
We only notice that the article on Injuries of the Upper Ex-
tremities has been re-edited by Mr. Hulke of Middlesex Hospital.
It is introduced by an article on Burns and Scalds, from the pen
of the accomplished Editor.   We are, however, inclined to regret
that he still holds to the old classification of Dupuytren ; we
should like to see something more practical, to use the word in

a somewhat English sense, that is to say, something which would give us a notion of how the injury was likely to turn out, and how best to treat it.

With this exception, all the articles are devoted to the subject of Mechanical Injuries, Fractures (Mr. Homidge), Dislocations (Mr. Holmes), and Gunshot Wounds. The treatise on the last-named subject—for it amounts to that, is from the pen of Professor Longmore, and is the most exact and most exhaustive we have in the English language. The article which follows, on Injuries to the Head, by Mr. Prescott Hewett of St. George's, is equally admirable; it is original, the product of much experience. Injuries of the Back and Injuries of the Face, the one handled by Mr. Shaw, late of Middlesex Hospital, and the other by Mr. Holmes Coote follow, whilst Mr. Durham deals with Injuries of the Neck in a very complete article. The chapter on Injuries of the Chest is the work of Mr. Poland, and after it comes a most valuable Contribution to the Surgery of the Abdomen, by Mr. George Pollock. Mr. Birkett treats of the Injuries of the Pelvis, whilst the article on Injuries of the Upper Extremity, formerly the work of Mr. Flower, has, as we have seen, been revised by Mr. Hulke. The concluding article, on Injuries to the Lower Extremity, is from the pen of Mr. Holthouse.

The contents of the third volume are more varied in character, and deal less with the results of mechanical violence. The first article we encounter is one on Diseases and Injuries of the Eye, by Mr. Dixon, formerly surgeon at Moorfields. His mode of discussing his subject is somewhat peculiar; he treats first of optical defects and the various plans of examining the eye, leaving the diseases of the eyelids and eyeball generally to be discussed last of all. The article is a comprehensive one, and in the present edition is accompanied by some of the best executed ophthalmoscopic chromo-lithographs we have seen done in this country. The article on Diseases of the Ear which follows is, perhaps, the best exposition of the subject, considering the space available, we know. The author is Mr. Hinton, a well-known and esteemed authority. This subject naturally divides itself into affections of the outer ear, the meatus, the membrana tympani, the tympanum, the Eustachian tube, and the labyrinth, to which he adds two chapters on diseases of the ear implicating the brain, and on malignant diseases. Unfortunately our knowledge of the affections of the labyrinth, &c., cannot but render that chapter unsatisfactory.

Next come the diseases of the circulatory system. Commencing with an article on the Diseases of the Absorbent System, by the late Mr. Charles Moore—an article which is not wholly satisfactory; but, indeed, other things could hardly be expected at a time when the normal anatomy of the absorb-

ents is not clearly made out, and the part they play in the pro-
pagation of diseased conditions guessed at rather than known.
The earlier portion of the succeeding article, which is by Mr.
Callender, and is devoted to the subject of Disease of the Veins,
deals with adhesive phlebitis and obstruction of veins, which
latter the author terms thromballosis. We do not know that
anything is gained by inserting the additional syllable, and cer-
tainly the shorter term thrombosis, is now in general use. Most
of the remainder of the article is occupied by an account of the
varicose condition of veins and their management. Next comes
an essay on Atheroma and Obstruction of Arteries, &c., by
the late Mr. Moore. We must totally demur to his account of
the pathology of atheroma, which is that it is of the nature of
a deposit from the blood, instead of an interstitial change in the
vessel itself, nor are we inclined to accept his views on em-
bolism as exceedingly accurate. A splendid article, one of the
best in the whole work, follows. It is from the pen of the
editor, and deals with the subject of Aneurism. It treats the sub-
ject exhaustively, commencing with the pathology of aneurism,
its tendency to spontaneous cure, and entering into the whole
subject, ends by reciting the modes of dealing with aneurisms
in various parts of the body. A very interesting article, by
Dr. Lockhart Clarke, on Affections of the Muscular System,
succeeds ; in it he includes affections of the muscles themselves,
atrophy, degeneration, &c., and also affections of the tendons
and bursæ mucosæ. Next comes a capital synopsis of Ortho-
pædic Surgery, by Dr. W. J. Little ; and a treatise on Diseases
of Bone, by Mr. Holmes, concludes the volume. In the last
the author deals with inflammation of bone, constitutional
states affecting the bones, tumours of bone, hypertrophy and
atrophy, and wounds of bone.

For various reasons we have been compelled to notice these
volumes very briefly, and we would only now refer to their
general excellence. It would be hard to point out an article
which is not fairly satisfactory. There is, indeed, a more uni-
form degree of excellence in this than in most books of the kind,
and Mr. Holmes may justly be congratulated on his staff. Nor
should he be less so on his own powers as an editor. Rarely
has an important book like this come out with the same regu-
larity. Each of these three volumes has appeared in its due
course, and at a moderate interval ; and we hope ere long
to see the work completed, when it will occupy the first rank
among English medical publications. Any delay that may
occur will, from its painful cause—the severe illness of its
talented editor—be deeply regretted by the whole profession ;
but we hope Mr. Holmes will be sufficiently restored soon to
complete his meritorious work.

VIII.—Irish Poor Law Annual Report.[1]

It will be seen on reference to the present volume, which contains the twenty-third report under the Acts 10 and 11 Victoria, c. 90, and the eighteenth report under the 14 and 15 Victoria, c. 68, that matters in relation to the deportation of paupers in a disabled state from age, sickness or mental disorder, loudly call for amendment; not only in reference to cases sent from England and Scotland, but also in those returned from America. We shall revert, however, to the consideration of this subject before concluding the present notice.

The numbers who obtained relief in the Irish workhouses exhibit a decrease in the last seven years; while the relief given in out-door cases has increased, as will be seen by the following tables.

Relief in Workhouse.

Date.	Maximum numbers.	Date.	Minimum numbers.	Date.	Aver. daily numbers.
1863-64	66·375	14 March, 1863	48·275	5 Sept., 1863	58·203
1864-65	65·549	27 Feb., 1864	47·170	27 Aug., 1864	55·808
1865-66	63·009	25 ,, 1865	44·696	2 Sept., 1865	52·121
1866-67	59·205	9 ,, 1867	42·785	1 ,, 1866	50·241
1867-68	62·170	8 ,, 1868	44·869	7 ,, 1867	53·017
1868-69	61·944	14 March, 1868	46·839	22 Aug., 1868	53·757
1869-70	59·024	6 ,, 1869	43·657	4 Sept., 1869	50·964

Out-door Relief.

Date.	Maximum numbers.	Date.	Minimum numbers.	Date.	Aver. daily numbers.
1863-64	10·434	20 Feb., 1864	5·665	19 Sept., 1863	7·859
1864-65	11·903	18 ,, 1865	6·689	1 Oct., 1864	8·748
1865-66	12·595	11 March, 1865	8·003	7 ,, 1865	10·040
1866-67	18·816	9 Feb., 1867	9·949	13 ,, 1866	12·205
1867-68	18·666	15 ,, 1868	11·975	28 Sept., 1867	14·940
1868-69	19·624	20 ,, 1869	14·217	3 Oct., 1868	16·862
1869-70	22·520	19 ,, 1870	15·899	3 ,, 1869	18·296

The commissioners do not anticipate any evil as likely to arise from the increase in the number of persons in the receipt of out-door relief; they observe:

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[1] *Annual Report of the Commissioners for Administering the Laws for the Relief of the Poor in Ireland, &c., with Appendices.* Dublin, 1870.

" It is most probable, indeed, that as the country advances in prosperity, the out-door relief lists, which have steadily increased from 655 persons daily in 1855 to 22,520 in 1870, will continue to increase, subject though they are to certain limitations imposed by statute.

" There is one source of increase in the extent of out-door relief to which we have to refer with satisfaction. In the last report the daily number of ' orphans and deserted children out at nurse ' had reached only to 689 throughout Ireland, while in the present year the number has increased to 1207 ; and we have no doubt that it will continue to increase concurrently with some decrease of the same class in the workhouses. The extension of the age to which this class of children may be relieved out of the workhouse, namely from five to ten years, which we recommended in paragraph 5 of our last Report, has been since adopted by Parliament in the Statute, 32 and 33 Vic., cap. 25 ; and the increase of numbers above noted, is in part due to that extension, and in part to the further adoption of the system by Boards of Guardians."

Out-door relief to persons disabled from labour by reason of severe sickness or serious accident appears rapidly increasing, having risen from 435 persons in 1857 to 7,168 persons so relieved in 1870.

There can be no question that it is necessary to have the power to grant such relief in certain cases. It is a privilege, however, which needs much circumspection in its exercise, for a strong inducement undoubtedly is held out for deception in such cases ; it not infrequently happens that persons so relieved draw upon other sources of charity, as through benevolent societies or the clergy and laity ; instances of the kind have come to our knowledge, and therefore it appears, as we have just said, that much caution is needed in all such cases that a premium is not thereby given to deception, and that idle and dishonest habits are not thus engendered. Indeed, we have known cases of individuals in receipt of pensions sufficient for their own support and, having no one dependant upon them, begging in the public streets ; so frequently have we seen persons thus occupied, though well able to work, or possessing other means, that we have often been struck with the correct judgment of the late Archbishop Whately, who said that he could not accuse himself of ever having been led to give to a street beggar.

Granting out-door relief to sick persons in their own houses or tenements greatly increases the risk of spreading infectious diseases, and renders the task of inducing such persons to remove to suitable hospitals much more difficult, even though the chances of recovery would be vastly increased by the change to

the airy and cleanly wards of an hospital from a miserable and over-crowded tenement.

It is only right that the medical officer should also be considered, for his duty and the risk of exposure to infection is increased oftentimes a hundredfold by permitting cases of zymotic disease to remain on out-relief; moreover the poor rates are certainly increased by the continuance and spread of disease, and by the frequent loss of the parent from illness contracted from the child, not to mention the burden that those who remain sickly and helpless from imperfect recovery in unwholesome tenements become upon the poor rates.

Exertions are being made by the Irish authorities to discourage " professional vagrants " as much as possible; we would be glad to find that visitors to Ireland would also discountenance the custom of begging.

" The total disbursement of poor rates for all purposes, viz., relief, medical relief, burial grounds, registration of births, deaths, and marriages, and sanitary measures, was in 1868 £847,995, and the amount of poor-rate collected £848,070, the levy and expenditure each making a poundage of 1s. $3\frac{1}{2}$d. in the pound on the valuation. In 1869 the expenditure fell to £817,772, or 1s. $2\frac{3}{4}$d. in the pound, and the poor rate collected to £815,480."

The soundness of the policy pursued in Ireland of liberally administering to the wants of the sick poor in providing prompt medical attendance, compulsory vaccination, and the ready access to medical, surgical, fever, and well regulated lying-in hospitals can readily be judged of when the Poor-law Taxation of Ireland (£848,070) is contrasted with that of England and Wales (£11,061,502), both for the year 1868.

We have above mentioned the important subject of deportation of aged and worn-out persons from England and Scotland to Ireland; the separation of husband and wife, parent and children, thereby enhance the hardship of many of these cases. The Irish Commissioners appealed to the Court of Queen's Bench in England in the case of a married woman and her children who had been sent to Ireland by the parish of Liverpool, the husband being at the time alive; the result was against the removal.

" Removals of the same kind have, notwithstanding the decision, continued to take place. Recently a married woman with six children was brought from Auckland Union, in the county of Durham, to Clogher Union, in Ireland, but under threat of appeal the Auckland Board of Guardians have consented to abandon the order, and take the family back again."

A case of removal from Scotland of a man, accidentally

rendered blind after thirty-five years' industrial residence there,
is also recorded, the Board of Supervision in Scotland appearing
to acquiesce in the removal.

In 1869, 1059 persons have been relieved in workhouses or
by out-door relief who were not born in Ireland; of these 727
were born in England, 198 in Scotland, 51 in the colonies,
and 83 in foreign countries. Of these 79 were sick, and 9
lunatic.

This shows the injustice of the existence of a removal law
from Great Britain to Ireland without any reciprocal law of
removal from Ireland to Great Britain.

A very considerable increase of cases attended at the homes
of the sick took place last year; the additional cases of that
description numbering no less than 12,642. When it is re-
membered that each of these cases required on an average
several visits, it will be seen that a very considerable additional
labour was thereby placed upon the district medical officers.

The total number of sick prescribed for by the medical staff
of the dispensary districts amounted to 775,327, at a total cost
of £123,718, which amount includes the cost of medicines and
medical appliances, rent of dispensaries, books, stationery,
printing, and advertising, salaries of medical officers and apothe-
caries, fuel, porters and incidental expenses, and all expenses
under the Vaccination Act.

The average poundage on the poor-law valuation of Ireland,
now amounting to £13,153,499, to provide for this expenditure,
was 2·26*d*. The appointment of nineteen additional midwives
has been made during the past year; this is a comparatively
recent measure, and one not by any means of unmixed benefit to
the community.

Some medical officers of dispensary districts and of workhouses
have availed themselves of the superannuation provided by the
Legislature. In the words of the report:

" In every one of these cases it may be safely assumed that the
medical officer was completely disabled by broken health or
by advanced age from the efficient performance of his duties, and
that therefore the appointment of young and active men in the stead
of the superannuated officers will be attended with great benefit to
the sick poor of the respective districts and workhouses."

We may here observe that, thanks in no small degree to the
energy of Dr. Brady and those other Irish members of parlia-
ment who supported him, a superannuation has now also been
provided for the members of the English Poor-law Service.

Vaccination in Ireland has produced results that are extremely
satisfactory; the Commissioners are well entitled to congratu-

late the country on the facts that the deaths from that disease
in workhouse hospitals have fallen from 145 in the year ending
February, 1865, to 59; 9, 5, 3, and 1 in the succeeding years
respectively; whilst in the years ending September, 1864-65-
66-67-68 and 69 the numbers of cases of variola treated by the
medical officers of all the dispensary districts of Ireland have
been severally 1965, 2000, 579, 105, 155, and 27.   The deaths
throughout Ireland from the same cause during the same years,
that is, since the introduction of compulsory vaccination, have been
854, 347, 187, 20, 19, and 18.   The results would have been
even more striking had not some deaths and many cases of the
disease occurred through the operations of a notorious inoculator
in the West of Ireland last year.   Introduction by this last
means appears now, however, stopped, and the disease, observes
the Report, may scarcely any longer be regarded indigenous in
Ireland, and as occurring only occasionally by introduction
from beyond sea, the means of introduction most to be appre-
hended being sailors, soldiers, tramps, and vagrants, and poor
persons compulsorily removed from British towns, such as
London, Liverpool, Glasgow, and others, where small-pox is
always present.

It is, however, necessary for every individual in authority as
well as those in private life, to use every exertion and sustained
energy to induce parents to get their children vaccinated, as even
now by no means all children are vaccinated, and as communica-
tion with infected ports is of such hourly occurrence.

We have been, we confess, surprised to observed that the
writer of the article on vaccination in 'A System of Medicine'
(third edition, published this year, 1870) has wholly ignored the
success of the Irish system of vaccination, and our reason for
alluding to the subject is that it appears injudicious, in a work
published in London, not to inculcate by the powerful argu-
ments afforded by Ireland, the great importance and value of
vaccination, especially when so many persons in London, as well
as throughout England generally, exhibit such ignorance and
uncivilised prejudice against Jenner's discovery, fraught as it
is with incalculable benefit to the human race.

The observation made by us on a former occasion, that no
advance had been made towards acknowledging the right as well
as the soundness of the policy of appointing members of the
medical staff as medical inspectors, on the occurrence of
vacancies, continues applicable.   The special provision of July,
1868, whereby non-professional men are enabled to fill the
offices of medical inspectors, continues to be acted upon.

It is true an effort is now being made to place the Irish
Poor-Law inspector on a somewhat better footing in respect of

pay than has been the case heretofore, and we trust that the same will be followed up to a successful issue; at the same time we cannot overlook the fact that a vacancy which has occurred in the staff of Poor-Law Medical Inspectors has not been as yet filled. We would ask the question, Is the object in view that of allowing such time to elapse that it may be forgotten that the vacancy had been previously filled by a medical gentleman? in the hope that little notice will be taken of the appointment of a non-medical man to the post, though, when once appointed, he is *to all intents and purposes a medical inspector?*

It is not a little remarkable that, at the very time when the public are demanding enlarged acquirements on the part of the medical profession, the legislature should have been engaged in transferring the duty and office of medical inspector under the Irish Poor Law to gentlemen who have never received any medical education whatever. This matter demands that attention from the public and from every member of the legislature which it cannot have heretofore received, as, in that case, it is hardly possible to conceive its becoming law. It is not necessary to say that the profession is also bound, not only by interest, but also by desire for the public good, to work earnestly to counteract the spirit which dictated such a policy, and to continue its efforts until the injudicious and unjust enactment is removed from the statute books of the United Kingdom.

IX.—Intra-Cranial Aneurism.[1]

INTRA-CRANIAL aneurism is a disease with which the progress of pathology has mde us acquainted of late years, for though isolated cases have been recorded long enough ago, such a morbid condition has hardly occupied a definite position till recent times. This can hardly be a matter of surprise, for the symptoms produced have seldom anything in themselves to indicate the nature of the disease, and, indeed, are generally

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[1] 1. *Des Tumeurs Aneurysmales des Artères du Cerveau.* Par le Dr. A. GOUGUENHEIM. Paris, 1866. 2. *On the Formation of Aneurism in connection with Embolism, or with Thrombosis of an Artery.* By JOHN W. OGLE, M.D., F.R.C.P., Physician to St. George's Hospital. (Reprint from 'Medical Times and Gazette,' 1866.) The reader is also referred to the following for cases: 'Brit. and Foreign Med. Chir. Rev.,' Oct., 1865, p. 491; 'Pathological Society's Transactions;' 'St. Bartholomew's Hospital Reports,' 1870, article by Dr. Church.

very few, till the sac bursts and fatal hæmorrhage ensues.
The case then becomes one of "apoplexy," admitting of many
explanations, and unless a very rigorous search be made, the
real cause may easily escape observation.   It is vastly probable,
indeed, that intra-cranial aneurism is much more common than
generally supposed, and that it is often overlooked in the ex-
amination of cases of apoplexy.   As our knowledge of pathology
becomes more exact as well as more extended, we shall cease
to be satisfied with an effusion of blood as the obvious cause of
death, and expect to more frequently and accurately determine
its origin.

Yet this lesion did not escape the older pathologists, and we
meet with very shrewd observations on it in some of their
writings.   Thus, Morgagni, whose vigilance hardly anything
seemed to evade, in speculating on the origin of cavities in the
cerebral substance, says,[1] "Nothing is more natural, when we
see these caverns in the brain, and blood semi-concreted therein,
or effused in great quantity into the neighbouring parts, than to
call to mind the rupture of aneurisms in the belly or thorax, and
even to imagine that something similar to this might sometimes
happen within the cavity of the cranium. . . . ."   He then
refers to the well-known case of Ramazzini, who had an
aneurism on the back of each hand, and who subsequently
had violent palpitations, hemicrania, blindness, and died of
apoplexy, and surmises, very justly, that the cause of death was
rupture of an aneurism of a cerebral artery.   Morgagni goes on
to remark about such cases, that "it is much better and more
agreeable to that slenderness of coat which is peculiar to all
the vessels of the brain, to imagine that when they have come
to a small dilatation, which is scarcely, and perhaps not at all,
perceivable to the eye, whether gradually or soon, they are soon
ruptured. . . . ."   But it is only within the last forty years
these lesions of the cerebral vessels have been made the subject
of special study.

Vieussens and Sandifort both mention having found dilata-
tions of the internal carotid in the cavernous sinus ; and Hodg-
son, in 1816, recorded three cases of cerebral aneurism.
Descending to later times, we find a paper by M. Serres on this
subject, in 1826, and a few years afterwards Nebel, of Heidel-
berg, and Albers, of Bonn, published memoirs on it.   These
observers were followed by Brinton, in 1851, by Lebert, and
by Gull and Ogle, the former of whom collected a series of
sixty-three cases, which he analysed very carefully in the 'Guy's
Reports' for 1859.   Dr. Gouguenheim has collected 80 cases,

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[1] English edit., 1769, vol i, letter 3rd, article 8.

but of these he excludes 12 as not sufficiently authenticated, and makes the remaining 68 the basis of his present essay. Of these 68, 45 are related by English, 18 by French, 4 by German physicians, and 1 by an American.

Intra-cranial aneurisms differ from those of other arteries in several points; for instance, in the age of the subjects, the relative frequency of the sex attacked, the causation, character, and course of the disease; and for these reasons they have considerable pathological interest.

In the thorax and abdomen an aneurism is easily recognised, although beyond remedy; in the limbs it generally yields to art, but within the cranium it is seldom to be diagnosed, and never to be treated, and this may, in some measure, account for the scanty notice the subject has, till lately, received. Each succeeding writer almost of necessity quotes the experience of his predecessors, but at the same time adds some original matter, and Dr. Gouguenheim's book may, without any disparagement, be called the latest *resumé* on the subject. It is, however, more than this, for he gives original cases, has bestowed much care and thought on the details of his work, and reviews the subject in all its bearings.

The first thing that strikes the observer is, that the subjects of cerebral aneurisms are not, as a rule, of such advanced years as those in whom other arteries are affected.

The 68 cases above mentioned are thus arranged in decenniads:

From 10 to 20 years	.	. 6
„ 20 „ 30 „	.	. 8
„ 30 „ 40 „	.	. 9
„ 40 „ 50 „	.	. 9
„ 50 „ 60 „	.	. 18
„ 60 „ 70 „	.	. 10
„ 70 „ 80 „	.	. 4
Not stated . .	.	. 4
		—
Total .	.	. 68

Rokitansky states that aneurisms " must be regarded as extremely unfrequent, and as exceptional cases when they are present before the age of twenty years," yet we see several such in the above list. Another peculiarity worthy of notice is the relative proportion of the sexes attacked, for, while the number of men far exceeds that of women, taking aneurisms generally, the difference is very slight in the particular variety we are considering. Crisp states that of 551 aneurisms, in all parts of the body, only about *one eighth* occurred in women; but this does not obtain with the cerebral arteries, for of sixty-six cases related by Gougenheim thirty-seven were men and twenty-

nine women—a result very similar to that given by Drs. Brinton and Gull. Crisp, however, mentions that some arteries—and instances the carotid—are attacked equally in the two sexes, a conclusion supported by Dr. Gouguenheim, who found that the carotid and its branches (within the cranium) were affected in twenty-one men and nineteen women, while, which is more curious, the basilar and its branches were the seat of disease in sixteen men and six women.

The liability to aneurism is very unequally shared by the cerebral arteries. The basilar is most often the seat of disease, next comes the middle cerebral, and then the internal carotid, but there is this peculiarity about the basilar, viz., that it is more often itself the seat of aneurism than are its branches, while the contrary holds good in the case of the carotid. The sixty-eight cases were thus distributed among the several arteries : The basilar, seventeen ; middle cerebral, fourteen ; internal carotid, twelve ; anterior cerebral, eight; posterior communicating, five; cerebellar, four; anterior communicating, two; posterior cerebral, two ; middle meningeal, two ; and varicose aneurisms, two.

Among the predisposing causes of aneurism we must reckon the tenuity of the walls of the cerebral vessels, but the most powerful one, probably, is the common atheromatous change, leading to a fatty degeneration and subsequent dilatation at the weakest point. Dr. Gouguenheim hazards the theory that a fatty degeneration may occur in the muscular coat of the artery during certain diseases, such as typhoid fever, for instance, in which disease a German writer (Zenker) has demonstrated that such a change occurs in involuntary muscular fibre, and that in this manner the foundation of an aneurism may be laid. He also refers to the " aneurismal diathesis," an hypothesis which Rokitansky and others have long considered to be without sufficient foundation.

Crisp, in his work on the Blood-vessels (p. 164), says :

" The cerebral arteries are more liable to aneurismal dilatation than other vessels of a similar size. The absence of a cellular sheath, the frequency of concussions of the skull, and the irregularities of the circulation in the brain from mental and bodily excitement, will fully account for the greater prevalence of the disease in these arteries."

This positive statement, however, receives no support from his experience, for of his 551 tabulated cases there are only seven of the cerebral arteries, and it is not easy to see on what he based his opinion. Nor do we think the causes to which he ascribes the frequency of aneurism are those most often in operation, for it is a rare consequence of external injury as far as pathology has

shown us, and there is no evidence of its connection with emotional excitement.

It seems most likely that the vessel must be diseased at one point before any cause such as violent emotion or bodily exertion can contribute to the formation of an aneurism, for the arteries within the cranium are more protected from accidental strain than any others.   Dr. J. W. Ogle has lately offered a very ingenious and reasonable suggestion as to the formation of aneurisms in connection with embolism.   He supposes that the fibrinous deposits met with in the valves of the heart may be carried into the circulation and obstruct an artery, and that, when thus fixed,

"The constant pressure of the blood *a tergô* cannot fail (whilst wedging the mass more firmly in the blood-vessel) to have a tendency to dilate the yielding walls of the vessel, as well at the part exactly corresponding to the plug as on the proximal side of the plug."

Such a dilatation of an artery in connection with embolism he has seen occasionally *post-mortem,* and similar cases are recorded in the 'Pathological Transactions.'   This process, Dr. Ogle thinks, "has specially seemed to apply to the formation of aneurisms on the *intra-cranial* and the coronary or cardiac arteries," and he further remarks that where there is no disease of the coats of the vessel existing it is difficult to account for an aneurism on any plausible theory.   He mentions several such cases, and when, moreover, heart disease is also present, the explanation he offers would seem to be the most likely one.

These aneurisms may be formed either by simple dilatation of the artery or by rupture of the inner coats, and adhesion of the lining membrane and outer coat.   The first supposition is that held by Gull, Albers, and Cruveilhier, as the most probable in the brain.

There is one recorded instance of recovery by obliteration of the sac from coagulation in it of fibrine, but this is, of course, quite exceptional.   The consequences of a cerebral aneurism vary according to its seat.   The membranes suffer, as a rule, but little ; the pia mater becomes more vascular, and thickened at the spot, but the dura mater escapes, though, in one instance, it was found thickened, and contained four ounces of blood between its layers, after rupture of the middle meningeal.   The brain becomes softened at the spot by pressure, and the nerves may suffer in the same way, though generally they are compressed without loss of structure, and have been known to give evidence of a recovery of powers on the rupture of the sac which compressed them.   The termination of these cases is, in the great majority, by rupture and effusion of blood either into the cellular tissue of the arachnoid or into its general cavity, but

softening of the cerebral substance may also occur and lead to death by itself. When the latter happens the softening is extensive, followed by apoplectic attacks with paralysis, and is due not to the constant pressure of the tumour, but to an arrest of circulation in a certain region by the blocking up of a large vessel. This is due, of course, to coagulation in the sac of an aneurism, and the effect is to deprive a certain portion of the brain of its blood, leaving it in a state of white softening with the capillaries filled with venous blood. The following interesting case illustrates this condition. It is related by M. Hayem, and we have condensed it from Dr. Gouguenheim's pages.

A man, æt. 71, of generally good health, suddenly lost consciousness, and vomited, and, after rallying in some degree, was found to have incomplete right hemiplegia, without any loss of sensation. He afterwards became comatose, and died in four days.

Autopsy.—The right lobe of the cerebellum was generally softened, and formed a pale, rose-coloured mass, which adhered slightly to the membranes. The finger easily sank into the nervous substance, which was soft and traversed by red lines, formed of large capillaries, in which the blood had coagulated. There was no extravasation of blood. The rose coloration was evidently due to the intimate mixture of the elements of the blood and of the nervous substance. The right anterior cerebellar artery was completely filled by a clot of blood, which reached from the commencement of the vessel to its smallest divisions. At the bifurcation of the basilar trunk a large clot was found, projecting into the basilar, and prolonged upwards into the right superior cerebellar and posterior cerebral arteries, quite obliterating them. The left posterior cerebral was slightly impeded by this clot; but all the other arteries were free, and all the other parts of the brain were healthy. In the right anterior cerebellar artery, besides atheroma of the internal membrane, there was a lateral dilatation, at which the inner coat was wanting, and where there was a small aneurism.

In this case the thrombosis of the artery had interrupted the entire circulation of one side of the cerebellum and upper part of the pons, and had given rise to the softening, the coagulation being due to the atheroma of the wall, without doubt.

The diagnosis of cerebral aneurism must always be difficult, but there are signs which serve to indicate its presence. The symptoms may be classed in two categories :—1st. Those common to all cerebral aneurisms ; and, 2nd, those which vary according to the seat of the disease.

Under the first head come headache and affections of sensation, motion, and of the intelligence.

The headache is in all cases constant, intense, and subject to

exacerbations, which may be explained by the shock communicated to the cerebral mass by the continual pulsations of the tumour, varying according to the conditions of circulation. If the headache be limited to one side, or any particular spot, it may assist in the formation of an opinion. Pain behind one eye has been noticed where the internal carotid has been affected.

Progressive paralysis would indicate softening of the nervous substance from pressure by the tumour, while sudden loss of power is due to rupture of the sac. Sensation is generally exalted during the slow progress of the disease, and that in a limited part, such as one limb, or the hand or foot merely, according as the softening extends, but is abolished when the fatal rupture occurs. The intellect usually remains clear; but in lingering cases the mind may become affected secondarily, and then it is probable that the anterior lobes are compressed or their vessels obstructed. It has happened that both anterior cerebrals have been affected, and that the patients have then fallen into complete dementia.

Under the second head we study the signs due to aneurism of particular arteries, and the following indications are given by Dr. Gouguenheim for our guidance. When the basilar and vertebral arteries are affected the pons and medulla oblongata are likely to suffer. When the pons is compressed in front we find progressive paralysis, loss of voice, impairment, and often total loss of power of deglutition. When the pons is compressed anteriorly there is no pain, but there is considerable pain when the pressure is on the posterior aspect.

When the medulla is pressed on by an aneurism there occurs headache, generally occipital, and also paraplegia, which may be distinguished from that of a spinal origin by the absence of pain along the back, and of paralysis of the sphincters.

In the case of the posterior communicating artery the symptoms are more definite. The third nerve always suffers, and ptosis occurs, often followed by an external squint and dilated pupil, and perhaps diplopia. If the aneurism attains any great size the ophthalmic nerve may get compressed, or the fifth may suffer, causing anæsthesia and hyperæsthesia of the side of the face.

When the internal carotid is affected the signs are frontal headache, sometimes limited to the back of one eye, followed by ptosis, and sometimes by paralysis of the fourth nerve, and more rarely of the optic and the sixth nerves.

Aneurism of the anterior cerebral is to be known by these symptoms: frontal headache, amaurosis of one eye, sometimes loss of smell, loss of memory, and affections of the intellect, sometimes attacks of acute mania ending in dementia.

Affections of the middle cerebral are the most difficult to recognise, as its course does not lie near the nerves, and consequently the symptoms are less definite in character.

The character of the headache and the paralysis will serve, in a general way, to indicate to a careful observer the presence of a tumour ; but its diagnosis as an aneurism is more difficult, and probably the most distinctive sign is the remission of the paralysis in some cases on the bursting of the sac, owing to the removal of the pressure. It must often happen that the previous symptoms are few and indefinite till the fatal hæmorrhage suggests the real nature of the disease, and we therefore think the minute differences specified by Dr. Gouguenheim are more ingenious than practical.

It happens, though rarely, that an aneurismal varix forms in the cavernous sinus, and such a case has been recorded by M. Nélaton. It is one remarkable, likewise, as being of traumatic origin—a cause not influencing the production of intra-cranial aneurism, except at this particular spot. The chief features of the case were as follows :—A student, æt. 21, in January, 1855, received a blow on the inner half of the left eyelid from an umbrella. This accident was followed by right ptosis and diplopia. M. Nélaton soon after diagnosed an aneurism of the ophthalmic or internal carotid. The following symptoms were observed :—Left eye healthy ; right eye exophthalmos, ptosis, external squint, and pulsation, with a bruit synchronous with the heart, and ceasing on compression of the carotid in the neck. After repeated epistaxis the patient died suddenly whilst vomiting blood, four months after the injury.

Post-mortem.—At the back part of the inner side of the left orbit was the mark of an old fracture. The brain was softened, and the membranes were adherent over the outer part of the right cavernous sinus, and at this spot the sinus was open above, and the right wall of the sphenoidal sinus was quite gone, which allowed its communication with the right cavernous sinus. In the external wall of the cavernous sinus there was a splinter of bone about a centimètre in breadth, and apparently the wall of the sphenoidal sinus was pushed outwards. The third nerve was pressed on by the upper edge of the fragment of bone, and was at that spot red, softened, and less in size than the left one. The internal carotid was divided across within the sinus, and its two cicatrised extremities were several millimètres apart.

· In taking leave of this subject we can but compliment Dr. Gouguenheim on the complete and exhaustive character of his essay, and the wide search he has made for materials, as evidenced by his illustrative cases.

IX.—Asylums for Inebriates.[1]

Most of our readers are doubtless aware that Dr. Dalrymple last session introduced a bill into the House of Commons " To Amend the Law of Lunacy, and to Provide for the Management of Habitual Drunkards." When the time appointed for its second reading arrived, the session was so far advanced, and so little time could have been devoted to its discussion, that he very prudently withdrew it. Whether the bill in its present form will ever pass is, we think, very doubtful; but at all events its mover has done the State good service in thus directing the attention of the public to a matter of much importance, and we are glad to learn, from the paper which Dr. Dalrymple has just read on this subject at the Social Science Congress, that he intends to re-introduce it next year with various improvements. From this paper we learn that he was anxious to have avoided the first part of the title, and in no way to have associated drunkards and lunatics, but that the existing lunacy laws would have interfered with the essential object of his bill. As the law at present stands, a person who is insane by reason of drink may be sent to an asylum, but he cannot be kept there long enough to secure his permanent recovery; for as soon as he recovers from the delirium induced by drink he becomes sane, and if he is any longer detained against his will, the persons in charge of him may be exposed to an action for false imprisonment. While a very brief period of abstinence is required to restore a patient of this kind to perfect apparent sanity, it takes a far longer time— a time varying according to the duration of the previous evil habits and the constitution of the individual—before he is restored to that power of self-control on which his future welfare depends. Hence in dealing with an habitual drunkard it is necessary that he should be legally retained in such confinement as shall totally exclude him from access to stimulants for a

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[1] 1. *The Annual Reports of the Washington Home, Boston, for the years* 1866, 1867, 1868, and 1869. 2. *The Superintendent's Reports of the New York State Inebriate Asylum, at Binghamton, for the years* 1867 and 1868. 3. *Ceremonies, etc., New York State Inebriate Asylum, Binghamton,* 1859. 4. *The Report of the Inebriate Asylum, Ward Island, City of New York, for* 1868 (contained in the ' Report of the Commissioners of Public Charities, &c., New York'). 5. *Inebriate Asylums, and a Visit to One.* (' The Atlantic Monthly,' for October, 1868.) 6. *Our Inebriates Classified and Clarified.* (' The Atlantic Monthly,' for April, 1869.) 6. *Our Inebriates Harbored and Helped.* (' The Atlantic Monthly,' for July, 1869.) 7. *Anchored off Binghamton.* (' Putnam's Monthly Magazine,' July, 1869.

sufficiently long period, both to restore the necessary moral self-control, and likewise to cure functional or structural disorders induced by the abuse of spirituous drinks.   For this purpose Section 2 of Part I was introduced, which gives the necessary power to confine an habitual drunkard for such a sufficient length of time, as may be necessary for the due protection and complete restoration of his mind and health.   The bill is divided into two parts, the first relating to those persons whose means are adequate to pay the cost of their detention and management in a reformatory for inebriates, while the second includes (to use Dr. Dalrymple's expressive words) "that abounding nuisance and scandal, the habitual drunkard, who is perpetually circulating between the gin-shop, the gutter, the police-cell, and the gaol." For the first class, the establishment of reformatories, sanatoriums, or refuges, may be left to depend on private and voluntary enterprise ; while for the second it is proposed to give power to magistrates in quarter sessions to establish reformatories, or to devote part of a prison or workhouse to a similar purpose.

Amongst the arguments which Dr. Dalrymple adduced in his powerful appeal to the members of the House of Commons in favour of legislation for the protection of drunkards was the success which refuges of the kind that he proposed to establish had already experienced in America.

" In one establishment in the city of Boston [he observed], where 2000 cases of habitual drunkenness were treated, no less than half of them had been perfectly cured.   In other establishments thirty and fifty per cent. of the patients were permanently and happily restored to their families."

We purpose in this article to investigate the truth of these remarkable statements ; and if, as we believe will be the case, we can convince our readers that they are based upon unquestionable evidence, we shall have established a strong case in favour of a similar system being adopted in this country.

The principal evidence we have been able to obtain regarding the American Homes for Drunkards is contained in the works attached to this article, and we must express our special indebtedness to the paper on " Inebriate Asylums and a Visit to One," which is understood to have been written by a well-known American author, Mr. Parton.   We are acquainted with the existence of at least six of these institutions in the United States, and there may be others of which we have not heard. The first of these was opened at Boston in 1857, and is known as the Washington Home.   This is the institution specially referred to by Dr. Dalrymple, and it may be regarded as the parent

of all those that have been subsequently established.   Its great
success under the management of Dr. Albert Day (who may be
regarded as holding the same position in relation to the treat-
ment of drunkards as the lamented Dr. Conolly held in relation
to the treatment of the insane), in the course of a few years
attracted general attention, and in or about 1867 similar refuges
were opened at San Francisco, at Media, near Philadelphia, and
at Binghamton, New York, called the New York State Inebriate
Asylum, while, in July, 1868, the citizens of New York esta-
blished an inebriate asylum on Ward Island (in consequence,
apparently, of the distance of Binghamton from the city), and
the inhabitants of Chicago adopted a similar course.

We have no information regarding the success of the institu
tions at San Francisco, Media, or Chicago, and shall, therefore,
confine our remarks to the Washington Home and the Bingham-
ton and Ward Island Asylums.   As the trustees of the Bing-
hamton Asylum secured the valuable services of Dr. Albert Day,
who had for about ten years successfully managed the Washing-
ton Home, the systems pursued in these two establishments may
be regarded as virtually identical, although the arrangements at
Binghamton are on a far larger scale.   This is the institution
described in the article "Inebriate Asylums and a Visit to One,"
and as it is regarded as being the most perfect example of its
class, we shall attempt to describe, at some length, its structure
and internal management.   But, before doing so, we must give
a brief sketch of the history of the remarkable man who is
entitled to rank as the true founder of these institutions.
" Albert Day has originated," says Mr. Parton, " nearly all that
is known of the art of curing the mania for alcohol ;" and this
strong statement is borne out by the facts which he and the
other writers on Binghamton have adduced.   Without the bene-
fit of a good early education, and not, in so far as we can see,
possessing any remarkably high intellectual powers, he has
achieved a great work " by instinct and sympathy rather than
by science or reflection."   He seems to have had, almost from
his youth, a singular pity for drunkards, and a firm belief that,
with due assistance, a majority of them could be restored to
self-control.   When he was a child at his father's farm in
Maine, he saw in his own family, and all around him, the evils
resulting from the excessive use of intoxicating liquors ; and he
states that he has never tasted any alcoholic drink.   Losing his
father at thirteen, like a genuine Yankee boy he packed up all
his worldly goods in a small bundle, and set forth on his travels
in search of a new home.   Beginning independent life as a
farmer's boy, he advanced to an apprenticeship and learned a
mechanical trade.   What the exact nature of the business was

we do not know, but we are informed that he exercised his trade at Boston, and at an early age he obtained a seat in the Legislature of Massachusetts. From his youth upwards he seems to have sought out drunkards, and to have been very successful in reclaiming even apparently hopeless cases. He told Mr. Parton the story of his first case, " a certain Jack Watts, the sot of the neighbourhood," who was "dead beat" by the civility, firmness, and practical help afforded him by an entire stranger. It is needless to give a full account of the mode of treatment adopted in this case; it is sufficient to observe that Jack Watts never drank again, brought up his family respectably, and died two or three years ago at a good old age. This was as difficult a case to deal with as it is easy to conceive, for the man had been a hard drinker for many years, and was poor and ignorant.

Boston took the initiative in establishing the class of retreats now advocated by Dr. Dalrymple; and Albert Day, who was one of the originators of the movement, was appointed superintendent of the Washington Home on its opening in 1857. The way in which the Boston people set to work contrasts most favorably with corresponding proceedings in the State of New York. While the latter, as Mr. Parton informs us, were "permitting a million dollars of public and private money to be lavished in the attempt to found an asylum, a few quiet people in Boston had actually established one, and kept it going for nine years, during which three thousand inebriates had been received, and two thousand of them cured!¹ The thing was accomplished in the simplest way : they hired the best house for the purpose

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¹ We cannot allow this statement to pass without a word of criticism. While the facts generally are undoubtedly true, we cannot see how Mr. Parton, who, we suspect, plays the part of an advocate rather than that of a judge, has arrived at his statistical result. Dr. Day was removed from Binghamton on the 1st of May, 1867, and in his last annual Report of the Washington Home, dated January 1st, 1867, he writes as follows :—" Since my connection with the 'Home' (about nine years), there have been registered as admitted under its care, the names of twenty-three hundred patients. Of this number four hundred and ten have suffered from the various forms of mania known under the general name of delirium tremens. Twenty-seven inmates of the 'Home' have died during this time, a large proportion of these deaths being caused by consumption, pneumonia, and other diseases aggravated by intemperance. Of course it is impossible to estimate with any degree of accuracy the proportion of this number who have been completely reformed. Many are dead, and hundreds are scattered all over the country, or have passed from under my observation; but it is safe to say that a majority have remained firm to their determination formed while with us, while a much larger proportion have had their condition alleviated with hopes of eventual and permanent cure."

It is impossible to suppose that during the first four months of 1867, seven hundred patients were received. It was not until the "Home" had been opened for *eleven* years that the whole number of patients exceeded three thousand, as we learn from the Report for the year 1869.

that chanced to be vacant, fitted it up at the least possible
expense, installed in it as superintendent an honest man whose
heart was in the business, and opened its doors for the reception
of patients.   By and by, when they had results to show, they
asked the Legislature for a little help, which was granted, and
has been received from year to year.   The sum voted has never
exceeded 5000 dollars in any year, and there are three men in
Boston at this moment, reclaimed from drunkenness by the
Washington Home, who pay taxes enough to support it."
Such is the history of the foundation and the success of the
Boston institution, and it affords us a good lesson as to how we
should proceed, at all events at first, in this country.   During
his residence in this establishment, Albert Day joined the medi-
cal department of Harvard University, and went through the
usual course, although he made a particular study of the diseases
arising from the abuse of stimulants, such as delirium tremens
and chronic alcoholism.

The success of the Washington Home attracted general
attention throughout the States, and in his latest annual Report
we find Dr. Day writing as follows :

" It is a pleasant thought and worthy of note that, while ours is
the pioneer institution in this important work, other institutions
are likely to be modelled from it.   I have been consulted several
times by gentlemen from other and distant cities, who contemplate
a work among their own communities to be based substantially upon
our plan."

In May, 1867, he was promoted from the Washington
Home, which he had so ably superintended for about nine years,
to a larger field of duty, the New York State Inebriate Asylum
at Binghamton ; and, like him, we shall now take our farewell
of the Boston Asylum, with the remark that, as far as we can
judge from the Reports for 1868 and 1869, it is being conducted
in a thoroughly efficient manner by its new superintendent, Mr.
Lawrence.

In the article in the ' Atlantic Monthly,' reference is made to
the large sum of money wasted in the building of the Bing-
hamton Institution.   The history of this establishment previous
to its reopening in 1867 deserves to be put on record as a warn-
ing to all weak-minded charitable persons.   Nearly twenty years
ago a London quack doctor of the most objectionable class
thought that he might do a good stroke of business by starting
a Home for Drunkards.   For several years he went about,
delivering addresses and collecting money, till he came to be

" regarded as one of the great philanthropists of the age ; and this

the more because he always gave out that he was labouring in the cause from pure love of the inebriate.''

The good people of Binghamton, misled by his representations, gave a farm of more than 250 acres for the benefit of his future patients; and in return for their generosity he seems to have selected their town as the seat of the proposed asylum. In 1858 the corner-stone of the New York State Inebriate Asylum was laid with numerous ceremonies, after which there were addresses, music, a poem, and a benediction. This building, if completed on the proposed scale, would have cost fully a million dollars, but, as far as we can learn, only a portion was constructed in 1864, when the true character of the adventurous scoundrel was at last discovered. In that year he offered to *give* to the institution, as part of its permanent fund, the handsome sum of two hundred and thirty thousand dollars, which, as he modestly explained, was due to him for eighteen years' services in founding the institution, at thirty-five hundred dollars a year for travelling expenses, clerks, &c. The trustees were much puzzled to know how a man with no visible resources could have expended the large sum which he declared he had disbursed from his private funds; but, leaving that mystery unsolved, they were fortunately able to detect the object of the donation. The charter provided that any one giving ten dollars to the institution should be a stockholder and entitled to vote at the election of trustees; since every ten dollars represented one vote, it is obvious that if the so-called *gift* had been accepted the audacious swindler would at once have obtained 2300 votes, and in point of fact would have become owner of four fifths of the governing stock and the absolute controller of the whole property of the institution! Perhaps the strangest part of this very remarkable story is that he all but succeeded in carrying out this scheme, and had at last to be bought off by the payment of a large sum. During the reign of this miscreant, which lasted for about two years after the institution was opened for the reception of patients, one of the wings of the building was burned down, after he had had it well insured. The insurance, 81,000 dollars, was paid him, and with this sum and 20,000 dollars of subscriptions he decamped. Of his subsequent history, except that he was tried for arson and convicted at Binghamton, but unfortunately acquitted by a higher court, we know nothing. His villainy tended materially to retard the success of the experiment. His theory seems to have been that an habitual drunkard is something between a criminal and a lunatic, who is to be punished like the one and re-strained like the other; while his real object seemed to be, after having received six months' payment in advance, to starve and madden the patient into a sudden departure. The very name he

chose for the institution, " Inebriate Asylum," was a most un-
happy one, and it is now regarded as one of the greatest single
obstacles to its growth.

When Dr. Day entered on his duties at Binghamton, on the
1st of May, 1867, the institution had been closed for several
months against the reception of patients, and the trustees had
availed themselves of the opportunity thus offered to them to
repair the portion of the building uninjured by the fire, and to
make various improvements and additions such as the introduc-
tion of water, gas, and heating apparatus, the construction of a
large kitchen and dining-room, &c. He likewise found some-
thing more discouraging than an empty house, namely,

" An element of dissatisfaction with and distrust of the institu-
tion, which is a legacy left me by the past management of the
asylum, and of which I do not complain, as I was led to expect it."

After a space of only twenty months he is able to write as
follows :

" Five patients whom I brought with me from Boston constituted
all the material upon which, as a new foundation, we might hope to
gather and rebuild the scattered fragments of our noble experiment.
Since then, those who have come and gone, with more or less happy
results, number three hundred and ten, of whom eighty-two are with
us to-day (December 31st, 1868) ; and the roll of present inmates is
steadily increasing."

Of the two hundred and twenty-eight patients discharged from
the asylum since its reopening, he reports one hundred and thir-
teen, or fifty per cent., as having, to all appearance, permanently
reformed after a single probationary trial.

" Eleven have fallen after a first trial, and four after a second, still
returning and clinging to the asylum ; these likewise have triumphed
in the end. Of sixty-eight we have no certain tidings, nor any means
of ascertaining their present condition ; but as many of these were
in a highly favorable state of physical and moral health when they
left, I think [says Dr. Day] we may confidently claim at least one
third of the number (say twenty-three) as reformed. Twenty-five
may be set down as failures and incorrigible. Only four have died ;
and three have been discharged as insane."

Here, then, we have Dr. Dalrymple's statistics more than con-
firmed, the cures amounting to 62 per cent. of the cases.

In his first annual Report to the Board of Trustees of the
New York State Asylum, the new superintendent very naturally
enters somewhat fully into his views regarding the nature and
treatment of drunkenness :

" Assuming as we do that inebriety is a disease, the question of
character and proper treatment is the problem that this asylum has
been founded to solve and apply. It is certain that as a disease its

character is most complex and obscure, involving as it does abnormal conditions of both mind and body, and varying in every case with individual temperament and characteristics. It is also certain that no panacea has yet been discovered to meet it, and its complicated character renders it impossible that any such simple remedy should exist.

"The fundamental basis upon which all hopeful treatment must rest lies in the desire of the patient himself to escape from the slavery that enthrals him. But little, if anything, can be accomplished in opposition to the wishes of the person to be treated, and it is a melancholy fact that cases do exist of those so naturally base, or debauched by long indulgence, that no aspirations for better things can be excited within them, and no effort can stimulate them to that personal exertion which their salvation demands. Such cases, however, are rare, and are found chiefly among those whose moral natures are slightly or imperfectly developed, who are naturally attracted to intemperance because it is a vice, and who, it may be, are saved from the commission of more serious crime by the indulgence of this form of sensuality. But in a vast majority of cases we may confidently rely upon the hearty co-operation of the patients themselves.

"In over two thousand cases of which I have been cognisant, ready submission to, and co-operation with, treatment have been universal, and in a large majority of cases this compliance with the means of recovery has been prompted solely by the patient himself, whose eagerness would not allow him to wait even for the advice or urgency of friends."

The advantages of a temporary seclusion are then noticed in the Report from which we have just quoted. One of the most obvious of these advantages is founded on the fact that on voluntarily entering an asylum the patient tacitly admits the necessity of treatment; another lies in the isolation which seclusion affords from invitations to indulge in alcoholic drinks : while a third and the chief advantage is, that it is only in seclusion and under moderate personal restraint that total abstinence can be ensured. The influence of the patients upon one another is regarded as "one of the strongest moral forces that can be utilised in remedial treatment." The author of 'Our Inebriates Harbored and Helped,' in somewhat peculiar but forcible language, confirms this view :

"If I were asked wherein lies the peculiar healing of this place I should answer in the profound impressions of its sympathetic intercourse ; for here my trembling trouble is met with unstudied appeals transcending the eloquence of Gough, and confronted with pictures of pain beyond the eager, tearful utterances of Vine Hall. This anxious little world of ours is moved by the moral power of its own public opinion."

Intimate friendships are often formed between persons of con-

genial dispositions, and thus even weak natures may give firmness of purpose to each other, especially as no class of persons are so susceptible to surrounding influences.

Dr. Day frankly admits that there is a limit beyond which human science cannot pass in the treatment of drunkenness as a disease. The appetite for drink, whether it be constitutional (which, as we shall presently show, alters the case), or induced by the habits of past life, can never be removed by any human skill. It may be weakened and rendered dormant as long as there is perfect abstinence, but it is ever ready to break forth on the slightest indulgence. Hence the end and aim of all treatment must be—" First, to convince the patient, by argument and experience, of the fact that the morbid appetite may be rendered dormant, but can never be destroyed ; and secondly, to stimulate and strengthen the *will* up to the point of total abstinence." It has been often found that the self-control necessary for the practice of total abstinence cannot be obtained during the existence of some physical ailment, which seems to have had the effect of reacting morbidly on the mind and of demoralising the will. In such cases as these, seclusion and temporary abstinence will be of no avail unless supplemented by proper medical treatment. The nervous system is usually enervated and exhausted, and the digestive and other systems suffer as a necessary consequence. Hence more or less tonic treatment is usually necessary, and the best tonic is to be found in the healthy and bracing atmosphere of the high ground on which the asylum is built. The second best tonic would probably be found in the shower-bath, judiciously prescribed. The intense sleeplessness that accompanies the commencement of total abstinence is best combated by bromide of potassium, which is the only article in the Materia Medica that is mentioned in any of the reports or articles now lying before us. Chloral had not then been introduced into practice.

As Binghamton is still little known to ordinary tourists, we may state for the benefit of those who wish to visit the asylum, which has now become famous, that it is a town beautifully situated at the confluence of the Susquehanna and Chenago rivers, 215 miles from New York, and on the line of the notorious Erie Railway. The asylum lies about two miles from the town, on the summit of a gently sloping eminence, and commanding a view of the rivers and their valleys for eight or nine miles in each direction. The building itself is a " castellated palace," constructed of stone, presenting a frontage of 365 feet, and established with numerous towers, which not only relieve the monotony of so extensive a front, but serve an excellent purpose in affording a large number of private apartments. A sketch

of this magnificent edifice and of the grounds in front of it is given in the last Report. The building contains, *inter alia*, a library (for which donations are urgently invited), a reading room, in which the principal periodicals and newspapers of both continents are to be found, a billiard room with three tables, a gymnasium, and a chapel containing an excellent organ. For the further recreation of the patients there are a garden of ten acres, a conservatory, cricket and croquet grounds, and a bowling alley.

The dining room, says Mr. Parton, is lofty and large, as, indeed, are all the public rooms (in one of which is a good piano). The private rooms are equal, both in size and furniture, to those of good city hotels. The arrangements for warming, lighting, washing, bathing, and cooking, are all that can be desired. Menial labour is reduced to its *minimum*, one man working ten minutes an hour being able to warm two or three hundred rooms. From the patient who wrote the article "Anchored off Binghamton," we learn that "the meals are served three times a day—breakfast at 8 a.m., dinner at 1 p.m., and supper at 6 p.m. They are well served as far as attendance is concerned, and the table is as well supplied as one could expect." We are surprised to learn from the same authority that "there is no restriction in regard to the use of tobacco in any form, which is consumed to an enormous extent; and the same may be said of coffee; and thus, in many instances, the unwise and unlimited use of these two stimulants injures the physical health of the inmates." From another patient—the author of "Our Inebriates Harbored and Helped" — we get more minute details regarding life in the asylum. He represents himself as one of "ninety-six gentlemen—in morals, as the world goes; in wit and manners above the average; all of us decent, many refined; none of us fools, not a few highly intellectual; an illiterate man a painful rarity among us; a polished scholar, not a phenomenon." This happy family, having breakfasted in messes which consist of twelve members, proceed to " prayers in chapel, and the real business of the day begins. Some to the billiard tables, some to the bowling alleys, some to the gymnasium; unless the weather be positively forbidding, there is always a considerable company who ramble over the hills, or by carriage or the railway. For it must be borne in mind that the corner-stone of the theory upon which this experiment rests is *confidence*." The mail comes in at eleven and six, forming two exciting episodes of their daily life. Their evenings are well provided for, in so far as amusements are concerned. On Mondays they have readings in the chapel, from the poets, dramatists, or novelists (those of our readers who

might be appalled at the idea of ' Pickwick' being read from
the pulpit of St. Paul's must be reminded that in America, as
in Scotland, churches are used for many purposes besides the
celebration of Divine worship). Tuesdays and Saturdays are
club-night meetings of a literary and social organization called
the Ollapod Club, numbering sixty members elected by ballot,
and including " the names of men who, in their respective walks
of life, have adorned and taught superior communities. Here
are divines, physicians, lawyers, writers, artists, teachers, mer-
chants, and more than one scholar honorably known by his
attainments in the exact sciences and criticism." At these
meetings a paper is read and discussed on any subject not
religious or political, " there being a preference for the satirical
handling of social absurdities." At the close of the literary
exercises the members indulge in a little chess, whist, euchre,
or cribbage; and once a month there is a " reception," to which
the public are invited. On Wednesday evenings the superin-
tendent holds a kind of temperance soirée, which, if it be cor-
rectly described by one of the inmates, must be very remarkable.

" Pithy performances these—neither scientific nor rhetorical, but
of the very mother-soil of the subject, and to the point; at times
with a directness so drolly excruciating as to make the squirming
hearer feel as though he were a full bottle of 'S. T.—1860—X,'[1]
and the spiral horror of an analyser's corkscrew, with its cold,
critical intelligence, were slowly but surely grinding into his
head."

After this terrific affair, which would have been a bar to the
pleasures of all but inebriates for the rest of the week, we find
them on the following evening, Thursday, busy at a " dramatic
reception," to which the leading Binghamton people are invited
by cards. We are told that they have *done* " Macbeth" and
the " Lady of Lyons." Friday evening seems the only one on
which some definite amusement is not chalked out for them; and
we should think, judging from our own feelings, that they must
heartily enjoy the respite. We presume, however, that we are
wrong; for Dr. Day, in speaking of the literary associations or
clubs, observes that " we would gladly have every evening of
the week, especially during the winter, thus occupied." With
all these recreations provided for them, there still remains a
large portion of unemployed time, especially in winter, when
the patients are debarred in a great measure from out-door
exercise. The listlessness and ennui consequent upon the tem-
porary cessation of the duties of active life are more or less felt
by all Dr. Day's patients, and he attributes to this enforced

[1] The reviewer is obliged to confess his ignorance of the nature of this
mysterious but apparently potent compound.

idleness most of the lapses from the direct path of reform (see the 'Report for 1868,' p. 14). Dr. Fisher, of the Ward Island Asylum, writes as follows :

"Amusement is amply provided for those who enter your asylum. But systematic occupation is as essential to the permanent success of this institution as the amusements which have been so amply supplied. A man in physical health, who has been engaged in active employment before his admission to the asylum, grows weary of a life of idleness, and either returns to his business and its cares before he is secure in his position against temptation, or, should he be prevented from doing so, the restraint chafes and irritates his disposition, while an obstinate spirit is aroused, and he seeks an opportunity to revenge himself upon his friends and drown his own unhappiness by recourse to the agent of his misfortunes." ('Report of the Commissioners of Public Charities and Correction,' New York, 1869, p. 120.)

We believe that the want of a fixed daily occupation acts more harmfully than any other cause in retarding the satisfactory progress of the class of patients who seek refuge in these asylums. Dr. Fisher earnestly recommends that a mechanical workshop should be fitted up in his asylum, where those who desire it may find bodily occupation. It must, however, be remembered that the great majority (287 out of 339) of Dr. Fisher's patients are non-paying "charity patients," drawn from a very different stratum of society than the select company who congregate at Binghamton,[1] paying their thirty dollars a week. The great misfortune in Dr. Day's life has been the want of a thoroughly good early education. Had he been a man of higher intellectual culture, we cannot help thinking that he might have in a great measure overcome this difficulty, by instituting classes for regular instruction in such subjects as the following : (1) *Chemistry*. The writer of this article was once assistant to the late Dr. David Boswell Reid, who then was a lecturer in Edinburgh (prior to his ventilating the Houses of Parliament), and he can testify to the large amount of knowledge of inorganic chemistry which can be acquired with apparatus consisting solely of a dozen slips of window glass, a few test-tubes, half a dozen test-fluids, and a simple blow-pipe. (2) *Elementary mathematics* and their application to land surveying, gauging, &c., to optics, and to astronomy. Many an amateur astronomer has found pleasant occu-

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[1] Of the 310 patients received at Binghamton in the year 1868, 93 were clerks, 82 merchants, 28 independent gentlemen, 16 farmers, 15 lawyers, 9 brokers and bankers, 5 printers, 3 clergymen, 2 physicians, 2 authors, 2 teachers, 5 professional musicians, and 1 artist, while the occupations of the remaining 50 are not recorded.

pation in grinding his own lenses. (3) *Ancient and modern languages,* a certain amount of translation to be insisted on as a daily duty; with a Greek Testament class on Sundays. A well fitted-up workshop, as suggested by Dr. Fisher, especially if a lathe were included, would afford good bodily occupation in bad weather; and we should think that the garden and conservatory might be more utilised in the way of affording healthy exercise for the patients.

It may be expedient to say a few words on the kind of patients who are not likely to benefit from such an institution as the Binghamton asylum, and who act prejudicially on the other inmates. Dr. Day, in his Report for 1868, makes the following remarks on this subject:

" Youth is an unfavorable condition; so especially is a giddy frivolity of mind on the one hand, or dulness on the other. It is hard work to impress upon the puerile or the stupid that solemn sense of the situation—the danger, and the responsibility—without which they must remain deaf to the voice of warning, or defiant to the claims of affection. Only punishment can do this, only the ' wages' can convince such an unstable or stolid creature of the ' sin.' He first begins to know himself when he is ' dead beat.' For this reason, we find his prospect of reform improving as he grows older and suffers more acutely—as his nerves become weaker and his remorse keener, and his once plucky constitution begins to show signs of giving in. Between the age of thirty-five and forty-five his chances are decidedly better than when he is younger and more reckless, or older and more shaky."

The author of ' Anchored off Binghamton,' expresses similar views:

" To the friends and guardians of very young men I would say, do *not* send your boys here, unless they themselves strongly desire to purge themselves from the evils of an early acquired habit of intemperance. Do *not* send boys against their will, or unwilling men of weak minds, for they will be but company to each other in their debauches."

Dr. Day forcibly points out the importance of excluding as far as possible involuntary patients, " or, at least, such as are brutally insensible and rebellious." To introduce such patients would be at the same time to " introduce the element of confinement and restraint, and thus to degrade the institution from its true character, as a saving and exalting home of faith and inspiration, into a mere house of correction or a gaol." Patients of this kind are fortunately rare, and require a special mode of treatment, into which we have not space to enter, but which often leads to their becoming new men and truly reformed.

We trust that in the preceding pages we have clearly demon-

strated that there is nothing Utopian in Dr. Dalrymple's pro-
posals in so far as the higher and middle classes of drunkards are
concerned; and we have proved that he has not overrated the
degree of success that has been attained both at the Washing-
ton Home and at the Binghamton Asylum. We shall con-
clude with a few words regarding the means that have been
adopted in America for the reformation of those who "reel
between the gutter, the gin shop, the police cell, and the gaol."
We learn from the Ward Island Asylum Report that a con-
siderable number of persons are arrested in New York for in-
toxication, and that it is mandatory on the magistrates to im-
pose a fine on such persons, and in default of payment to commit
them to the workhouse. The commissioners report that—

"In the case of habitual drunkards the propriety of fine or
imprisonment is obvious, but it may be questioned whether it is just
to punish by imprisonment occasional or accidental intoxication.
The imprisonments for intoxication that have come under their ob-
servation, lead them to believe that while the severity of the law
does not diminish the vice of intoxication, it is the cause of suffering
wholly incommensurate to the offence, involving the loss of cha-
racter and oftentimes the means of support. A drunken man in
the public streets is a public nuisance, and should be removed by the
police to the station-house, and there kept until sober. The dis-
grace of the detention, in most cases, would be a sufficient punish-
ment of the offence."

Entertaining such sympathising views, in which we cannot say
that we participate, the commissioners opened in July, 1868,
a home for these unfortunates on Ward's Island. From the
report for the year 1868, which embraces only a period of six
months, and is the only one that has reached us, we learn that
the total number of cases received between July 21st and De-
cember 30th, was 339, of whom 287, or nearly 88 per cent., were
charity patients, or persons unable to pay for their support, who
are received—

"Upon the condition that they perform such labour as may be
assigned to them, and in this way make the institution self-support-
ing, even to the performance of the more menial duties. . . . Of
these, the females have been employed as scrubbers, chambermaids,
seamstresses, scullions, and as nurses for the children in the infants'
hospital. The males have been engaged in grading, road-making,
building sea-wall, &c., while those who were practically skilled as
mechanics have worked upon the building. But few of these have
experienced the practical results which the asylum is expected to
bring forth, owing in many cases to the shortness of the time of
commitment, but mainly due to the fact that, belonging to the class
of revolvers—men and women that have grown up in vice and poverty,
and are constantly placed under the care of your honorable Board,

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either as objects of charity or correction, the desire to reform, a pre-requisite to its accomplishment, was wanted in them, and beyond the temporary restraint their residence in the asylum was of little benefit."

This result is not satisfactory, but it is only what might have been anticipated. If when Dr. Dalrymple next year introduces his amended bill he would be content with confining his legislation to the upper and middle classes who can pay their own expenses, we wish him every success. Let him get over the legal difficulties that stand in the way of retaining patients sufficiently long to effect a permanent cure, and then let him and his friends establish at home an asylum conducted on the Binghamton system. If it succeeds, as we feel assured that it will, he may then with his greater experience take the " revolvers" in hand.

XI.—Soelberg Wells on Eye Diseases.[1]

Mr. Wells's work has been too recently noticed in these pages to require an extended analysis, but we cannot do less than refer to the numerous additions that have been made to it, and which render it a very thorough and complete digest of the ophthalmological knowledge of the present day. The new matter covers nearly sixty pages, and appears to us to be very evenly distributed through the book, an evidence of the care with which the old edition has been revised.

The chapter on muscular asthenopia appears to have been in great measure rewritten, or at least has received considerable additions, derived in fact from the recent important communications (almost the last he wrote) of Professor A. von Gräfe on this subject. The term asthenopia, as is now pretty well known, is applied to that condition in which, whilst the patient is capable of reading the smallest type or of accommodating the eyes most perfectly to varying distances, very brief exertion causes them to ache, to become congested, and to make letters, words, or lines appear confused. In some cases this is dependent on simple hyperæsthesia of the retina, which may result from over-exertion of the eye, as we have on several occasions seen in the case of compositors, when it is usually accompanied by some hyperæmia of the disk. Here rest from work and the employment of blue or smoked glass spectacles will commonly effect a cure. In a second class of cases asthenopia is associated, as

was first pointed out by Donders, with hypermetropia, and can be at once relieved by the adoption of appropriate convex glasses. This is by far the most common form.   Lastly, asthenopia may arise from insufficient strength of the internal recti muscles. In this condition the patient can converge the axes of the eyes upon a near object for a few seconds or for a minute or two, but soon a sense of fatigue is experienced, and one or other of the eyes rolls outwards, its internal rectus being no longer able to sustain the effort of contraction.   The debility of the muscle is roughly shown by directing the patient to look at a pencil that, held vertically, is gradually approximated to him.   If when it has reached to within three inches a card be interposed between one eye and the object, the eye, the view of which is obstructed, speedily rolls outwards.   A more delicate method of determining the presence and amount of the insufficiency is by means of prisms.   If a weak prism be placed with its base downwards before a normal or emmetropic eye, and a fine line with a dot in the centre be looked at at a distance of a foot, two images will be seen, one immediately above the other, and in this position they will remain, but in an eye affected with muscular asthenopia the motion for contraction of the internal rectus, *i.e.* the avoidance of double vision, being taken away, this being already effected by the prism, the eye rolls outwards, and the displaced image is not only seen on a higher plane, but more or less shifted laterally to the opposite side, so that crossed diplopia results.   The amount of this displacement, and consequently the degree of insufficiency of the rectus of one side, can readily be ascertained by placing in front of the opposite eye a prism with its base inwards, which will again cause not fusion of the two images, but their vertical superposition.   The frequency and the importance of muscular asthenopia are greatest in cases of progressive myopia, the patient being compelled to hold objects continuously closer and closer to the eye, and consequently throwing more and more work upon the internal recti, one or other of which at length gives way, and an external squint is the result.   In regard to the treatment of this affection von Gräfe and others originally attempted to remedy the conditions present by placing feeble prisms with their bases outwards before the eyes, which by producing crossed diplopia in distant objects should stimulate the internal recti to contraction and strengthen them by exercise; but this plan has not been found sufficiently successful in practice to cause it to be generally adopted, and instead von Gräfe, and Mr. Wells after him, recommends division of the external rectus.   The result, of course, is that this muscle retracts and forms fresh attachments at a more posterior part of the globe, where its mechanical effect is less, giving a pre-

ponderating power to the internal rectus, which is consequently enabled to act with less exertion in rotating the eye inwards when near objects are examined. The operation, however, should not be lightly undertaken, nor by any one who has not made himself master of all the circumstances of the case under consideration. Mr. Wells observes that—

" Great care and circumspection are required in accurately apportioning the extent of the operation to the degree of the disturbance in the lateral equilibrium. For if the effect of the tenotomy be excessive a convergent squint—with most annoying diplopia—will be produced for distance, which will be very awkward, for if the internal rectus be then divided to remedy this convergence the former insufficiency for reading, &c., will be produced. To guard against such unfortunate results, the preliminary examination as to the power of abduction for distance must be very carefully made, and the extent of the operation be entirely apportioned to this, and the after treatment must also be sedulously attended to. Thus von Gräfe lays it down as a general rule that if a prism from 15° to 18° can be overcome for distance by facultative divergence, a simple tenotomy should be performed. If the strength of the prism is less than 14° the effect of the operation must be more or less diminished by the application of a conjunctival suture, the latter including the more conjunctiva, and being tied the tighter the greater the effect that we desire. As a rule, the operation is not to be recommended if only a less prism than 8° can be overcome. But if, in a case where one of 12° or 14° can be overcome, it is very desirable to divide the operation between the two eyes in order to gain a very symmetrical effect, a very broad piece ($2\frac{1}{2}'''$—3''') of conjunctiva towards the outer canthus must be included in the suture, and the latter very firmly tied. If the abductive power exceeds a prism of 18° the operation should, as a rule, be divided between the two eyes; but if from some reason this is not desirable, the effect of the tenotomy may be increased by applying a subconjunctival suture at the opposite and inner side of the eyeball, and thus rolling the eye inwards. As soon as the patient has recovered from the chloroform narcosis, we must carefully test the effect of the operation and ascertain whether or not we have obtained perfect lateral equilibrium for distance. In order, however, to avoid being misled by a temporary insufficiency of the operated muscle, we must not hold the object (which is to be about ten feet off) in the median line, but about 15° to the side of the healthy eye, and about as much below the horizontal meridian. A prism with its base turned downwards is to be held before one eye, and the double images should lie straight above one another, if there is perfect lateral equilibrium, which should exist directly after the operation."

Mr. Wells then proceeds to mention certain points in the after treatment, and shows how the question of the eye to be operated on should be settled altogether. This is a very good and interesting chapter.

Besides such long insertions as the foregoing, we note innumerable minor additions and improvements; such, for example, as the suggestion of Knapp, which we consider to be valuable and have always since adopted, of passing the sutures after abscision not through the sclerotic, which involves considerable pinching and maltreatment of the stump, but through the conjunctiva, whereby a very accurate adaptation of the edges of the wound can be effected with little or no risk of sympathetic irritation. In regard to this latter affection, again, Mr. Wells has extended the chapter in which it is discussed, giving the results of Mooren's investigations as contained in his treatise on "The Sympathetic Disorders of Vision" and those of Laqueur. In the chapter on cataract the observations of Iwanoff on its genesis are introduced; in that on Retinitis pigmentosa those of Leber; in that on the Vitreous those of Iwanoff, Gräfe, and others; in that on Astigmatism those of Mr. Couper; in that on Spectacles, the lenses employed by Scheffler; and so on throughout the work.

We should feel disposed to recommend a second or third year's student, who has an aptitude for a specialty of this kind, to read through one of the smaller works of which there are now so many, a thorough knowledge of which will qualify him to undertake the duties of clinical assistant. After he has obtained this appointment he should purchase Mr. Wells's work, and, when he has mastered its contents and has acquired a little experience in operations and ophthalmoscopic work, he need have no misgivings in undertaking the treatment of any case that may come under his hands.

XII.—Wallace on Natural Selection.[1]

THOSE of our readers who have devoted any attention to the history of the development of the theory of natural selection are well aware that it was independently and almost simultaneously originated by Mr. Darwin and the author of the volume that stands at the head of this article. The public at large, however, who are little given to the accurate study of such subjects, can scarcely be expected to understand the relative claims of these two naturalists, and hence we think that Mr. Wallace has done wisely in republishing in this volume the essays in which he origi-

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[1] *Contributions to the Theory of Natural Selection; a series of Essays.* By ALFRED RUSSEL WALLACE, Author of "The Malay Archipelago," &c. London, 1870.

nally developed his views. The essay on which his claims to be a co-discoverer with Darwin essentially rests was written at Ternate, in the Malay Archipelago, in February, 1858, and published in the 'Journal of the Proceedings of the Linnean Society' for August of the same year; an outline of Mr. Darwin's views also appearing in the same number of the journal. We cannot sufficiently admire the modesty with which Mr. Wallace speaks of his own labours :

"The present work will, I venture to think, prove that I both saw at the time the value and scope of the law which I had discovered, and have since been able to apply it to some purpose in a few original lines of investigation. But here my claims cease. I have felt all my life, and I still feel, the most sincere satisfaction that Mr. Darwin had been at work long before me, and that it was not left for me to write 'The Origin of Species.' I have long since measured my own strength, and know well that it would be quite unequal to this task."

The earliest of the ten essays contained in this volume appeared in 1855, and the latest in 1869, and they are collected from the 'Annals of Natural History,' the 'Proceedings' and 'Transactions of the Linnean Society,' the 'Intellectual Observer,' the 'Journal of Travel and Natural History,' the 'Quarterly Journal of Science,' and from the 'Anthropological,' 'Quarterly,' and 'Westminster' Reviews. Our limited space will only allow us to notice a few of the most remarkable of these essays, and we shall begin with the second, "On the Tendency of Varieties to depart indefinitely from the Original Type," which may almost be regarded as a syllabus of the most important chapters of the then unpublished 'Origin of Species.' The author, after noticing the common belief "that *varieties* occurring in a state of nature are in all respects analogous to or identical with those of domestic animals, and are governed by the same laws as regards their permanence or further variation," states that the object of this paper is to prove

"that this assumption is altogether false, that there is a general principle in nature which will cause many *varieties* to survive the parent species and to give rise to successive variations, departing further and further from the original type, and which also produces in domesticated animals the tendency of varieties to return to the parent form."

Here we clearly have the idea of the formation of species by the method of natural selection, and the author establishes his case by the following line of reasoning. He begins by a reference to "the struggle for existence" in wild animals, and by briefly noticing the conditions which determine not only the population of a species but the excess or abundance of some species, while others closely allied to them are very rare. If we take birds, for example (and the remark applies

equally to all organized beings), we see that while they multiply in a constant and rapid succession — few birds producing less than two young ones in the year, while many have six, eight, or ten—the average number of individuals existing in any country does not increase; hence, on the lowest calculation, whatever be the average number of any species of bird in a given area, *twice that number must perish annually,* and as the individual existence of each animal depends upon itself, those that die must be the weakest — the very young, the aged, and the diseased; while those that can prolong their existence can only be the most perfect in health and vigour—those that are best able to obtain food regularly and avoid their numerous enemies.   It is " a struggle for existence," in which the weakest and least perfectly organized must always succumb. He proceeds to show that the abundance or rarity of a species is dependent upon its more or less perfect adaptation to the conditions of existence; that useful varieties will tend to increase, while useless or hurtful varieties will diminish; and that superior varieties will ultimately extirpate and replace the original species.   The partial reversion of domesticated varieties is then explained, and the author shows how "domestic varieties, when turned wild, *must* return to something near the original wild stock, or *become altogether extinct."*   After pointing out how completely the view that he is propounding differs from Lamarck's hypothesis, he concludes by expressing his belief that he has shown that

" there is a tendency in nature to the continued progression of certain classes of *varieties* further and further from the original type—a progression to which there appears no reason to assign any definite limits;"

and that this progression, by minute steps, in various directions, but always checked by certain necessary conditions, may serve to explain " all the phenomena presented by organized beings, their extinction and succession in past ages, and all the extraordinary modifications of form, instinct, and habits which they exhibit."

In his essay on " Mimicry and other Protective Resemblances amongst Animals," Mr. Wallace makes an important application of Darwin's law or principle of utility.   He begins by showing that the popular theories of colour in animals break down on examination, and by observing that it was reserved for the theory of natural selection to solve this question.   In sketching the series of phenomena which may be classed under the head of useful or protective resemblances, he begins by noticing the importance of concealment as influencing colour, and, after quoting numerous illustrative cases, proceeds to consider special modifications of colour.   If the lion is enabled by his sandy colour to conceal himself by merely crouching down upon the desert, how do the elegant markings of the tiger and many other large cats accord with this theory ?   The author replies to

this supposed question, that these are generally cases of special adaptation. The vertical stripes on the body of the tiger assimilate with the vertical stems of the bamboos and other plants amongst which he hides, while the spotted skins of the other large cats which are arboreal in their habits, serve to blend them with the foliage. Amongst birds the ptarmigan is a remarkable case of special adaptation, its summer plumage harmonising with the stones among which it delights to sit, while in winter its white plumage affords it similar protection on the snow. The colours of the woodcock, snipe, wooddove, robin redbreast, &c., likewise present admirable illustrations of the same kind. The arboreal lizards and frogs are for the most part as green as the foliage amongst which they live, while there is a North American frog which so exactly corresponds in colour with the lichen-covered rocks and walls on which it is found as to be quite safe from detection as long as it does not move. Moreover, cases of the same kind occur among fishes. Passing over the familiar example of the flatfish of our own coasts, which exactly resemble the sea-bottom on which they rest, we may notice the Australian sea-horses (Hippocampus), some of which are of a brilliant red colour, and live amongst sea-weeds of precisely the same tint. It is, however, from the insect world that Mr. Wallace draws most of his illustrations. There is a beetle which is found only on a rough-barked tree on the Amazon, which so exactly resembles the bark that, until it moves, it is absolutely invisible ! There are butterflies in India and Sumatra in which the exposed surface of the wings, when they are at rest on a twig, not only imitates a shrivelled leaf in form and venation, but the wings appear variously blotched and mildewed, as if they had been covered with minute fungi; " their size, colour, form, markings, and habits all combining to produce a disguise which may be said to be absolutely perfect." Most of our readers are probably conversant with the " walking-leaf insects," in which not only are the wings perfect imitations of leaves, but the thorax and legs are leaf-like ; and with the " walking-stick insects," some of which are a foot long and as thick as the finger, in which the arrangement of the parts is such as to render them absolutely identical in appearance with dead sticks.

We now enter upon the discussion of another set of phenomena. Hitherto we have been noticing cases in which animals are protected by means of their colour either concealing them, or making them resemble vegetable or mineral matter. The essay now proceeds to consider creatures which are for the most part very conspicuous, and which owe their safety to their completely resembling in outward appearance some creature of quite a different group which usually happens to be unfit for food from its noxious taste, poisonous qualities, &c. This is now commonly known as *mimicry,* and although it was noticed by Kirby and Spence in a few cases as a protective agency,

its full bearing has only been recognised during the last few years by Bates, Murray, and the author of the present volume. From the investigation of a large number of cases, Mr. Wallace has deduced the following laws in relation to mimicry:

1st. That in an overwhelming majority of cases the creatures (or the groups) which resemble each other inhabit the same country and the same district, and in most cases are to be found together at the very same spot.

2nd. That such resemblances are not indiscriminate, but are limited to certain groups, which in every case are abundant in species and individuals, and can often be ascertained to have some special protection.

3rd. That the species which mimic these dominant groups are comparatively less abundant in individuals, and are often very rare.

From the vast collection of cases we can only find room for two or three illustrations. Certain families of our own day-flying moths so strongly resemble the stinging Hymenoptera that they have received the specific names of apiformis, vespiformis, craboniformis, &c. There is a South American longicorn beetle that derives its specific name from its resemblance to a small bee of the genus Melipona, its body and thorax being extremely hairy, and its legs tufted in a remarkable manner, while another is so like a small common wasp of the genus Odynerus that Mr. Bates tells us he was afraid of taking it out of the net with his fingers. There is a genus of small spiders in the tropics which feed on ants, and they are exactly like the ants themselves, while there is in South America a Mantis which exactly resembles the Termites on which it feeds, the similarity in these cases giving the mimickers an opportunity for securing their prey. Lastly, there is a large South American caterpillar which startled its discoverer, Mr. Bates, by its close resemblance to a poisonous viper, the first three segments behind the head being dilatable at pleasure, there being two large black pupillated spots in the position of the eyes, and the crown presenting an appearance of keeled scales produced by the recumbent feet, as the caterpillar threw itself backwards.

We must pass over the next five essays with the remark that those on instinct and on the philosophy and theory of birds' nests are especially deserving of notice, and shall conclude our observations on this instructive and very suggestive volume with a brief analysis of the author's theory regarding "the Development of Human Races under the law of Natural Selection." In this and in the final essay on "the Limits of Natural Selection as applied to Man," he diverges at a certain point from the rigid Darwinism which he has inculcated in the earlier part of the book.

While there is now a very general agreement regarding the question of the antiquity of man, there is still great diversity of opinion

regarding the question as to whether man is of one or many species. While one party resolutely maintain that man belongs to a *single species,* and that differences of colour, &c., are but local and temporary variations produced by the various influences and conditions to which he is exposed, the other party, basing their conclusions on the same facts, assert that man is a genus of *many species,* " each of which is practically unchangeable, and has ever been as distinct or even more distinct than we now behold them." It is the author's object in this essay, which originally appeared in 1864, to harmonise these conflicting theories by means of the law of Natural Selection. After summing up the arguments adduced in favour of the unity of mankind, and likewise those in support of the original diversity of man, he decides that " the best of the argument is on the side of those who maintain the primitive diversity of man." He then goes on to show that while Natural Selection exerts an undivided power upon the rest of the organic world—

"Man, in two distinct ways, has escaped the influence of those laws which have produced unceasing change to the animal world. (1) By his superior intellect he is enabled to provide himself with clothing and weapons, and, by cultivating the soil, to obtain a constant supply of congenial food. This renders it unnecessary for his body, like those of the lower animals, to be modified in accordance with changing conditions, so as to gain a warmer natural covering, to acquire more powerful teeth or claws, or to become adapted to obtain and digest new kinds of food, as circumstances may require. (2) By his superior sympathetic and moral feelings he becomes fitted for the social state ; he ceases to plunder the weak and helpless of his tribe ; he shares the game which he has caught with less active or less fortunate hunters, or exchanges it for weapons ; he saves the sick and wounded from death ; and thus the power which leads to the rigid destruction of all animals which cannot in every respect help themselves is prevented from acting on him."

Previously to the time when the social and sympathetic feelings of man came into active operation, he or his progenitor was under the same power of natural selection as other organisms, but *then* the form of his *body* became stationary, while his *head* and *brain* have alone undergone modifications such as occur in other animals generally. In the fact of man's physical structure ceasing, at the period above indicated, to be effected by the operation of natural selection, we have the clue to the origin of races ; for those great modifications of external colour and form which—

"resulted in the development of man out of some lower type of animal must have occurred before his intellect had raised him above the condition of the brutes, and before he possessed the power of speech, at a period when he was gregarious, but scarcely social, with a mind perceptive but not reflective, ere any sense of *right* or feeling of *sympathy* had been developed in him."

This view enables or even requires us to place the Origin of Man at a much more remote ethnological epoch than has been yet thought probable. Mr. Wallace thinks that he may even have lived in the Miocene or Eocene period, when not a single mammal was identical in form with any existing species. For in the long series of centuries during which the primæval animals have been modified into their present representatives, the power that occasioned these changes in them would merely affect the brain and mental organization of man. We can thus understand how the celebrated Denise and Engis skulls agree so closely with existing forms, although their owners were contemporaneous with mammalia now extinct; while the Neanderthal skull may have belonged to one of the lowest races then existing, corresponding to the Australian of the present epoch.

Hitherto we have been looking back at the dark vistas of the mysterious *past*. Let us conclude with a cheering prophetic vision of the *future* of the human race. If our author's conclusions are correct, and no one can doubt that they have been most carefully worked out,

"it must inevitably follow that the higher—the more intellectual and moral—must displace the lower and more degraded races; and the power of 'natural selection,' still acting on his mental organisation, must ever lead to the more perfect adaptation of man's higher faculties to the conditions of surrounding nature, and to the exigencies of the social state. While his external form will probably ever remain unchanged, except in the development of that perfect beauty which results from a healthy and well-organized body, refined by the highest intellectual faculties, his mental constitution may continue to advance and improve, till the world is again inhabited by a single nearly homogeneous race, no individual of which will be inferior to the noblest specimens of existing humanity."

Bibliographical Record.

Colin on Intermittent Fevers.[1]—Dr. Colin has here presented to the medical public a very elaborate and at the same time practical work on Intermittent Fevers, and we may remark at the outset that he has himself studied in their very seat many of the affections which he describes. His occupation, as an army surgeon, has brought him into contact with intermittent fevers, as they occur in Algeria and Italy, in which countries he passed six years of his military life, and his remarks upon the diseases peculiar to the French possessions in Africa and to the Roman Campagna will be read with great interest, although some of his views are at variance with many currently received theories. In the first place Dr. Colin combats the prevailing opinion that intermittent fevers are always due to the presence of marsh-miasmata, although he admits the paludal origin of many of them. In many regions where fever is endemic in its worst forms, no local condition deserving the name of paludal can be discovered, and he therefore proposes to substitute the term *telluric poisoning (intoxication tellurique)* for *marsh* or *paludal poisoning.* The importance of adopting this view is increased by the circumstance that the prophylaxis against malaria will be more successful in proportion as the marsh origin of intermittent fevers is less exclusively regarded, for a removal of troops from the land, even where no marshes exist, and their embarkation on ship-board and their conveyance to the open sea, are often the only available methods of arresting the destructive influence of malaria. Since the conquest of Algeria by the French, it has been proved that fevers have been frequently caused simply by the influence of emanations from the soil, and especially where the uncultivated ground has been suddenly denuded by the operations of clearing, or by the construction of different works of art and civilisation. Dr. Colin contends that the morbific results of all these operations prove that even in temperate climates marshes are not indispensable for the production of malaria, for these sources of disease have disappeared in great measure by hygienic precautions in civilised countries, and the causes of fevers

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[1] *Traité des Fièvres Intermittentes.* Par Leon Colin (*Treatise on Intermittent Fevers*). Pp. 544, Paris, 1870.

are now more commonly referred to emanations, exhalations, and even miasmata from the earth itself.

On a small scale the outbreak of fevers has been observed even in Paris, quite independently of the presence of marshes, and apparently in consequence of terrestrial emanations, from the construction of garrisons, canals, and the like; but in the French capital, it may be presumed that, owing to the high latitude, the temperature is hardly sufficient to fecundate the germs of disease to the fearful extent which is witnessed in hotter regions.   In Algeria, for instance, fever is developed in regions presenting conditions the reverse of marshy, and indeed in places where there is neither marsh, nor moisture, nor vegetation, nor decomposition.   But these lands, which appear so barren, have an enormously productive power, and a luxuriant vegetation may be obtained, as if by enchantment, by a very small quantity of water and a slight harrowing of the soil; and it would appear that in such regions the earth has in reserve a hidden force which, when exposed by the least cultivation, is as favorable to the development of plants as it is fatal to the life of man.

The section of Dr. Colin's work which will perhaps be read with special interest is that which treats of the development of malaria in the Roman Campagna, for although he has studied the diseases both of Algeria and Rome, it was in the latter locality that he matured the experience which he had originally gained in the former. The telluric poisoning in the Campagna is rendered more or less active by three special conditions, namely, the configuration and constitution of the soil, the atmospheric influences, and the greater or less resistance offered by men in proportion to their living in society or in isolation.

It is of course admitted by Dr. Colin that the Pontine marshes are unhealthy, but he argues that their insalubrity is not the cause of the unhealthiness of the Roman Campagna, for the soil of the Campagna itself is not marshy, and only becomes poisonous when it ceases to be cultivated.   In other words, the Campagna is unhealthy in consequence of poisonous conditions existing in the soil itself, and not from the vicinity of the marshes.   This unhealthiness of the Campagna is a condition which has manifested itself only in comparatively recent years, and from circumstances which Dr. Colin takes great pains to explain; and he brings abundant historical evidence (some of it, however, not very trustworthy) to show that in former years the neighbourhood of Rome was far more densely peopled and very much more healthy than it is at present.   Indeed, in his zeal for collecting evidence, Dr. Colin is not satisfied with the statements made by contemporary historians, but he quotes the poets in proof of his proposition, and treats the history of Romulus and of the Roman kings apparently with as much respect as he does that of the Roman republic and the empire.   Still, of the general truth

of the conclusions he draws there can be very little doubt, and the present unhealthiness and the scanty population of Rome and its vicinity offer a sad and melancholy contrast to their former splendour, abundant population, and general salubrity.

But among the causes which at present favour the influence of malaria, one adduced by Dr. Colin appears at first sight so paradoxical as to require considerable explanation, and yet we feel bound to admit that his inferences are well borne out by his facts. The cause to which we allude is the scattered and scanty population of modern as compared with ancient Rome, for, contrary to the habit of the greater part of epidemic fevers, the Roman fever especially attacks isolated persons and the inhabitants of the country districts. The aggregation of human beings, even in the midst of insalubrious conditions, opposes a resistance to the ravages of fever, as is proved by the relative healthiness of great cities, especially in their centres; and M. Colin shows that this principle is amply illustrated by Rome itself, where the most healthy quarters are those which are central and the most populous, while the unhealthiness increases in proportion to the scantiness of the population and the distance from the centre of the city.

In the flat plain in modern Rome, subject to the inundations of the Tiber, and which was the site of the ancient Campus Martius, the sanitary condition of the people is at its maximum, because the population there is extremely dense, and the region is therefore habitable; while the surrounding hills are eminently dangerous, although covered with detached houses, and surrounded with gardens, and apparently possessing all the conditions of perfect healthiness. Of the localities especially though paradoxically distinguished for its salubrity in the centre of Rome, the Ghetto is the most conspicuous—a part of the city where it is known that the Jews chiefly congregate, and to which they were at one time restricted. This spot is so distinguished that it is avoided as far as possible by the other inhabitants of Rome, and yet the malaria penetrates less in this quarter than elsewhere, for the very density of the population appears to form a barrier to its entrance. The Ghetto is moreover situated on the Tiber, and there is no quay, the houses plunging directly into the muddy bed of the river, and subjected to the emanations of the mud at every fall of the waters, and yet the malaria never penetrates to this region, although it prevails on the opposite side of the Tiber, where there is a fine and wide street, bordered by houses and gardens, and therefore unprotected by a dense population.

Dr. Colin, from the results of his military experience, has strengthened the proposition that situation is superior to all other hygienic conditions, for he found that the most healthy barracks were not those that were best managed as to their internal arrangements,

but those that had the most central positions; and he adduces as an instance the healthy state of one of the barracks on the Corso, where the soldiers were badly lodged in narrow, ill-ventilated rooms, while on the other hand disease prevailed in a great number of outlying quarters, although large convents had been chosen for the purpose of barracks, where the halls and corridors were of ample dimensions, and indeed exceeded the limits demanded by the French Government for military buildings.

The results, then, of Dr. Colin's observations on the sanitary condition of Rome and its vicinity are,—that in the Campagna the malaria prevails everywhere, without having any special limited source, and that it is generated from the richness of a soil formerly covered with forests or cultivated fields, which are now replaced by pasturages insufficient to exhaust the vegetative power of the earth. Heat is an indispensable condition in developing the telluric fevers, although it does not alone produce them; the diffusion of malaria over the whole Campagna explains the insalubrity of the environs of Rome; and the regions which enjoy the most complete immunity from fever are those where the population is most dense.

These conclusions, in reference to the Roman Campagna, are the more important, in Dr. Colin's opinion, because this region has been frequently cited as a centre of marsh miasmata, and the name of *marshy foci* (*foyers marécageux*) having been given gratuitously to a number of localities, both in the Mediterranean regions, as Rome, Algeria, and Egypt, and in the tropical zone, as the Indies, Senegal, and Guiana, an arbitary distinction has been drawn between the fevers of marshy countries and those of countries which are not so. It will be admitted, Dr. Colin thinks, that the dimensions of the so-called marshy centres have been greatly exaggerated, when regarded in their relation to the immense number of intermittent fevers, which are really due to a wholly telluric origin.

If our space permitted we should follow our author through his careful and elaborate chapters on the symptoms, the pathology, and the special treatment of the fevers which form the subject of the book, but our limits have compelled us to dwell only on those points which seem to present features of particular novelty or interest.   We must, therefore, pass over the greater part of the volume, which treats on matters with which practical physicians are more or less familiar; and we can only observe in conclusion that the prophylaxis of intermittent fevers (a subject especially interesting to the hygiene of armies and colonists) must be directed by the experience gained as to the etiology of these affections.   If Dr. Colin's arguments and facts are such as to justify his conclusions, the subjects he has brought forward and the suggestions he offers are worthy of the deepest and most attentive consideration.

Cholera and Yellow Fever in United States' Army.[1]—These two official documents have been prepared by Assistant-Surgeon Woodward, who is a brevet lieut.-colonel in the United States' army. The principal bulk of them consists of very numerous reports, or parts of reports, from medical officers in the service. His own two reports, which profess to contain a summary of the evidence in these papers, occupy about a fifth part of the whole space. Unfortunately this evidence is so bulky and prolix, and withal so very loose and fragmentary, that it is quite impossible to analyse it, or to deduce trustworthy information on the main objects of the inquiry. Europe has not fared much better in this respect than America. The want of exactitude and precision in the data given, and the insufficiency of accurate details, have rendered many of the published accounts of the last epidemic cholera in France, and in other parts of the Continent, nearly valueless in respect of reliable testimony as to the development and extension of the disease; and the result unhappily is that we are now just about as much in the dark about many of the problems connected with its origin and spread as we were twenty years ago, although there have been two great epidemics during the interval.

It will be remembered that cholera was imported into New York in the early autumn of 1865; but the pestilence showed no disposition that year to become diffused there or anywhere else in America. The same was the case in our own country. Next summer, however, the disease began to manifest itself in various parts, and markedly so in New York. It was about the beginning of July, 1866, that the earliest cases occurred among the troops, and this was in one of the islands in the harbour of that city. There had been much diarrhœa, often of a severe type, among them during June.

" Originating " (says Dr. Woodward) " in the overcrowded barracks of Governor's Island, in the immediate vicinity of an infected city, through which recruits passed with more or less delay before arrival, the infection spread by rapidly traceable steps to Hart's Island and other posts in the harbour; to Tybee Island, Georgia; to Louisiana by way of New Orleans; to Texas by way of Galveston; to Louisville, Kentucky; to Richmond, Virginia; and to La Virgin, Nicaragua Bay. From Richmond it was carried to Norfolk, Virginia; and from Louisville to Bowling Green, Kentucky."

And then it is added that—

" the probabilities appear to be that the disease was carried from New Orleans up the Mississippi to various points on that stream and west of it; and though the whole chain of evidence is not com-

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[1] *Report on Epidemic Cholera in the Army of the United States during* 1866. 4to, pp. 85, Washington, 1867.

Report on Epidemic Cholera and Yellow Fever in the United States' Army during 1868. 4to, pp. 196, Washington, 1868.

plete, yet there are a sufficient number of known cases of the trans-
fer of the epidemic from one post to another in this region to put
this view of the whole movement beyond reasonable doubt."

We have endeavoured to make out from the documentary evi-
dence in the appendix the proofs of several of the above statements,
and have found nothing but simple affirmations, or sometimes mere
conjectures, without so much as any allusion to the health-state of
the civil populations in the localities enumerated, or whether they
were or were not infected at the time of the troops beginning to
suffer.   And then as to the disease being carried up the Mississippi
to the states lying to the northward, we afterwards learn that it was
prevailing in St. Louis, Cincinnati, and other towns on the Ohio,
during the summer at the very time that New York was being
ravaged; "the epidemic appearing to have radiated distinctly from
(these) two chief centres."   Unless the exact dates of the earliest
ascertained cases in the different localities be recorded, along with
some notice of the public health then and antecedently, no reliance
whatever, it is obvious, can be placed on vague statements as to the
course and movements of any epidemic.   That the movements of
infected bodies of troops aided in disseminating the cholera in the
United States in 1866 is quite in accordance with medical experience
in other regions, as in India, Algeria, &c.   The disease was very
widely diffused over the Union that year from north to south, and
from the Atlantic to the Pacific coast.   The total number of deaths
among the troops is estimated at 1269 out of 2813 cases.

In 1867, the epidemic reappeared in different places during May
or June, a few spasmodic cases only having occurred during the
winter.   It was much less disastrous than in the previous year; the
deaths in the army did not exceed 230 out of 604 cases.   The
medical officers had been instructed "to endeavour, as far as possi-
ble, to protect any threatened command by a proper quarantine.
The measures thus adopted," says Dr. Woodward, "in conjunction
with the hygienic precautions directed in the same circular, un-
doubtedly saved many lives."   It is to be remembered that through-
out the country generally the disease was much less extensively dif-
fused, although the virulence of its type was not abated, than in the
preceding year.

With respect to the yellow fever epidemic in 1867, the same diffi-
culty is experienced in tracing its development and course as in the
case of the cholera, and from the same cause, viz. the want of exac-
titude and precision in the wordy statements of the medical reporters
from the military stations where the disease appeared.

"The reports indicate clearly two foreign sources from which the
disease was imported into the United States that year, viz., from
Vera Cruz and from Havanna.   From the former it was brought to

Indianola, and thence to other points in Texas. At all other stations it seems to have been brought, directly or indirectly, from Havanna. . . . . The fever was first introduced into New Orleans from Havanna; it spread from New Orleans to all the other places in (the states of) Mississippi, Alabama, and Tennessee, where cases are reported. At Key West and Tortugas it was introduced directly from Havanna."

Dr. Woodward is of opinion that "the more thoroughly the facts connected with the spread of yellow fever in the army during 1867 are known, the more strongly they appear to favour the theory of the exotic origin of the disease in the United States." This may be so; but certainly it seems rather strange *primâ facie* that at no part of the coast of the Mexican Gulf belonging to the Union should this fever be liable to originate just as well as in the district belonging to the Government of Mexico. If we take the case of New Orleans, we find that, independently of the fact that it existed in that city in 1866 (p. 108), the evidence of Dr. M'Parlin, the principal medical officer of the troops there, seems to indicate an endemic rather than an exotic origin of the first fatal cases in June (p. 110). Then as regards Mobile, the chief seaport of Alabama, we are told that "there is nothing positive to show how yellow fever was introduced; but as officers and others appear to have passed freely between the city and Fort Morgan" (where the first death occurred on August 13th), "in the bay, there can be but little doubt," says Dr. Woodward, "as to the source of the infection." No information whatever is given as to the date of the earliest cases in Mobile itself. At Pensacola on the coast, and about thirty miles to the eastward, the fever had appeared in July. Dr. Campbell, of the United States Navy, states that "the yellow fever epidemic of 1867 will long be remembered both for its severity and its unusual range along the coast of the Gulf of Mexico from Key West, Florida, to Corpus Christi, Texas, and inland to La Grange, Texas, and Memphis, Tennessee." The pestilence was widely diffused that year throughout the Mexican Gulf, including many of the West India islands, and notably in our colony of Jamaica.

Our limits prevent us from noticing at any length the opinions expressed in these reports, and upon the value of quarantine as a preservative defence against cholera and yellow fever. Dr. Woodward is a zealous advocate of the practice, and his narratives are throughout tinctured with the views he has adopted. No affirmative evidence of the success of the measure is adduced; his recommendation rests mainly on the circumstance that in every place where cholera or yellow fever appeared, quarantine had been either quite omitted, or was very imperfectly and inefficiently enforced. The city physician at New Orleans declares that

"the system in operation here does not deserve the name of

quarantine, being a sham, a delusion, and a make-believe, in place of one which would be efficacious if properly carried out."

And another medical man there writes:

"The opponents of quarantine laughed at the puny efforts of the authorities to keep cholera out of the city in 1866, and yellow fever in 1867, and it did seem ridiculous to impose a rigid quarantine upon all vessels coming from northern ports, when cholera was raging in the north and west, while the river and railroads were left free to pour as much of the disease into our midst as they could transport."

It is certainly high time that this difficult question of State medicine should be more thoroughly investigated, both by the government of the United States and by our own, than it has yet been.

Before closing, we would strongly recommend to the American Army Medical Department that all future similar reports be accompanied with a chart indicating the districts affected by the epidemic sickness, and the localities which were the chief seats of its ravages, together with the exact dates of its earliest appearance in each. Their value, too, will be greatly enhanced if authentic information respecting the health of the civil populations as well as of the troops in the affected districts be given.

Progress of Sanitation in India.[1] — This sketch gives an extremely interesting account of the progress of sanitary work done in India during the ten years ending 1869, with accompanying remarks. The variety of subjects briefly noticed will be understood from the following imperfect enumeration:—Sanitary commissions; vital statistics of the army; construction of barracks and hospitals; official investigations into the causes and prevention of cholera; conclusions of the Constantinople Conference; hill sanitaria; epidemic fever in different districts; effects of irrigation and other public works on health and disease; vaccination; water supply; quarantine; dry-earth conservancy; quality of animal food; emigration. For a couple of short extracts is all the space we can afford. In reference to the conclusions of the Constantinople Conference, our author remarks:

"If, on the assertion of the majority of the members of the said body, we admit that Asiatic cholera is never developed spontaneously, has never been observed as an endemic disease in Europe, but that it has always entered from without; if we admit these dogmas as correct, we not only ignore facts connected with the etiology of the disease, but also adopt a very dangerous theory. If the public are taught to believe that cholera is always introduced from without, internal sanitary arrangements will soon be regarded as less

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[1] *Review of the Progress of Sanitation in India.* By Dr. W. J. MOORE, Surgeon, Rajpootana Political Agency. Parts I and II, 8vo, pp. 65 and 47. 1870.

necessary. Instead of trusting to home sanitation, an impracticable system of quarantine will be the reed on which public health will lean. The Commission properly insisted on increased attention to sanitation in India, and especially in Bengal, where they consider cholera may be attacked as the only focus of origin. But for the protection of other countries they had nothing better to advise than a large and impossible system of quarantine. . . . As regards India being the only birthplace of cholera, and as regards the spread of the disease being prevented by the large quarantine system suggested, we firmly believe that the Commission are entirely mistaken. Facts and experience are both against their conclusions."

On the subject of the causes of epidemic fever [which is often of a mixed type, *typho-malarial*, being a compound of typhoid or pythogenic and of marsh fevers], we are told that—

" Although epidemics of fever have occurred in localities like Rajpootana, Guzerat, North Canara, where such works as railway embankments, irrigation canals, and raised metalled roads are unknown, still it is none the less a fact that fever has been more persistent and destructive in all those localities to which we are accustomed to point as presenting triumphs of European administration. However humiliating this reflection may be, the fact is undoubted ; and to ignore it is to perpetuate the evil. If we ignore it, the natives certainly do not. They ask if the boasted improvements of the English have not resulted in physical, if not moral, deterioration of the people in those localities where the most magnificent works exist. They assert that the raised metalled roads, the railway embankments for hundreds of miles through a flat country, have interfered with the natural drainage ; that the canals have saturated the subsoil and produced an atmosphere damp, malarious, and unhealthy. They complain that we have assigned too much importance to jungle, to rank vegetation, and want of conservancy in their towns and villages ; and, lastly, they declare that the few sanitary regulations enforced have not been followed by any certain favorable result. But in truth the cause of the fever is neither altogether due to the neglect of sanitation, nor to the operation of our public works, but to *both*, and in certain localities to other influences over which we have even less control."

Mauritius Fever Inquiry.[1]—These reports—for there are two, one by the majority of the medical members of the committee, and the other by Dr. Barraut, the acting general sanitary inspector—of one of the most disastrous fever epidemics on record in any of our colonies, are confessedly incomplete, in consequence of the absence at the time, from ill health, of the chief medical officer of the island, and of the short time allowed for their preparation. The leading facts in the history of the visitation seem to be that, for several

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[1] *Report of the Fever Inquiry Commission (Mauritius)*, 1866 and 1867. Folio pp. 78, Mauritius, 1868.

years previously, the public health had been decidedly deteriorating. A large portion of the lower classes was more destitute, and there was more wretchedness and squalor in their condition than formerly. Besides abounding sanitary evils in Port Louis, the chief town, which had lately become worse than usual, many of the rural districts had become more swampy and malarious, owing mainly to the effects of the "deboisement" or denudation of the adjacent hills. In the spring of 1865 there occurred a very destructive inundation, and this was followed by seasons of extreme dryness and heat, characterised, too, by other meteorological peculiarities, as great stillness of the atmosphere, the total absence for months of the trade winds, and the scarcity of thunder storms.

As to the nature of the epidemic it is declared in the first report to have been

" a mixture of the various fevers described separately by authors under the names of intermittent, remittent, continued or pseudo-continued, pernicious and bilious, or bilious remittent. In the epidemic, of which this report is the history, will be seen the faithful reproduction of the numerous epidemics of pernicious fever which have ravaged Europe, the description of which has been handed down to us by numerous authors from Morton and Torti to Alibert."

Besides the different forms of true malarial fever in the epidemic, Dr. Barraut insists much on the coexistence of a continued fever, allied to true typhus, and known in Mauritius by the absurd appellation of "Bombay fever," and which, according to him, had existed in the island for many years prior to 1865, "insidiously and slowly pursuing its way."

. The idea entertained by some persons at first that the Mauritius epidemic had been imported from abroad is declared by all the reporters to be entirely groundless.

With respect to the treatment of the disease, we are told that

" those who were well lodged, well fed, and properly attended to struggled successfully enough against the effects of the malaria, whilst the others fell by thousands, as much from want of food and the polluted atmosphere of their overcrowded huts, as from want of medicine and medical attendance, as had already been the case in our previous epidemics of cholera."

Indian Cholera Statistics.[1]—Dr. Townshend arrives at the following conclusions from the documentary evidence in the body of his report :

1. That for the production of cholera two conditions are

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[1] 1. *Report on the Cholera Epidemic of* 1868 *in the Central Provinces.* By Dr. S. C. TOWNSHEND, Sanitary Commissioner, Nagpore. Fol., pp. 85, 1869.

2. *Statistics of Cholera.* By EDWARD BALFOUR, Deputy Inspector of Hospitals, Madras Army, &c. Second edition, 8vo, pp. 98, Madras, 1870.

necessary,—the presence of a special *contagion*, and a susceptibility to its influence on the part of the person to whom the *contagion* is applied.

2. That with respect to the origin of the epidemic of 1868, the evidence is in favour of the *contagion* having been brought from elsewhere rather than that it was generated in the localities where the disease first broke out.

3. That the subsequent diffusion of the *contagion* was effected solely by means of human intercourse.

4. That a high temperature and extreme dryness are no obstacles to the diffusion of the *contagion*.

5. That with respect to the general population of the country the imbibition of water containing animal organic impurities is the most common means by which personal susceptibility to the effects of the *contagion* is induced.

With reference to the second of these propositions, Dr. Townshend admits that, " with regard to the origin of the first outbreak, there is no evidence of the importation of the disease from elsewhere," and also that "from the first outbreak in the Gunneshguni valley, cholera did not, as far as can be ascertained, spread to any other locality." Nevertheless, he subsequently declares that

" The fact of the first manifestations of the disease having occurred in bodies of men located close by a road daily thronged with passengers from a part of the country in which the disease had previously appeared, afforded strong support to the supposition that the infecting matter may have been imported rather than generated locally; and the account given of the subsequent spread of the disease, and of its appearance in the different towns and villages scattered over the epidemic area, appears to me to favour the opinion that the choleraic influence is diffused by means of human intercourse, and by that means alone."

While he maintains that " a water supply containing organic impurities is the chief, if not the sole, condition under which cholera manifests itself," and that " cholera will not prevail epidemically among a population when the water supply is abundant and fairly protected from pollution," he does not seem to accept the hypothesis that the " materies morbi " is apt to find its way directly into water from the alvine excreta of the sick, and that the drinking of this cholera-tainted water is the channel by which the disease is chiefly propagated. The accurate details he has given respecting the diffusion of the epidemic in Rajpootana render his report highly valuable as a topographical narrative.

The first edition of Dr. Balfour's ' Statistics ' was published in 1849, and was favorably received. This, its second issue, contains a large amount of instructive details, which should be diligently studied by Indian medical officers, who will find many of the topics

treated of highly suggestive. These details serve to show the magnitude and complexity of the numerous problems respecting the disease that are still unsolved, and the fluctuation and uncertainty of our knowledge in regard of them. Dr. George Johnson seems to have been anticipated in his method of treatment more than eighty years ago :

"Mr. Duffin, head surgeon at Vellore, writing of the rapidly fatal epidemic there in 1787, speaks doubtfully as to the value of opiates, and recommends castor oil as the only effectual remedy, with wine, brandy and water, and 'scarce ever lost a case.' In a subsequent letter he attributes the outbreak at Arcot to filth and the peculiar weather, and recommends removal."

The neighbourhood and banks of rivers are shown to be particularly dangerous in the Madras presidency.

"In 152 marches of native soldiers in which cholera broke out, 106 outbreaks occurred within fifteen miles of rivers (the average distance was $3\frac{1}{8}$th miles); and of these 106, 47 occurred on the banks. * * * The delay on the banks of rivers, and the labours in crossing them, render soldiers more liable to be attacked with cholera; near rivers the contaminating agent seems to be more abundant. The water from them may be polluted, or the cholera agent may seek the low moist beds of rivers and the valleys in which they run, or, if it be a thing with life, moisture may be needed for its development."

The marked decrease of attacks and deaths from the disease in the Madras army during the last twenty years or so, compared with what it was previously, gives rise to the following remarks :

"To what cause are we to attribute the decreasing numbers of attacks alike amongst the European and the native soldiers ?

"There have, in the time under review, been improvements in the pay, diet, dress, and dwellings of both arms of the service, and the conservancy in and near the barracks and lines has been more closely attended to ; but the most marked change in the Madras presidency has been the less frequent marches of regiments, and the increased facilities and comforts which steam vessels, railroads, and horse and bullock transit carriage have afforded them when moving. Its prevalence is still great amongst the civil population in every part of the Madras presidency, and in some collectorates the mortality from it amounts, in some years, to one third or one half of all the deaths."

Original Communications.

1.—The Army in Relation to Public Health.—By Charles Alexander Gordon, M.D., C.B., Deputy Inspector-General, Army Medical Department.

Introductory.—The histories of military establishments afford numerous examples of the manner in which, directly and indirectly, the civil population becomes affected by and through the army. They inform us that this is in a measure produced by the demand for recruits, by the extension to the population of epidemics, and by the discharge from the military ranks of men suffering from various disabilities, some of which only affect the individual, but others by their nature, extend to his descendants, or to his neighbours. If this is the case, the importance of applying to the army a most efficient system of sanitary administration becomes apparent. But there are other circumstances which, if possible, still further increase this necessity. The state must have soldiers, and sailors, even in times of peace, and must necessarily add greatly to their numbers in times of war. In either circumstance disease is costly; in the latter it is not only costly, but may produce serious national results, by bringing about the failure of a military or naval expedition, and thus losses in various ways may ensue, which cannot be appraised at a mere money value. Numerous such instances have occurred, to only a few of which I need here allude. Thus, in 1693 Sir Francis Wheeler's expedition miscarried at Martinique through the extent to which the force under his command became weakened by disease; in 1726 that under Admiral Hozier, sent to protect the trade of the West Indies against the Spaniards, miscarried from the same cause. To excessive sickness and mortality Sir Gilbert Blane attributes the failure of our arms in six general engagements of the seven years' war and the American war, and he asserts that if the mortality of the British navy in the latter struggle had continued during the French revolutionary war, our stock of men would have been used up, and recruits would not have been attainable for any bounties whatever. Hence, to use the words of Dr. Guy, it was not merely the seamanship and fighting qualities of our sailors that carried us

triumphantly through that terrible contest, but to these were added a state of health improved by sanitary discoveries and reforms, which maintained our population by saving lives in infancy, and guarded our sea and land forces from those destructive agents, jail fever, dysentery, and smallpox.   This greater efficiency was also very largely due to the great exertions of the medical officers who accompanied our armies and our fleets, and to the support given to them by officers in command.   Walcheren, indeed, was an exception, for there, as subsequently transpired before a Parliamentary Committee, the recommendations of the medical officers were not so supported.   The melancholy results of this neglect are matter of history ; the expeditionary force dwindled away ; its remnant had to be brought back to England, and a loss was incurred of thousands of men, and tens of thousands of money, which might have been saved had the advice of the medical officers been properly acted upon.

Fortunately, such calamities are now matters of the past, and similar occurrences are, it is to be hoped, not likely to take place again ; it must be remembered, nevertheless, that for this well-founded expectation we are indebted to recent improvements in the hygienic management of masses ; but this amelioration does not obviate the necessity, now any more than formerly, for the utmost care and vigilance against evils which can be averted by sanitary precautions alone.

That the improvements effected of late years in the condition of the British soldier have in many respects placed him in a position relatively better than that of the majority of his class in civil life, I think, cannot be denied.   The advantages he now enjoys include, as a rule, superior accommodation, food, clothing, and pay ; he has also attendance during sickness, intellectual and physical recreation, and rewards for good behaviour.   But it is not so much these I desire to discuss now, as the manner in which the mass of the civil population is influenced by the army, to which it supplies the *personnel*, and from which it receives the rejected as well as the *débris*.   In the first place, an influence is exerted through our system of recruiting ; namely, by withdrawing from civil pursuits young men possessing the physical and mental health which enable them to pass the medical examination ; leaving those incapable of undergoing that test to be thrown back into the general mass.   In the second place, it is affected in a very material manner by soldiers collectively while they are serving.   Thus, those who fall in conflict or die have to be replaced ; and those whose health fails are not only replaced, but, as sufferers from disease, are returned to the mass whence they were originally taken.   Many propagate again the disease which they originally had contracted from members of the civil population.   In some instances they receive, in others communicate diseases in epidemic form ; and under certain circumstances they bring with them

from other countries maladies of more or less danger to the civil population amongst which they may be located.

In the following pages the object is to draw attention to some of the most common modes in which these classes mutually affect each other. In doing this I shall venture to add such remarks as occur to me, on the means of diminishing the injury they produce.

Propagation of Diseases by Armies.—That diseases of various kinds have been propagated among the civil population by means of the army is a circumstance well known to even general readers ; and although the object of the present remarks does not lead me to enumerate the whole of such instances, it may add force to my remarks if I refer to a few. It is generally allowed that measles and small-pox were both brought from the East by the Moorish armies, and the latter disease had spread over the greater part of Europe by the end of the eighth century. In the ninth it extended to England, and was re-introduced in the thirteenth century by the returned crusaders, who, moreover, brought with them leprosy, plague, and other diseases, the result of filth and vice. It is generally believed that the crusaders had contracted these various cutaneous affections by using the baths frequented by the general population of Palestine, in accordance with Eastern customs. When, during the reign of Edward III the Scots invaded England, pestilence broke out in their army, so that disease and the sword completed the annihilation of their force. But this was not all, by means of those who escaped with their lives, the pestilence was disseminated over the whole country. On the continent, the crowds that followed the processions of the Flagellants contributed to propagate the plague ; and it may be mentioned that syphilis, which will be elsewhere more particularly alluded to, has been in all times and countries propagated by vagrants in a very remarkable degree—indeed, as we shall see, there is much reason to believe that at the present date soldiers are less afflicted by it than the masses in civil life. In the year 1485 the "sweating sickness," whatever that may have been, was attributed to the army of free-booters and mercenaries who fought at Bosworth ; and the outbreak of the same disease in 1528 "coincided in point of time with the great military operations of Francis the First and his allies in Italy and before Naples." In 1713 the affection, then known as the Dunkirk fever, was brought by our soldiers from that place.

The petechial fever seems to have first appeared in Spain in 1490 ; it broke out at Granada, where it nearly annihilated the army of Ferdinand the Catholic. In 1551 it prevailed in the armies of the Continent; it is also thought to have attacked the Imperial troops in 1547, and the Hungarians in their camp near Komorn in 1566. The *Troupe galant,* named from the speedy death it inflicted upon young and robust men, followed fast upon the disasters of the French army before Naples in 1528. We find the

circumstance mentioned that the brother of Montezuma, of Mexico, died of smallpox, imported into that country by the army of Novarez.   In 1740 a malignant spotted fever was introduced into Plymouth by a ship of war from Gibraltar, and, finally, a striking example of the same kind occurred in the early part of the present century, which may be here related.   When in 1809 the remnant of Sir John Moore's army was landed at Portsmouth, so great were the numbers prostrated by malignant typhus fever that every available public building, and several private ones, had to be converted into temporary hospitals for the reception of the sick ; even places at some distance, as Horsham and Petworth, were similarly placed under contribution. This result followed : the pestilence spread from these *foci,* and caused great mortality among the ordinary population in and around the various localities at which the sick had been accommodated.   Had sanitary or preventive medicine in those days been as well recognised by the higher authorities, civil and military, as it is now, the occurrence related would no doubt have been avoided.

Dr. Guy, in concluding his remarks on the various outbreaks of epidemic diseases which characterised the sixteenth century, includes among their principal causes " the gathering and disbanding of hosts of mercenary troops ; sieges, with their inevitable accompaniments of scarcity and disease; battles, with their slaughter and dispersion of sick soldiers to carry disease with them far and wide."

Extension of Diseases to Armies from the Civil Population.—We have seen that in many instances diseases have been communicated by the military to the civil population.   It is now our task to show that the compliment has been returned by the latter with interest ; nor must we forget that many maladies which armies transported into new countries were in the first instance contracted from the civil inhabitants of the districts in which they were endemic.   In former years it is unquestionable that much of the typhus fever and smallpox by which our own army was ravaged were communicated to the soldiers by means of recruits, drafted, as was then the case, from the common jails.   Of this circumstance army medical officers made frequent mention in the first half of the last century, and about 1740 we find Sir John Pringle observing that they were often the sources of malignant fevers—that in the rebellion in Scotland above 200 men of one regiment were infected by men brought from English prisons.   Lind observed that the sources of infection to our armies and fleets were undoubtedly our jails.   Howard was told by an officer at Worcester that, having sent a sergeant and two men for two deserters lodged in Chester Castle, three of the five died a few days after they joined, and many other similar instances could be related.

If we inquire a little more into the extension of diseases from the

civil population to the military, we find that the causes were in almost constant operation prior to the commencement of the present century, and even for some time afterwards. These were—1. The very objectionable manner in which the ranks of the army were recruited. 2. The system of billeting troops on civilians. 3. The severity of discipline and of punishments, the fear of which led numbers of men to desert, and ultimately to be imprisoned for this offence. I will add a few remarks on each of these heads.

1. We learn that in the early part of last century an enactment was passed, directing that *idle* persons, without apparent means of living, should be apprehended and sent to serve in the ranks of the army. Later in the same century the prisons were regularly ransacked for "recruits," and in the beginning of the present century "all rogues, vagrants, vagabonds, and sturdy beggars," were liable to be seized and drafted into the army.

2. Not only was the system of billeting troops on the civil population a source of grievance to the latter, but, as may be readily conceived, it directly exposed the billeted men to whatever diseases were prevalent in the houses in which they were forced to reside. Although in some instances they were treated by their hosts with much consideration, in the majority they were poorly accommodated and fed ; they were thus rendered unusually susceptible to what are now designated zymotic diseases. The recruits obtained by these unwarrantable procedures were so ready to desert that they were kept, during the intervals between enlistment and embarcation, in establishments called "*lock-up houses*," really prisons under another name, where fever prevailed to such an extent that dead bodies used to be removed at night, and buried in secret for fear of causing alarm in the neighbourhood. How, then, could each succeeding reinforcement of recruits from such places be otherwise than a centre of infection ?

3. In other respects than those already mentioned the conditions of a soldier's life prior to the introduction of more considerate regulations were such that we cannot now wonder at the extent to which desertion prevailed ; while these deserters in their turn crowded the jails, to which they, when apprehended, were consigned. Even so lately as 1806 it is recorded that "the harsh, brutal, and often unjust treatment which soldiers experience, so different from what any man durst use in civil life, sours their minds and makes them hate a service which subjects them to such galling distresses." Add to this the circumstance that a soldier was bound for life to the service where such treatment was common, and we have a ready explanation of the endeavour that soldiers made in a variety of ways to escape from their thraldom. This cruelty and injustice now happily belong to the past, but while they existed they were continually producing the evils enumerated.

Many examples could be adduced to show how much disease among soldiers is derived from the civil population.   In all cases of cholera that I am aware of, the troops have received it from the people, and of late years likewise, scarlatina, measles, and several other diseases have been so communicated, one class of which deserves a few words of special notice.   I of course allude to those of venereal origin, for which soldiers are entirely indebted to a class of the civil population of our garrison towns.   (In passing I may be allowed to say a word in favour of the soldiers, with whom now for a period of twenty years I have been more or less closely associated.   It is that incontinency is rare indeed among their wives, and that in all my experience I have never met with or heard of a case of seduction among their unmarried daughters.   Would that a tithe of such honour were to be found amidst corresponding classes of the non-military population!)   So extremely prevalent is the class of diseases to which I have alluded among soldiers, that, until the passing of the Contagious Diseases Act, nearly one third of the entire sickness in a regiment arose from this cause.   Each man affected by it was, on an average, twenty-three days in hospital for each attack; there was no more fertile source of disability, and no malady so surely renders miserable the after life of the immediate sufferer, and the existence of his children, if he should have any.   Truly do the sins of the father, in the shape of transmitted syphilis, descend to the third and fourth generations, manifesting themselves in what we call "delicacy" of constitution, scrofula, phthisis, deformities, idiocy, and in many other affections.   How far similar occurrences take place out of the army it is not my present purpose to inquire.   I defer that consideration to a later portion of the paper.

Diseases that have decreased chiefly through Army Sanitation.—If, on the one hand, armies have been the means of disseminating and introducing diseases among the civil population of their own or other countries, there are certain maladies, for example, typhus fever, dysentery, scurvy, and smallpox, which have unquestionably been reduced in prevalence and severity by hygienic measures first applied in the public services.   With regard to smallpox we learn from the pages of Dr. Brocklesby that, about the middle of the eighteenth century, the mortality from it in the army was so great, that about one in four of those attacked died, while not more than two in every nine escaped the disease; thus out of every 100 soldiers only twenty-two escaped attack, and twenty-two in every 100, or rather twenty-two in eighty-eight attacked died by this cause.   Now, however, through vaccination and improved sanitation of troops, the disease has been reduced to an extent which may for all practical purposes be described as trifling.   In both the army and navy vaccination is carried out more effectually than it can possibly be in civil life, with most favorable results.

Comparative Mortality in the Army and in Civil Life.—Until a very recent date the rate of mortality among soldiers, even in home service, was very considerably higher than among the civil male population of corresponding ages ; latterly, however, statistics have indicated a very considerable change in this respect, so great, indeed, that an apparent saving has been effected equal to that of a battalion 700 strong in the army of the United Kingdom.   It is also asserted that the sick rate among regiments is now only four to four and a half per cent., including venereal diseases, and that every one per cent. in hospital is equivalent to withdrawing 900 men from the ranks.   No doubt this estimate must be taken with limitations, for neither have the present conditions been in existence sufficiently long to establish the conclusions absolutely, nor do they, with the facilities now existing for the return of men to civil life, afford the same reliable data for comparison which they formerly did.

Dr. Balfour some years ago elaborated a valuable series of calculations, the object of which was to show the yearly decrement per 1000 in each class, supposing the comparison to refer to two bodies of equal strength, taken at twenty years of age and continued till the residue had reached that of thirty-nine.   The following is an abstract of the return in question, which refers to the period from 1849 to 1853 inclusive, viz. :—

Ages.	Ratio of mortality per 1000.		Excess among soldiers.
	Soldiers at home.	English males.	
20	16·90	8·20	8·7
21	16·80	8·30	8·7
22	16·60	8·40	8·2
23	16·40	8·50	7·9
24	16·20	8·60	7·6
25	16·00	8·70	7·3
26	15·90	8·80	7·1
27	15·80	8·90	6·9
28	15·70	9·10	6·6
29	15·50	9·10	6·4
30	15·30	9·30	6·0
31	15·00	9·40	5·6
32	14·70	9·50	5·2
33	14·50	9·70	4·8
34	14·40	9·70	4·7
35	14·40	9·90	4·5
36	14·30	10·10	4·2
37	14·10	10·20	3·9
38	13·80	10·30	3·5
39	13·50	10·60	2·9

From these series of ratios it appears that the mortality in young soldiers used to be, if it no longer is, more than double that of civilians at the same age; and that while the mortality of civilians increases year by year that of the army decreases, till at the ordinary termination of service the soldier's chance of life is the same as that of the civilian, which between 35 and 45 is returned at 13·03 by the Registrar-General.

If we consider this question from another point of view, we find that comparing the rates of mortality throughout the army with that of males in England and Wales of the military age, namely 18 to 40, the former, prior to 1853, ranged from 23 to 44 per 1000, the general average being 33, while that of the latter was 9·2. We shall see that more recent army statistics show better results, but the period over which they extend is too short to justify conclusions. I cannot now enter upon the questions of seasoning and hardening of soldiers. The figures thus given show, however, so far as they go, that the greatest rate of mortality among soldiers over civilians occurs in the earlier years of military service, and we find that this is in accord with all experience. Readers of military history need hardly be reminded what was the condition of the French army immediately subsequent to the disasters of the retreat from Moscow. They will remember that in order to supply the casualties which then occurred, a conscription of 1,200,000 was set on foot immediately afterwards; and also that the immense consumption of human life which had already taken place during the wars of the Revolution had so diminished the productiveness of the human species in France, that the conscription was necessarily brought down to boys of seventeen and eighteen. These young lads, though strong in courage, lacked the physical requisites for soldiers, and accordingly in a few weeks they sank under the exhaustion of service,—including fatiguing marches and dripping bivouacks— crowding the roadsides and the hospitals. About this time more than half the army of Napoleon consisted of lads under twenty years of age, and when, after the battle of Leipsic, he once again applied to the Senate for reinforcements, he expressed himself strongly adverse to receiving young men into the ranks of his army. With regard to our own armies again, we learn that during the last three and a half years of the Peninsular War, the average strength of the forces employed was 61,511 men, of whom 13,815, or $22\frac{1}{2}$ per cent., were always sick, the wounded amounting only to $1\frac{1}{2}$ of of that proportion, and we are further informed that a chief cause of this enormous ratio of sick was the want of physical strength in the recruits who joined that army. As in France, so in Britain, the manhood of the country had been exhausted. And if we now turn to the time of the Crimean campaign, we find it publicly asserted, that one of the chief causes of the great mortality among our troops

in the early part of that struggle was the fact of immature lads being
sent out as reinforcements. I will, however, revert to this subject
when discussing the question of recruiting.

I would now briefly solicit attention to the ratios of loss by death
and invaliding in the army at some other periods, omitting refer-
ence to the numbers of men who obtain their discharge on other
grounds. The years 1864-5 and 6 include a period of profound
peace, and one in which no unusual sickness prevailed among our
forces. It will therefore be convenient to prepare the following table
for these years, namely:

Stations.	1864.		1865.		1866.	
	Ratio of deaths.	Ratio of invalided.	Ratio of deaths.	Ratio of invalided.	Ratio of deaths.	Ratio of invalided.
United Kingdom	9·99	31·74	8·86	36·44	9·62	30·13
Mediterranean	6·88	22·20	25·18	17·30	8·89	18·60
British America	23·10	10·70	9·01	11·00	9·58	19·20
West Indies	13·92	29·4	20·99	38·50	25·69	17·70
St. Helena	7·53	11·3	7·57	37·85	} 10·46 {	44·50
Cape of Good Hope	8·71	20·6	11·70	25·70		16·40
Mauritius	11·74	29·62	7·97	22·85	14·01	17·41
Ceylon	34·59	6·30	27·72	4·30	21·44	22·57
Australia	22·67	13·01	13·72	16·44	12·53	24·74
China and Japan	45·26	25·48	80·69	20·00	32·46	50·11
India	21·93	16·90	28·14	20·53	21·70	21·98
Board ship	11·47	—	17·65	—	10·54	—
Total ratios	16·13	22·40	18·07	25·33	14·30	20·55

These figures, if summarised, indicate that the ratio per 1000 died
and invalided in each of these years was as follows:

Year.			Died.			Invalided.			Total loss.
1864	.	.	16·13	.	.	22·40	.	.	38·53
1865	.	.	18·07	.	.	25·33	.	.	43·40
1866	.	.	14·30	.	.	23·58	.	.	37·88

Giving for the period an average of 16·18 deaths, 23·77 invalided,
or a general loss of 39·93—a great improvement over the similar
statistics already given.

With regard to the mortality of our troops in India, attention
may be drawn to the subjoined table, which indicates the casualties,
besides deaths and invaliding, in the European forces of the
Indian service during the period from 1847 to 1856 inclusive,
according to length of service in that country. It gives a very
forcible proof of the costliness of sending young unseasoned troops
on foreign service.

Loss by Casualties in India from 1847 *to* 1856.

Years in India.	Strength (years of life).	Casualties.				Rate per 1000.			
		Deaths.	Invalided.	Died and invalided.	All causes.	Deaths.	Invalided	Deaths and invalided	All causes.
0 to 1	14390	938	45	983	1547	65·2	3·1	68·3	107·5
1 „ 2	11630	623	88	711	1085	53·6	7·5	61·1	93·2
2 „ 3	·9220	518	83	601	872	56·2	9·0	65·2	94·5
3 „ 4	9530	470	121	591	907	49·3	12·7	62·0	95·1
4 „ 5	10120	446	128	574	871	44·1	12·6	56·7	86·0
5 „ 10	41860	1968	468	2436	4048	47·0	11·2	58·2	96·7
10 „ 15	21440	1131	597	1728	2949	52·8	27·8	80·6	137·5
15 „ 20	9976	429	598	1027	1424	43·0	60·0	103·30	142·8
20 & up- wards	3090	193	779	972	1207	62·5	252·1	314·6	390·6

From these figures we learn that the mortality is greatest in the early years of residence ; that after a time it decreases, again to rise after the tenth year ; while on the other hand the invaliding is inconsiderable up to the fifth year, but from that time rises, and rapidly increases. Young soldiers not only break down in health, but die, while old soldiers break down, but succumb in a diminished ratio,— this circumstance obtained frequent confirmation during the mutiny campaign, in which crisis the longest marches and most arduous services were performed by the regiments longest in India.

To turn now to the statistics of loss by death and invaliding in India at two periods, between which an interval of great progress in the hygienic management of the soldier has intervened. The first embraces the three years 1815-16-17, and presents an average ratio per 1000 of 41·40 deaths, and 25·00 invalided, which represents an annual loss equal to 66·40 men per 1000. The second period comprises 1864 to 1866, during which the ratios, at all ages, were as follows :—

Year.			Died.			Invalided.			Total loss.
1864	.	.	21·93	.	.	16·90	.	.	38·88
1865	.	.	28·14	.	.	20·53	.	.	48·67
1866	.	.	21·70	.	.	21·98	.	.	43·68

The average thus shown is 23·92 of deaths, and 19·80 of invaliding, or a total proportional loss of 43·72 ; this compared with the ratios of the preceding period, encourages us to hope that by continuing our advances in sanitation, still further saving may be effected in that part of the manhood of this country which recruits the gaps occasioned by battle and disease. India, I may observe, demands 250 recruits per week to maintain our forces there at a strength of 70,000 ; at present we have only 63,000 in that country.

Deaths according to ages in India.

Stations.		Under 20.			20 to 25.			25 to 30.			30 to 35.			35 to 40.			40 and upwards.		
		Strength	Died.	Per 1000.	Strength	Died.	Per 1000.	Strength	Died.	Per 1000.	Strength	Died.	Per 1000.	Strength	Died.	Per 1000.	Strength	Died.	Per 1000.
1864.	Bengal	673	12	17·83	12817	147	11·47	12562	305	24·36	4394	121	27·78	1725	66	38·26	295	16	54·23
	Madras	335	2	5·97	3938	54	13·71	4349	106	24·37	1729	47	27·18	626	33	52·71	135	12	88·88
	Bombay	525	2	3·80	3545	37	10·43	4386	81	18·46	1926	44	22·84	939	40	42·59	184	9	48·91
1865.	Bengal	1579	12	7·59	13219	185	14·00	16037	449	27·90	6076	209	34·39	2150	100	46·51	371	26	70·09
	Madras	537	1	1·86	4270	62	14·52	4447	130	29·23	1935	72	37·20	852	35	41·08	155	10	64·51
	Bombay	506	11	21·90	3227	104	32·22	4305	145	33·70	1811	77	42·51	902	71	78·71	166	10	60·24
1866.	Bengal	1329	6	4·51	10107	117	11·47	15396	321	20·85	6045	185	30·63	2103	98	46·60	360	23	63·88
	Madras	853	2	2·34	3880	45	11·59	3899	114	29·23	1627	54	33·19	621	36	57·96	101	11	108·91
	Bombay	777	2	2·57	2915	33	11·32	4440	54	12·16	2379	36	15·13	1157	26	22·47	230	9	39·13
Totals		7114	50	66·78	57918	784	130·73	69821	1705	220·26	27932	845	270·85	11075	505	427·15	1997	126	597·51
Ratios		...	...	7·02	...	...	13·53	...	...	24·41	...	...	30·01	...	...	45·50	...	...	63·00

The table on the preceding page represents the deaths according to ages among our troops in India in the second period of 1864-5-6, the results of which place the ratio per 1000 strength as follow, namely,

Under 20 years of age	.	.	7·02
20 to 25 ,,	.	.	13·53
25 to 30 ,,	.	.	24·41
30 to 35 ,,	.	.	30·01
35 to 40 ,,	.	.	45·50
40 and upwards	.	.	63·09

If we compare these ratios with those of the army at home, a great difference is manifest; in the latter the ratio of deaths decreases according to age, while in India it increases.

It is easy to understand that the standard of health among the population is directly affected by men lowered in health being yearly thrown back upon the general population from the public services; the extent to which this takes place varies according to certain circumstances, such as whether active military operations have been in progress, whether they have been carried on in a country where troops could or could not retain their health, and whether the bodily power of the survivors has or has not been permanently impaired by epidemic or endemic diseases. The following particulars illustrate the ordinary rate at which men, more or less permanently injured in health and bodily efficiency are annually discharged from the army; they are compiled from the ' Departmental Blue Book.'

1st. Period of the Crimean War.—From April, 1854, to June, 1856, there died in hospital of the troops employed, exclusive of wounds and injuries not immediately fatal, 36,111. There were killed in action 2598 non-commissioned officers and men, and 157 officers, besides 86 of the latter, who died in hospital of wounds. There were invalided on account of disease 18,088, and on account of wounds 3318, of whom 3120 of the former and 3011 of the latter were discharged the service and thrown back upon the population: all these, be it observed, out of a force originally numbering 98,589 non-commissioned officers and men and 3915 officers. Thus of all who went out, 39 per cent. died or were killed, 22 per cent. were invalided to England.

Of the invalided, the following statement shows their particular disabilities, namely—

By diseases of the chest 650

    ,,   heart and blood corpuscles . 416

    ,,   contents of abdomen . . 233

    ,,   brain and nervous system . 197

By rheumatism 317

By ulcers 104

By venereal 85

By frostbite 171

By diseases of the eyes 227

By other affections 720

                           Total . . 3120

2nd. Period of the Indian Mutiny.—I regret my inability to give full statistics of the casualties among our troops in India during the mutiny period. I find, however, the following particulars in regard to the forces in Bengal, namely: In 1857, the strength was 34,169, and 2318 died; in 1858 the strength was 42,768, the deaths 2635; in 1859 the strength was 47,532, the deaths in nine months of that year, 1597. Information is not available with regard to the numbers killed during these eventful years; but from the particulars given, some idea may be formed of the expenditure of our national health and muscle, which that mutiny cost us, when we bear in mind what has been said relative to the drain that took place by recruiting to fill the vacancies created.

The information I am able to give in regard to the periods next to be noted, although very far from complete, is more extensive than for those just alluded to. I take a short series of years, including a period of peace, when the conditions of the army were more than usually favorable, viz.—

1. *Invaliding in* 1864.

Stations.	Fevers.	Bowel affec-tions.	Venereal	Tuber-cular.	Other diseases.	Total.	Ratio per 1000 strength	Aver.of 4 previous years.
United Kingdom ...	Not stated.					2355	31·74	42·18
Mediterranean	5	4	9	63	193	274	22·20	13·30
British America......	...	...	6	52	64	122	10·70	10·36
West Indies	1	...	...	6	13	20	29·4	15·1
St. Helena	...	...	...	2	4	6	11·3	4·9
Cape of Good Hope.	1	1	2	5	76	85	20·6	18·2
Mauritius	...	1	1	9	42	53	29·62	11·77
Ceylon	...	...	1	...	42	43	6·35	17·67
Australia	...	...	2	24	102	128	13·01	11·73
China and Japan ...	4	6	1	12	44	67	25·48	21·53
India	14	33	84	100	874	1105	16·90	12·94
Totals and averages .	25	45	106	273	1454	4258	22·40	23·76

2. *Invaliding in* 1865.

Stations.	Fevers.	Bowel affections.	Venereal	Tuber-cular.	Other diseases.	Total.	Ratio per 1000 strength	Aver. of 5 previous years.
United Kingdom ...			Not stated.			2660	36·44	39·77
Mediterranean	1	4	12	22	140	179	17·30	15·50
British America......	...	...	5	37	89	131	11·00	10·10
West Indies	1	...	4	14	43	62	38·50	19·45
St. Helena............	2	1	1	...	11	15	37·87	6·35
Cape of Good Hope.	...	...	13	21	69	103	25·70	18·80
Mauritius	...	3	5	5	30	43	22·85	14·71
Ceylon	...	2	1	...	13	16	4·30	15·50
Australia	1	...	7	22	133	163	16·44	12·17
China and Japan ...	5	6	2	12	26	51	20·00	22·20
India	19	37	135	148	946	1285	20·53	16·26
Totals and averages .	29	53	185	281	1500	4708	25·33	23·58

3. *Invaliding in* 1866.

Stations.	Fevers.	Bowel affections.	Venereal	Tuber-cular.	Other diseases.	Total.	Ratio per 1000 strength	Aver. of 6 previous years.
United Kingdom ...			Not stated.			...	30·13	38·07
Mediterranean	2	...	14	25	141	182	18·60	15·30
British America......	...	1	7	38	112	158	19·20	11·20
West Indies	...	...	...	3	11	14	17·70	46·17
St. Helena............	...	...	1	2	13	16	44·50	22·70
Cape of Good Hope.	1	...	5	14	48	68	16·40	20·00
Mauritius	...	3	2	2	24	31	17·41	16·71
Ceylon	...	...	...	3	17	20	22·57	24·49
Australia	...	2	6	33	111	152	24·74	13·27
China and Japan ...	40	9	4	7	28	88	50·11	21·90
India	13	37	107	142	996	1295	21·98	18·40
Totals and averages .	56	52	146	269	1501	2024	20·55	

In order to summarise the above tables, I would give the following short abstract of the general results deduced from them. Thus, according to the returns for the years already mentioned, I find that of the number noted, there were discharged from the service on the following accounts, respectively in—

				1864.	1865.	1866.
Fevers	.	.	.	25	29	56
Dysentery and diarrhœa	.	.	.	45	53	52
Venereal	.	.	.	106	185	146
Tubercular	.	.	.	273	281	269
Other diseases	.	.	.	1454	1500	1501
Total for each year			.	2763	2928	2024

But these figures, far from including the whole number of men discharged from the army on account of disease, refer only to those who have arrived in this country as invalids from abroad. To embrace the total thus thrown back upon the population, 2355 in 1864, 2660 in 1865, and 2118 in 1866, who were discharged in the United Kingdom for bodily disability, must be added to the above. I regret my inability to state the nature of the ailments under which these laboured. I think, however, we shall not be far wrong if we take those already named as being the principal that prevail throughout the whole, and if so, considering that during the three years named, a total number of 14,848 diseased and infirm men were cast upon society, from this one source we can readily form some idea of the extent to which, by a similar stream flowing year after year, the standard of public health becomes affected.

We are, I think, justified in assuming that while the conditions of army life remain as they are, no material decrease can fairly be expected to occur in the proportion of men annually invalided, and thrown upon the public, and hence that the results from the three annual periods now given may be taken as a sample of what may be looked for in the future; that year after year the same current, like the continual dropping of water upon stone, will continue to affect the stratum of public health. Inability to earn a livelihood speedily results in one or other, or several evils combined; and these in many instances affect many persons beyond the original sufferer. Thus they spread and multiply. Ill health in too many instances leads to poverty, poverty to crime in one set of persons, to actual disease and death in others. In either case wives and children, deprived of the means of obtaining necessary food and clothing, are reduced to like conditions, and all finally serve to fill our poor-houses, our hospitals, our jails, or that floating mass of creatures whose condition is alike the bane of our civilisation, and the unsolved enigma of our social economists.

Tubercular Affections.—Prevalent as are tubercular affections in the army, and great as are the rates of mortality and invaliding due to them, it is somewhat remarkable that Dr. Parkes is almost the only author who enters fully into the question of this prevalence, and who gives anything like a statistical view of the measure of non-efficiency which they occasion. According to him the mortality by chest affections (including phthisis) from 1830

to 1846 was in the household brigade 67·7 per cent. of all deaths;
in the cavalry of the line nearly 50; in the infantry nearly 57;
while among the civil population of the soldier-age in all England
and Wales, it was only 44·5 of the total deaths.   The general average
for the army being 58·2, the deaths by these affections in the army
are 13·7 per cent. greater than in the general population; and yet, as
has been already stated, the men passed fit for military service repre-
sent *picked lives*.   If such be the case, and it undoubtedly is so to
a very great extent, there must be in the conditions of military life
something terribly conducive to the affections in question.   Dr.
Maudsley in his Gulstonian Lectures for 1870, stated that one in
four of the population of and above the age of fourteen are affected
with phthisis, and that this form of disease only represents one half
of the extent to which tubercular affections generally prevail.   These
returns and statements are of so astounding a nature that they
demand further and more elaborate observations of the important
subject to which they refer.   They almost indicate that 50 per cent.
of our population is tubercular, and from what is elsewhere men-
tioned we would almost presume to fear that a large proportion of
the remainder are more or less tainted by syphilis.   If such be the
case even to the extent of a moiety of the proportions here given
the matter assumes at once an importance which is national in its
bearings, for it clearly indicates that few, indeed, of the inhabitants
of the United Kingdom are in their persons free from the germs of
one or other of these maladies.

Dr. Parkes endeavours to convey a comparative notion of the ratio
of deaths by consumption to those by all causes in the various
armies of Europe.   In Prussia, it caused 27 per cent. of the army
mortality, but he explains that this is under the real mark in
amount; that phthisical men are sent to their homes and are after a
time struck off the rolls of their regiment; probably, as with our-
selves, men are " invalided" and dismissed the service.   In the other
armies, the ratio of deaths by phthisis to those from all causes are
as follows, namely :

Austria	. .	25·0 per 100.
France	. .	22·9 ,,
Hanover	. .	39·4 ,,
Belgium	. .	30·0 ,,
Portugal	. .	22·0 ,,

Of the two latter countries, Belgium gives a ratio of 18·97
among the civil population, and Portugal of only 12, so that, as is
the case in our own army, the military ratio is much the greater.

We further learn with regard to the civil population of this
country, that consumption and allied diseases destroy about 100,000
lives in the three kingdoms yearly, and that the ratio of mortality
by these causes is in proportion to the density of the population.

In the London districts, for example, the deaths by these according to density of population, are as follows, namely :

Square yards to each person.	Deaths yearly per 100,000 living.	
	Consumption.	Other pulmonary diseases.
180	375	659
119	405	771
35	485	914

The prevalence of these affections is influenced as might be supposed by the occupations of individuals. They abound among artisans who have to inhale much animal impurities; they are caused by insufficient light and ventilation, and doubtless, also, by superficial as well as *cubic* crowding of individuals. All these conditions, moreover, give rise to craving for intoxicating drinks, and these taken in excess lead to exposure and other causes of chest affections, so that their evils are both direct and indirect.

The influence of the army on civil life, in so far as these affections are concerned, is twofold. It arises from the selection necessary in raising recruits, and, in the second place, by the drain back again to the population of men invalided from the army suffering from them. Both these points may be conveniently represented side by side, and as the data have been already given with reference to the years from 1864 to 1866 inclusive, I would select them for my present purpose. The following table represents the ratio of recruits rejected for tubercular disease per 1000 of the total rejected, and the ratio invalided of soldiers on account of them per 1000 of the total invalided :—

Proportion of tubercular disease among the incapable of military service.

YEARS.	Ratio of recruits rejected for tubercular diseases, per 1000 rejected for all causes.	Ratio of soldiers invalided for tubercular diseases, per 1000 invalided for all causes.
1864	18·51	143·41
1865	17·44	268·13
1866	15·97	132·90
Average of three years .	17·30	181·48

The results thus brought out are interesting and important. They indicate that the relative proportions of men rejected as recruits on account of these diseases is inconsiderable compared with those

thrown upon civil life in consequence of diseases developed in the army; hence we are justified in assigning to military service, as it is at present maintained, a very considerable influence in lowering the health of the masses by infusing it with soldiers who have become diseased.   No doubt other circumstances to which I shall allude account for much of this; how far they can be removed without detriment to the purposes for which an army is maintained, it is the duty of medical officers to consider, and to devise the measures best calculated to effect this object.

There is, I fear, no room to doubt that the manner in which our soldiers are accommodated in barracks causes much of the tubercular disease.   In temperate climates they have seldom more than 450 cubic feet of space in barracks, while the superficial area varies from 32 to 48, these measurements being altogether inadequate for sanitary requirements; in India, however, although the space is much larger, the requirements of climate demand that the troops be retained within doors during a great part of the twenty-four hours, and the result is that they become *etiolated* for want of sunlight, and tubercle is developed.   I only notice the theory of such affections being communicable by means of particles, to point out that, if it be so, here are excellent opportunities for its dissemination in this way.

Diseases of the heart and blood-vessels.—Diseases of the organs of circulation, whether they occur as independent affections, or are mere sequences of others, are the cause of an immense amount of non-efficiency in the army as well as in civil life.   The object of the following remarks is to follow out, as far as is practicable, the extent of this non-efficiency, and, therefore, it is desirable that we enumerate the precise affections to which our observations are intended to refer: these are—1, Aneurism; 2, Valvular disease; 3, Hypertrophy; 4, Degeneration; 5, Pericarditis; 6, "Disease of the heart;" 7, Carditis; 8, Atrophy of the heart; 9, Atheroma of the arteries; 10, Varix; 11, Syncope; 12, Palpitation; and, 13, Angina pectoris.   Each and all of these may occur as independent affections, or supervene as sequences of others, more especially of diseases of the lungs, of the kidneys, or of rheumatism; although, on the other hand, they are by no means necessary sequences, as proved by statistics; thus, according to the 'Reports of Guy's Hospital,' in 100 cases of renal disease, hypertrophy of the heart was found to exist in fifty-two, the coats of the vessels being variously affected in eleven more.   Dr. Parkes gives the statistics of seventy cases of heart disease in the army, in only two or three of which any history could be traced of rheumatism, renal or syphilitic disease.

There are, perhaps, no diseases that more completely unfit their subject for active labour than the several affections of the heart and blood-vessels; and consequently, no other group more effectually

renders the labouring classes of the population incapable of earning their livelihood; so that the ultimate result must be an addition to poverty and its attendant evils among those who are unfortunately the subjects of these diseases. That the army furnishes a large quota of persons so affected is apparent by statistics; thus we learn that from March 1863, to March, 1869, there arrived at Netley 1635 soldiers from abroad suffering from these diseases, of whom 24 died, 1322 were discharged the service, 276 returned, doubtless only for a short time, to their regiments, and 13 remained under treatment. There is, moreover, reason to believe that there are few old soldiers in whom the inner coat of the aorta is perfectly healthy, and many soldiers under thirty years of age who take their discharge from various causes, are utterly unfitted for active service in consequence of the presence of these diseases in their early stage.

With a view to indicate the relative prevalence and non-efficiency caused by the different forms of disease we have enumerated, a table, given below, has been compiled from the official returns of the army from 1863 to 1867 inclusive, the calculations having reference only to the forces serving in the United Kingdom, viz. :—

Diseases.	Deaths.	Ratio per 1000.	Invalided.	Ratio per 1000.
Aneurism	138	431·23	35	26·00
Morb. val. cordis	103	321·87	518	369·98
Hypertrophy	21	65·62	201	149·26
Degeneration	21	65·62	2	1·48
Pericarditis	21	65·62	17	12·63
"Morbus cordis"	5	15·62	37	27·48
Carditis	4	12·50	29	21·54
Atrophia cordis	3	9·37	4	2·97
Atheroma art.	2	6·25	...	...
Varix	1	3·12	473	357·41
Syncope	1	3·12	3	2·22
Palpitation	...	...	21	15·60
Angina pectoris	...	...	6	4·45
Totals	320		1346	

It will be seen from the above that the greatest amount of non-efficiency is caused by the three affections first enumerated, and by varix, although the mortality from these differs greatly. It is well, however, to make a few remarks on each of the diseases noted.

Aneurism.—According to Holmes, Erichsen, Porter, and others, the primary or proximate cause of aneurism consists in a softening of the coats of the artery. The disease is considered to be much more prevalent among soldiers than civilians; one assigned cause of this greater prevalence is the extent to which syphilis prevails in the army; but, as stated in greater detail elsewhere, the circumstances that give rise to the disease are more likely to be connected with the system of training and drilling to which men, and especially the younger of them, are subjected. According to Dr.

Lawson, deaths from aneurism are eleven times more frequent in the army than in civil life, yet, as he points out, many men affected with that disease are discharged into civil life, and thereby unfairly increase the mortality attributed to the latter class.

With reference to the position of aortic aneurism, Dr. Sibson states that in 703 cases, of which the particulars are recorded, the seat of the affection in 420 was in the ascending aorta, that being the part against which the principal force of the stream of blood impinges after leaving the heart. According to another series of figures it would appear that in 109 cases the ascending aorta was affected in 37, the arch in 38, the descending in 12, the thoracic in 7, and abdominal in 15.

Hypertrophy.—This condition of the heart may be consistent with a state of health, or it may be a concomitant of disease of the organ. It may affect one or both sides, and may occur in concentric or eccentric form, being more frequently seated in the ventricles than the auricles. Fuller considers that the affection is never cured, but that by careful hygiene life may be prolonged several years in comparative comfort. According to Vanderbyl, out of seventy cases of the affection the valves were healthy in only eight, and out of forty previously recorded by him the valves were affected in all. The mortality in the army by this cause is small, but the invaliding is considerable. The affection is also not uncommon in civil life, being met with in persons whose avocations demand great muscular exertion, as well as in subjects of disease affecting the kidneys, the organs of circulation, and those of respiration.

Pericarditis.—This affection may result from traumatic injury, from cancer, tubercle, poison of smallpox, pyæmia, uræmia, syphilis, rheumatism, and Bright's disease. According to Frerichs it was found to exist in thirteen cases out of ninety-two of the last-named disease. It is generally considered to be a lesion of early life, the average age of patients affected with it in sixty-two cases being twenty-one years; also to be more prevalent in civil life than in the army, to affect both sexes equally, and in many such instances to be the result of rheumatic diathesis. In the army it is a comparatively rare affection; thus, according to the returns for 1865, there occurred in a force of 84,000 men stationed in the United Kingdom, thirteen cases and three deaths by it. Adverting to the morbid changes produced by this form of disease, they are enumerated as consisting of congestion, exudation, absorption, adhesion, and the development of new growths. When occurring as a sequence of rheumatism, the subject of it is usually young; while, when happening unconnected with that disease, it does so for the most part in more advanced life.

"*Morbus cordis.*"—Diseases of the heart in general are stated to affect the left side of the organ more frequently than the right, lesions

of the latter occurring for the most part in connection with pulmonary affections of a wasting nature. I would observe, however, that the term here employed is necessarily vague and indefinite; it is evidently employed to include under one category all forms in the diagnosis of which there is difficulty and uncertainty—a wise discretion, for the fact must be well known to practising medical men that the discrimination of particular varieties of these diseases is among the difficult problems they meet with in the practice of their profession.

Morbus valvulorum cordis.—It has been found at Netley that a considerable portion of the cases admitted under this head have been in reality no more than instances of functional disorder; hence a certain degree of doubt must attach to the statistics. With this reserve, in ninety-seven cases the disease was of the aortic valves in fifty, of the mitral in twenty-five, and of both aortic and mitral in twenty-two; according to Dr. M'Lean, in 126 cases seventy-two were of the aortic and fifty-four of the mitral valves; both these sets of statistics have reference to soldiers. In civil life, of 673 cases, 192 were of aortic valves, 205 of the mitral, 259 of the aortic and mitral. Their relative proportion per 1000 cases of valvular disease in military and civil classes is therefore as follows, viz. :

	Per 1000 cases.	
Valves affected.	Military.	Civil.
Aortic	547·08	285·29
Mitral	354·20	304·60
Aortic and mitral	226·70	384·74

A slight cause of error must be noted with reference to the above, namely, that the ratio of occurrence of both mitral and aortic valvular disease has to be calculated only from the twenty-two cases out of the ninety-seven first enumerated; it is believed, however, that the approximation is sufficiently near for all practical purposes. We learn from the table that disease of the aortic valves is nearly twice as frequent among soldiers as among civilians; of the mitral alone, also slightly more frequent among soldiers; but that the combined affection of the aortic and mitral valves predominate among civilians.

Another point is also stated to be met with among the civil population, when disease of the valves supervenes upon acute rheumatism, both sets of valves are commonly affected, and, when one set alone is attacked, the mitral suffer more frequently than the aortic. It has, moreover, been asserted by Dr. Peacock that men are more liable than women to valvular disease. Inflammation is not necessary to produce these affections; according to Dr. Hope, it was pointed out in 1824, by Bouillaud, that continued friction is sufficient to induce them.

With regard to morbid conditions of individual valves, it may be observed that calcareous or atheromatous affections are most fre-

quently met with in the aortic valve, where, according to some writers, they are sequels of rheumatism more frequently than in the mitral valves. The latter become diseased more often in persons in civil life than in soldiers, rheumatism being usually the exciting cause. In the tricuspids, it is only necessary to observe that derangement is for the most part attendant on disease of the other cardiac valves, and is seldom met with alone.

Dilatation of the heart.—This condition may exist—1, with hypertrophy of the walls; 2, with the normal state of thickness; and 3, with attenuation of the valves. The first of these conditions is the most frequent in occurrence, and is merely the condition named by some writers eccentric hypertrophy. The second is a simple increase in the muscular tissue of the organ; and in the third the muscular tissue is soft, weak, and collapses when cut into. They have been severally described by Dr. Walshe as, 1, hypertrophy with dilatation; 2, simple dilatation; and 3, attenuated dilatation.

Functional disorders.—One of the most frequent forms of functional disorder met with is palpitation, which, according to Dr. McLean, is often a greater source of disability for military duty than even valvular disease, especially in the early stages of the latter. At the same time, although men affected with functional disorder of the heart are thereby rendered unserviceable as soldiers, they are not necessarily incapacitated for gaining their livelihood in civil life. One variety of these disorders occurs in the dyspeptic, morose, and melancholic; another is excited by fatty deposit on the surface of the heart, usually along the course of the coronary arteries, the latter being quite distinct from fatty degeneration, which often attends wasting diseases, as tubercle, &c. : but both fatty deposit and fatty degeneration may exist together. Among the causes of these so-called "functional" disorders, especially in India, some writers enumerate and lay much stress upon the influence of tobacco; others, however, strenuously oppose this belief; but all consider that long continued high temperature and malaria are prolific sources of the affections.

According to a committee appointed in 1864, the special affection from which young soldiers suffered was not so much disease of the valves as extreme excitability of the heart, combined with some, but not great degree of enlargement. In some few cases the state of irritability ceases after a time, to be succeeded by hypertrophy or dilatation; and, according to Dr. McLean, if the state of irritability is once fairly established, it is questionable whether a complete cure ever takes place, or the subject of the disability ever becomes an efficient soldier. The affection may arise from obstruction to the circulation, external as well as internal; and, according to Fuller, although it may involve both sides of the heart, it is most apparent in the left,

the following being its order of frequency, namely : 1, left ventricle; 2, right ventricle; 3, left auricle; 4, right auricle.

Fatty degeneration.—This form of disease is by no means often met with among troops in temperate climates. It is otherwise, however, in hot, malarious countries, as, for example, in India, where it prevails to a very considerable extent, and is the cause of not a few sudden deaths.

According to Dr. Francis, among the causes of this form of disease is the circumstance that the lungs being in that country smaller than they are in the United Kingdom, their functions are proportionally lessened, decarbonisation of the blood is incomplete, and hence the disease is one of secretion. The theory may be as correct as it is ingenious, but I utter no opinion regarding it. I note the statement, however, that, according to some few writers, the presence of the *arcus senilis* betokens fatty heart.

Angina pectoris.—This fearful malady is usually classed among the functional disorders, although generally believed to be associated with a state of ossification of the nutrient vessels of the heart and fatty degeneration of the organ.

In the plan of these remarks we come next to briefly consider a phenomenon, regarding which a great deal has of late been written and said, namely :

The white spot.—Several writers make allusion to " the soldiers' spot," and various opinions are expressed in regard to it. It is asserted that the phenomenon is really not more prevalent among soldiers than among men of corresponding ages in civil life; however this may be statistics have demonstrated that it is more frequent among men than women, and has even been discovered on the hearts of infants. Nor is the detection of the *spot* a recent discovery, Baillie having alluded to it in his work on Morbid Anatomy.

To indicate the ages at which the spot is most frequently found to exist, the following table has been compiled, namely—

15 were found in soldiers under 20 years of age.

16	,,	,,	of 20 to 25	,,
23	,,	,,	of 25 to 30	,,
20	,,	,,	of 30 to 35	,,
16	,,	,,	of 35 to 40	,,
15	,,	,,	of 40 to 45	,,

These make a total of 105.

With regard to the pathology of the *spot*, it is considered to be the result of a low form of inflammation over the muscular surface of the heart. In rickety children it is stated to be found at that portion of the heart where the organ impinges against the chest ; and according to Dr. McLeod of Jessore, it existed over the anterior surface of the right ventricle in nine out of fifty bodies examined by him ; unfortunately, however, it is not noted in the reports from

which we quote, what was the class or occupation of the persons who were the subjects of the phenomenon. Whether its presence be considered to illustrate continued pressure or not, it is not asserted by any writer that it in any way endangers life.

I would here observe that while drawing up these remarks I have had the advantage of perusing the essays submitted by the competitors for the Alexander Memorial prize; and thus I have been able to obtain an epitome of the literature of this subject, the influence of which on military efficiency and public health is manifestly important.

Rate of prevalence of heart disease in the army.—According to Parkes, out of every 100 deaths among soldiers, 6·23 are occasioned by diseases of the heart and blood-vessels. To give an illustration of their prevalence in the British army generally, the yearly means from 1862 to 1866 have been given as under, namely,

Mean strength 184,000
Mean yearly admitted for these diseases 1167, or 6·33 per 1000.
  ,,   died   ,,   130, or 0·70 ,,
  ,,   invalided   ,,   447, or 2·42 ,,

This almost equals a yearly loss of one whole regiment of the home strength.

According to Dr. McLean, of the 1635 men affected with disease of the heart at Netley, 1129 had disease of the valves. To denote the prevalence among soldiers at different ages and periods of service, he gives the following statistics of disease of the heart:

Among invalids of all lengths of service . 77 per 1000.
      ,,   under two years' service . 142 ,,

In a similar manner diseases of the lungs prevail:

Among invalids of all lengths of service . 198 per 1000.
      ,,   under two years' service . 299 ,,

so that of every 1000 soldiers disabled under 2 years' service, diseases of the heart and lungs constitute 478, and above this period only 405. According to another series of statistics which have reference to the year 1865, the following results appear, viz.:

Strength at home 68,112
Died by disease of heart and blood vessels . . 63
Invalided   ,,   ,,   ,,   . . 244
                         —
      Total loss 307

giving from both causes a ratio of 4·57 per 1000.

Of the above, the largest mortality occurred among the infantry regiments and depôt battalions, and in persons between the ages of 25 and 35.

According to a committee appointed in 1864, the proportion of

men invalided for heart diseases to those from all causes was as under, viz.:

	Of invalids.	Ratio per 1000 strength.	
		All causes.	Disease of heart.
Under 20 years of age	1 to 5·45	11·93	2·19
From 20 to 24 .	1 to 6·44	·29·45	4·57
From 25 upwards	1 in 8	39·40	5·02

We are, moreover, furnished with a series of statistics, which show that in the period from 1860 to 1865, the ratio of deaths and invaliding by these diseases among the troops serving in the United Kingdom, was 0·9 from the former, and 5·26 from the latter per 1000 of strength.

The subjoined table represents the relative mortality from diseases of the heart and organs of circulation among soldiers at different stations, and is based on the averages of returns for the period from 1860 to 1867 inclusive. It also shows the general rate of death from all causes.

Stations.	Annual mortality per 1000 strength.	
	By disease of circulatory system.	By all causes.
United Kingdom	·95	9·33
Gibraltar	·74 ⎱	10·71
Malta	·73 ⎰	
Canada	1·19	9·18
Bermuda	1.12	35·58
St. Helena	·48 ⎱	10·57
Cape of Good Hope	1·90 ⎰	
Mauritius	·55	18·44
Ceylon	1·12	24·53
Australia	2·21 ⎱	16·93
New Zealand	1·72 ⎰	
China	1·24 ⎱	57·75
Japan	1·74 ⎰	
India ⎰ Bombay . ·79 ⎱ Bengal . ·96 ⎰ Madras . 1·26 ⎱	1·00	27·48

By another table, on the next page, we learn the approximate prevalence of these diseases at different stations and in different classes during certain periods which are named.

According to the first of these tables, the following is the order in which the different military stations rank in regard to mortality from the diseases in question, that where they are most fatal being at the head of the list, the one where they are least so at the foot, namely: 1. Australia. 2. Cape of Good Hope. 3. Japan. 4. New Zealand. 5. China. 6. Canada. 7. Bermuda and Ceylon (alike). 8. India. 9. United Kingdom. 10. Gibraltar. 11. Malta. 12. Mauritius. According to the second table the following, in like manner, is the order of mortality by these affections among the classes and at the stations named: 1. Chelsea pensioners aged 65

TABLE *showing the approximate prevalence of heart diseases at different stations and in different classes, during certain stated periods.*

STATIONS.	Years.	No. of Years.	Aggregate			Average yearly			Ratio per 1000 of strength per annum.	
			Strength.	Admissions.	Deaths.	Strength.	Admissions.	Deaths.	Admissions.	Deaths.
Home	1859 to 1867	9	632,559	4,596	590	70,365	511	66	7·26	0·93
Mediterranean	1859 ,, 1867	9	117,933	706	92	13,104	78	10	5·95	0·76
North America and Bermuda	1859 ,, 1867	9	105,825	395	122	11,758	44	14	3·83	1·11
West Indies { White	1859 ,, 1867	9	16,089	92	20	1,788	10	2	5·79	1·15
West Indies { Black	1859 ,, 1867	9	20,383	50	23	2,265	6	3	2·65	1·32
Cape of Good Hope	1859 ,, 1867	9	38,739	616	67	4,304	68	7	15·56	1·63
Australia, New Zealand, China, and Japan	1859 ,, 1867	9	107,749	887	144	11,972	99	16	8·27	1·34
India	1860 ,, 1867	8	496,263	5,532	509	55,140	615	56	11·15	1·01
						170,696	1,431	174	8·32	1·01
Pensioners in Chelsea, at age 65	1864 ,, 1867	4	2,092	71	77	523	18	19	34·41	36·33
India { White troops	1864 ,, 1867	4	147,625	1,503	168	36,906	376	42	10·11	1·14
India { Native ,,	1864 ,, 1867	4	183,673	79	28	45,918	20	7	·43	·15
India { ,, prisoners	1864 ,, 1867	4	219,263	99	62	54,816	25	15	·45	·27
Police Force	1867 ,, 1867	1	7,425	53	7	7,425	53	7	7·14	·94
Guards	1867 ,, 1867	1	5,529	25	8	5,529	25	8	4·52	1·44

and upwards. 2. The troops at the Cape of Good Hope. 3. The Guards. 4. Troops in New Zealand, Australia, China, and Japan (classified together). 5. Black troops in the West Indies. 6. White troops in the West Indies. 7. White troops in India. 8. Troops in North America and Bermuda. 9. Metropolitan Police Force. 10. Army at home. 11. Troops in the Mediterranean. 12. Native prisoners in India. And, 13. Native troops in India.

We shall see presently that the numerical frequency of these affections has of late years increased in the civil population. It has notably done so in the army, more especially since 1862, without any sufficient cause being assigned. There are, indeed, some young writers who express themselves as believing that the increase is more fancied than real, depending upon the greater correctness of diagnosis now-a-days compared to that of former times. But such an explanation is wholly erroneous, for it is acknowledged by those most capable of forming an opinion on the subject, that with regard to diagnosis and treatment, the elder medical officers are, to say the least, quite equal to their younger brethren. The increase in frequency of the affections in soldiers has been most observable in those occupying the Mediterranean stations, North America, and Bermuda. It is not so distinct in the West Indies, nor is the difference in its prevalence among white as compared to coloured troops in these islands so evident as at some other places. The rate of admissions for affections of the circulatory system has diminished at the Cape of Good Hope since 1859, the mortality remaining unaffected, while in New Zealand mortality from this cause underwent an increase, doubtless in consequence of arduous service taking place there. In India the ratios of both admissions and deaths have increased.

We find that the prevalence of these diseases varies at the same station at different times without any apparent cause. Dr. Lawson takes notice of this, but without being able to account for it, observing that the ratio of deaths by affections of the heart and blood-vessels among the troops abroad has varied as follows:

From 1817 to 1836 . ·15 per 1000.
„ 1859 to 1865 . ·95 „

During the latter period it was among the troops at home ·84, and only ·48 among the civil population.

We also observe that the ratio of disability from affections of the circulatory system varies considerably in the different branches of the army, as will be seen by the subjoined table, viz.:

Branch of the service.	Strength.	Died.	Ratio per 1000.	Invalided.	Ratio per 1000.
Cavalry	62,117	50	·80	243	3·91
Artillery	63,176	56	·88	223	3·35
Infantry	168,385	144	·80	891	4·37

These figures, which represent the ratios of the period from 1860 to 1867, indicate the fact that more of the infantry than of either of the other classes are annually incapacitated for duty by these affections. This circumstance appears to be accounted for in some measure by the infantry being drilled in accoutrements, whereas the cavalry and artillery are not so.

Household Troops and Metropolitan Police.—Various comparisons have been drawn between the rates of prevalence of diseases of the circulatory organs among the men of the household brigade and those of the London police, the conditions of both being similar in many respects; but the manner in which the statistics have been prepared renders conclusions difficult to define; the statistics do not give the results of corresponding years for any considerable length of time, nor do they separate the infantry from the caval Such as the returns are, however, I give them below.

Period.	HOUSEHOLD TROOPS.					LONDON POLICE.				
	Strength	Admitted.	Died.	Invalided.	Non-effective per 1000.	Strength	Admitted.	Died.	Invalided.	Non-effective per 1000.
1863 to 1866	19,516	*	15	63	4·02	*	*	*	*	*
1867 . .	5,529	25	8	*	*	7,425	53	7	*	*
1867 to 1868	*	*	*	*	*	16,749	*	5	23	1·66

The above table is confessedly imperfect, but from it we learn that a smaller ratio of admissions for these diseases takes place among the guards than among the metropolitan police, but that the household troops are subject to a somewhat larger mortality from them than the latter.

Continental armies.—It has been found impracticable to form a trustworthy comparison between the prevalence of these diseases in the British army and the armies of other European nations, partly by the different nomenclature of disease followed, and partly by the terms of engagement of soldiers varying greatly in different armies, and from what especially prevails in our own. Let us hope, however, that a system of statistics will ere long be established, according to which it will be practicable to compare not only these diseases, but others in the various armies of civilised nations.

In the royal navy.—The following statistics, illustrative of the extent to which diseases of the heart and organs of circulation prevail, have been obtained:

Mortality from heart disease in the Royal Navy.

Year.		Strength.		Died.		Ratio per 1000.
1859	.	52,825	.	50	.	1·0
1860	.	64,025	.	44	.	0·7
1861	.	62,485	.	39	.	0·6
1865	.	51,210	.	29	.	0·5
1866	.	49,475	.	31	.	0·6
1867	.	51,000	.	46	.	0·9

The 'Medical Press and Circular' of 7th July, 1869, contains a paper by Dr. Robertson, in which that gentleman institutes a comparison between the prevalence of diseases in the army and navy. That gentleman sets the rates of mortality by *aneurism* per 1000 strength in each of the years mentioned as follow:

Year.		Army.		Navy.
1863	.	·32	.	·03
1864	.	·45	.	·18
1865	.	·39	.	·09
1866	.	·48	.	·12
Average		·40	.	·12

The next table indicates the ratio, per 1000 strength, of *cases* of cardiac diseases, and that of their mortality in the two services:

		ARMY.				NAVY.		
Year.		Ratio of cases.	Ratio of deaths.			Ratio of cases.		Ratio of deaths.
1863	.	7·4	.	·65	.	8·5	.	·49
1864	.	7·6	.	·65	.	8·	.	·67
1865	.	8·	.	·72	.	8·5	.	·46
1866	.	8·1	.	·90	.	6·7	.	·52
Average		7·8	.	·73	.	8·1	.	·54

Thus it appears that in the army, the mortality from these diseases has not only a higher ratio than it has in the navy, but is increasing in the former service. But the ratio of their occurrence in the navy is higher than in the army, for the decrease in admissions noted in one year does not justify a different conclusion.

Among the circumstances which are put forward to account for the difference in the ratio of prevalence of these affections in the army and navy are the following:—1. It has been asserted, that whereas the ratio of recruits for the army who are rejected is about 388 per 1000, there are 792 boys rejected of every 1000 who offer themselves for the navy; thus those who pass for the latter service have a greater measure of health in the mass than those accepted for the former. They begin at fourteen years of age their rough and active life, where continual exercise is a necessity, and all their movements are performed without constraint, for they are loosely but at the same time comfortably dressed. We are not to suppose, however, that sailors are by any means exempt from affections of the circulatory organs, for it is found that the heart's action is often

intensely excited by the exertion of running aloft, and many are in consequence invalided from the service.   2. It is urged that sailors only engage for short periods, such as three or five years, or for a single commission, and at the end of their engagement they are simply discharged if not in perfect health, or are refused a re-engagement if unfit, but in either case their disability does not appear in statistics.   3. The exercise and food of sailors are better proportioned than are those of soldiers or marines. They have fewer opportunities than soldiers of indulging in spirits and tobacco.   The sailor is allowed a pound of fresh meat and a pound and a quarter of biscuit, which is equal to a pound and a half of soft bread.

According to some writers, there is a greater prevalence of aortic aneurism among sailors than among soldiers, and Dr. Leech seems inclined to think that the circumstance is accounted for by the great and violent muscular exertion they have often to perform, in duties such as reefing, hauling ropes, &c., which necessarily affects them more or less prejudicially, notwithstanding that their clothing is so much better adapted for their occupations than is that of soldiers for theirs.   In other respects it should also be borne in mind, that the sailor is exposed to the same conditions which tend to induce heart diseases in the soldier, for example, hot climates, broken sleep, confined air and space, syphilis, rheumatism, chewing tobacco, &c.; on the other hand, he has a more or less restricted diet, consisting in a great measure of salted meat.

Stokers.—So far as it is practicable to form a comparison, there is reason to believe that stokers on board ship are more liable to heart diseases than the other classes of the navy, from the great and continuous heat to which they are exposed.

Marines.—According to writers, the diseases under notice are more frequent among the marines than among the sailors of the Royal Navy.   Among the probable circumstances upon which this difference depends, it has been said that marines have often greater opportunities to indulge in venery and drunkenness than the sailors, and that these causes, more than mere difference in clothing, conduce to the difference.   The circumstances of food and clothing have been already alluded to.

Marine artillery.—Since the introduction of running drill, the proportion of heart disease has increased in this branch of the service, and doubtless also in others.   Thus, according to Dr. Robertson, there occurred among the men at Eastney, 24 cases of these diseases in 1865, and 26 in 1866; in the summer of 1867, running drill was introduced, and that year, in the same number of men (1750) 47 cases were admitted, 25 more occurring in the first quarter of 1868.

Merchant seamen.—The only available information of heart diseases among merchant seamen has reference to the year 1866, and, for

obvious reasons, it is only an approximation to correctness. According to the returns the strength of the whole body was 196,371, the deaths by these diseases, 70, being in the proportion of 0·35 per 1000.

In civil life. — Trustworthy statistics of the prevalence of these diseases among the civil population are difficult to obtain, and in those that are available, men are included who, having contracted the disease in service, yet, having ceased to belong to the ranks, are unfairly made to increase the measure of these disabilities apparent in civil life. There is every reason to believe, however, that they are actually less frequent in civil life than they are in the army, Dr. Lawson being of opinion that in what may be termed the military age this is the case in the proportion of eleven to one. He considers that their fatality is greater among civilians than soldiers, in the proportion, excluding aneurism, of ·50 to ·45 per 1000 ; and some writers believe that their rate of prevalence is on the increase. We may inquire whether, if such be the case, it be not one more additional evil to the many now attributed to the present system of gymnastics and violent outdoor exercises so fashionable in these days. There is, indeed, much reason to believe that such is the case, from the fact of their greater frequency among males than females, the proportion of diseases of this nature being in them respectively in the ratio of seven or eight to one.

An attempt is made in the following abstract to indicate the ratio of occurrence in the army and in civil life of the affections now being considered, after reducing these rates to a thousand, namely :

		Ratio per 1000.		
Year.		In soldiers.		In male civilians.
1863	.	1·06	.	0·9
1864	.	1·04	.	1·0
1865	.	1·1	.	1·0
1866	.	1·1	.	0·98

From causes already alluded to, the comparison becomes very difficult between the two classes. The subjoined table will, however, I trust, give some further approximation to the rate of occurrence of these affections in the army and in civil life, viz. :

Forces, &c., at home.	Strength.	Deaths.	Ratio per 1000.	Invalided.	Ratio per 1000.
Foot guards and Infantry 1860 to 1865 .	285,969	259	·9	1506	5·26
Males in London 20 to 25 years of age in 1861 .	507,405	393	·77	Not given.	
Royal Navy, 1860-65 .	343,680	228	·64	1184	3·43
Merchant seamen, 1866 .	196,371	70	·35	Not given.	
Metropolitan police, 1867-68 .	16,749	5	·29	23	1·37

By the following table it is attempted to convey some idea of the

relative mortality of these diseases, according to ages, in the army and in the civil male population of London for the ten years ending 1861, the date of the last census, namely—

Age.		Strength.	Deaths from all causes.	Ratio per 1000.	Deaths from disease of circ. organs.	Ratio per 1000.
20 to 24	Army	131,452	754	5·73	Not given.	
	Civil	122,548	885	7·22	29	·23
25 to 34	Army	137,971	1275	9·24		
	Civil	214,423	2075	9·67	128	·59
35 to 45	Army	27,690	457	16·50		
	Civil	170,434	2624	15·39	236	1·38
Total	Army	297,113	2486	8·36		
	Civil	507,405	5584	11·00	393	·77
	Army	285,969			259	·90

Dr. Lawson, who is one of our greatest authorities on these affections, is of opinion, judging from statistics extending from 1859 to 1865, that among native soldiers and civilians, of ages from fifteen to forty-four, the ratio of deaths by heart affections was in the former ·84 per 1000, in the latter ·50; while, according to other writers, the relative proportion of deaths in the two classes by them, from 1861 to 1863, was as stated below, namely—

Age.	Army.	Civil.
20 to 24	·12 per 1000 strength	·25 per 1000 strength.
25 and upwards	1·56 ,, ,,	·94 ,, ,,

Cornish miners.—This class of persons suffer to a considerable extent from heart diseases. After undergoing arduous labour these men spend an hour or an hour and a half in ascending and descending their mines, and the result is that after such exertion they are often greatly exhausted, and suffer from deranged circulation. How far this is dependent upon the particular proportions of nitrogenous and non-nitrogenous constituents of their food is a question which Dr. Houghton has discussed at length in his lecture on food with regard to force, delivered before the British Medical Association.

In briefly alluding to the prevalence of these diseases at our foreign stations I may observe, by way of introduction, that there is always much difficulty in obtaining reliable statistics in reference to the civil population, more especially when they are aboriginal. According to general opinion, however, black and coloured troops enjoy an immunity from heart diseases, in their rate of occurrence; but the rate of mortality of these diseases is greater among coloured than among European troops. This is said to hold good with Hindoos, Mussulmans, Caffres, Hottentots, West Africans, and the half-castes of St. Helena; to explain the fact, the ingenious theory has been propounded that those races which are most civilised, and whose susceptibilities are most developed, are most liable to the

affections in question. How far the explanation is to be deemed satisfactory I offer no opinion.

With these observations I proceed to consider such points, with reference to particular foreign stations, as are available for my purpose, namely—*Mediterranean*.—At *Gibraltar* these diseases are considered somewhat frequent in their rate of occurrence among the troops, although no sufficient cause for the circumstance is noted. Among the civil population no particular prevalence of them has been observed.

North America.—They do not prevail in North America to a greater extent than in the United Kingdom.

West Indies.—It has been remarked that they do not prevail there to a great extent among the troops, notwithstanding that intemperance is a common vice among them. Among the black population deaths by diseases of the heart are by no means unfrequent.

Cape of Good Hope.—This station has long been recognised as favorable to diseases of the heart and blood-vessels among the troops. An opinion has been expressed that these affections are increasing in frequency, but such a view is not supported by statistics. Among the peculiarities of the affections here the fact is noted that in fatal cases, instead of an aneurism existing at or near the heart, death is found to occur from the occurrence of a slit in the vessel, a result attributed by some writers, Laennec among others, to phlegmonous inflammation of the spot. Dr. Lawson makes no mention of syphilis as being one of their causes, but observes that they are as frequent among the temperate as among the intemperate; he observes that they have been as frequent since the Caffre war as during it, and that the knapsack cannot be looked upon as a cause, inasmuch as in that colony it is always carried for the men. But he states that rheumatism is the chief cause, though he remarks that rheumatism is itself less common than at some other stations. Other writers look upon syphilis as a fertile cause of these affections among the troops there, although they remark the rarity of heart disease, &c., among the civil population. Others ascribe a specially injurious influence to the climate of the Cape, just as the climate of the hills in India is known to affect certain constitutions, or as other climates are hurtful in slow hepatic diseases, others in phthisis, and so on. The cases at the Cape are also men from China and Japan who have suffered in those countries from malarious rheumatism. Hence it is recommended that instead of sending regiments from China and Japan to the Cape, corps should be sent there direct from England. Other writers attribute these affections, not so much to climatic changes as to the debilitated condition of the troops arriving in that command from China and Japan.

Australia.—The statistics of these diseases indicate here a high rate of prevalence, but that the cause assigned is not altogether of a local

nature ; it being suggested that of late years it was probably in some measure attributable to the circumstance of troops frequently moving between New Zealand and this colony, and that in the latter place severe service and consequent fatigue had to be undergone. In addition to these causes, there are said to be in Australia great facilities for indulgence in intemperance; syphilis prevails to a large extent, and rheumatism is common.

New Zealand.—In some respects the statistics of these diseases that should specially bear upon New Zealand are mixed up with those of Australia. We learn, however, that in 1866, that is, during the war against the Maories, a distinct increase in their rate of prevalence took place, which was attributed partly to the severe exertion and exposure to which the troops were then exposed, partly to the fact of the men having had, while in service, to carry their knapsacks, and partly to the increased prevalence of rheumatism consequent upon exposure. Dr. Gibb attributes it during the period in question, entirely to such fatigue and exposure.

China and Japan. — It is believed that the form in which syphilis prevails in these two countries being the most virulent to be met with anywhere, tends to cause the frequency with which our troops are affected by diseases of the heart and blood-vessels. Rheumatism also prevails to a great extent, and the facilities for indulgence in drunkenness are great. The climate varies extremely, and the natives of both countries are sickly, although no reliable statistics with reference to them are yet obtainable.

India generally.—Different series of statistics are given by different writers representing the rate of prevalence of, and mortality by, affections of the heart and blood-vessels, among the troops throughout India and the relative extent to which various classes of the community are affected by them. One such series includes the eight years extending from 1860 to 1867, and gives the following results, namely :

Aggregate strength for the period	496,263
„ admissions by heart diseases	5,532
„ deaths „ „	509
Giving an annual strength of	55,140
„ „ admissions	615
„ „ deaths	56

Or a ratio per 1000 strength of 11·15 admissions, and of 1·01 deaths.

Another series gives the relative ratios of death and invaliding by these diseases in different arms of the service during the three years from 1865 to 1867 inclusive, viz. :

Ratios per 1000 strength.

Men.	Deaths.	Invalided.
Cavalry	2·06	4·9
Artillery	·86	4·33
Infantry	·9	2·63

And in the report from which the particulars are extracted, it is stated that in 1866, the ratio of death by these affections attained the very high range of 3·46; having done so among the troops on the line of march.

Statistics of the civil native population are difficult to obtain, and by no means to be relied upon when obtained. An attempt has, however, been made to draw a comparison between the ratios of mortality by pulmonic diseases and by affections of the heart in both these classes, the only year for which such a comparison is available being 1866; according to it the results are as follows, viz.:

Ratios of deaths per 1000 strength.

	By consumption.	By diseases of the heart.
Army	1·88	2·00
Civil	3·4	1·05

from which figures it would appear that pulmonary consumption is much less frequent among our soldiers in that country than it is among the natives, but that on the other hand, diseases of the heart are considerably more numerous among the former than the latter. Among certain classes of natives also, asthma is of very frequent occurrence, and there appears reason to believe that deaths by it are sometimes attributed to affections of the heart. According to the views of Dr. Bryden also, prisoners being always more or less in an anæmic condition are thus especially liable to become the subjects of these diseases.

Summary.—If then, we summarise the most important points in connection with diseases of the heart and other organs of circulation as they occur in the army, we find that they include the following, namely:

1. That disease of the heart is of more frequent occurrence in soldiers than among civilians.

2. That its principal causes are rheumatism, Bright's disease, and violent exertion.

3. That syphilis, in affecting both classes, produces like results in both.

4. Disease of the mitral valves is more common than of the aortic in civilians, but of the aortic than mitral in soldiers.

5. Heat and malaria of India probably conduce more to disease of the heart than the climate of Britain.

6. The functional disorders in young soldiers may be readily detected by the smygmograph.

7. The great and most generally recognised causes include contraction of the chest by uniform and accoutrements, thus producing a strain upon the heart.

(To be continued.)

II.—On the Evidence to be obtained as to the Nature of the Vital Force, from a Minute Study of Anatomy, and of the Laws which regulate the Electro-Magnetic Force.   By R. C. Shettle, M.D., Physician to the Royal Berkshire Hospital, &c.

The purport of the following paper is to demonstrate the analogy, if not perfect identity, which exists between the electro-magnetic and vital forces, as concisely as possible.

I shall first point out the general structural arrangement of the heart ; secondly, by reference to minute anatomy as revealed to us by the highest powers of the microscope now used, show the formation and mode of growth of various tissues, and thirdly, endeavour to show that there is a physical force, and *only one* known force, under the influence of the laws of which bioplasmic matter must assume the form it does in the animal machine.

I shall refer first to some dissections of the ganglia and nerves of the heart made some years since by Dr. Robert Lee, by which he shows that the nerves wind more or less spirally round the heart, that they frequently more or less encircle the arteries, that ganglia of considerable size are formed on the superficial nerves, where they are crossing the arteries, and from these chains of ganglia branches are sent off to the coats of the blood-vessels, which sink deep into the substance of the heart.

I would next call especial attention to the general spiral arrangement of the nerves and the enlargements or ganglia formed upon them when they are crossing the arteries, an arrangement for which some cause must exist, as it so almost universally obtains.

The muscular fibres of the heart were admirably described by Dr. James Pettigrew in a communication to the Royal Society in 1863, and to his dissections I must also direct attentive consideration (as published in the ' Philosophical Transactions ' for that year), but it is impossible, owing to the limited space that can be devoted to this paper, to do more than state that Dr. Pettigrew has shown these muscular fibres to consist of seven layers, that these layers, owing to the difference in the direction of the fibres, are well marked ; that there is a gradual sequence in the direction of the fibres, whereby they are made to change their course from a nearly vertical to a horizontal or transverse, and from the transverse back again to the nearly vertical.   Thus in dissecting these fibres from without inwards, the fibres of the first layer, which run in a spiral direction from left to right downwards, are more vertical than those of the second layer, the second than those of the third, the third than those of the fourth ; the fibres of the fourth layer have a transverse direction,

running at nearly right angles to those of the first, passing the fourth layer, which occupies nearly a central position in the ventricular walls, the order of arrangement is reversed, and the fibres of the layers five, six, and seven, gradually return in an opposite direction, and in inverse order, to the same relation to the ventricular walls as that maintained by the fibres of the external layer.

The practical point to which I wish to call attention here is, that the muscular fibres of the heart, for the most part, form interminable coils or spiral turns around the cavities of the ventricles, and especially the left, and this arrangement is not only carried out with regard to the walls of the ventricles, but Dr. Pettigrew states that the musculi papillares, and even the valves, partake of this same character with regard to their fibres; moreover, this arrangement of the internal structure, together with the conical shape of the cavities, causes the blood to be arranged during the diastole of the ventricle in spiral columns, and subsequently to be driven out of the orifice of the ventricle with a spiral turn or twist given to it. These are facts upon which Dr. Pettigrew lays some stress, for he says " that without presuming dogmatically to assert that the ultimate arrangement of the ventricles of the bird and mammal is reduced to any known mathematical law, I cannot help mentioning that the arrangement in question can be thoroughly imitated, even in its details, by certain mechanical contrivances about to be explained; that I would consider the present communication incomplete were I not shortly to direct attention to them : thus if a sheet of paper or other flexible material whose length is twice that of its breadth be taken, and parallel lines be drawn on both sides of it, in the direction of its length to represent the course of the fibres, all that requires to be done in order to convert it into a literal transcript of one half of the left or typical ventricle is to lay it out lengthways across a table, and catching it by the right hand distal corner to roll or turn in towards oneself a conical shaped portion, and continue the rolling process in the direction of the opposite or oblique corner, until three and a half turns are made, and a hollow cone produced. It will be found that every turn in it is converted into a double conical spiral."

The formation and structure of the nerve-cells of the frog, as described by Dr. Lionel Beale in a communication to the Royal Society in 1863, must now be carefully considered. Dr. Beale has found that all the ganglion-cells from which nerve-fibres proceed to the vessels and other parts of the submucous areolar tissue of the palate, tongue, lungs, and neighbouring organs, those from which nerves distributed to the viscera are derived, as well as the cells connected with the pneumogastric, those forming the ganglia upon the posterior roots of the spinal nerves; and some others exhibit the same general structure, although there are many

special pecularities and differences of size in the cells of which some of these ganglia are composed.

The general form of these cells is oval or spherical, but upon closer examination it is found that the most perfectly formed ganglion-cell is pear- or balloon-shaped, and by its narrow extremity is continuous with the nerve-fibres, which may be followed into nerve-trunks. The substance of the cells consists of a more or less granular material. Near the fundus or rounded end is a large circular nucleus with its nucleolus; in some cells, about the centre, are observed a number of small oval nuclei, which are arranged transversely to the long axis of the cell, and follow each other in lines, in a direction more or less obliquely downwards. The matter of which the mass of the cells consists gradually diminishes in diameter, and contracts so as to form a fibre, in which a nucleus is often seen. About the centre of the exterior of the cell the material gradually assumes the form of fibres, and these pass around the first fibre in a spiral manner. Thus a fibre comes from the centre of the cell (straight fibre), and one or many fibres (spiral) proceed from its surface. So much for the general structure. A few words more as to how these are formed :—" In very young animals these ganglion-cells *gradually form from nuclei, which appear to be imbedded in very soft granular matter*. The fibres extend from the collection in at least two directions, and exist as granular nucleated bands. The fibres do not grow out of the cells, but are formed as two masses of germinal matter gradually separate from each other. New ganglion-cells, nerve-fibres, and nuclei, are being constantly produced, not only in fully developed young animals and in the adult, but certainly for a considerable time after the animal has arrived at maturity, and I believe almost to the close of the ordinary period of life." After the ganglia have so formed they divide and subdivide into several divisions having the same structure; they then assume the balloon shape, and *begin to move away* from the point where they were first formed, and it is clear that the granular matter from which they were first formed may be drawn out, so as to form a fibre, but when the ganglion-cells are formed by changes occurring in what appears to be a nucleus of nerve-fibre, the process is somewhat different; here " a nucleus which cannot at first be distinguished from the ordinary nuclei in connection with the nerve-fibres, grows somewhat larger than the rest; sometimes several in different parts of a fibre enlarge to some extent, but for the most part only one in the course of a long distance will be developed into a ganglion-cell. The enlarged nucleus, when about to be developed into a ganglion cell, soon exhibits a transparent portion at its circumference; it next becomes separated more and more from the point where its formation commenced. The two opposite extremities of the cell are drawn lower, the fibres increase in length and lie parallel to each other,

and the form of the cell becomes much altered. If formed in connection with one of a bundle composed of numerous fibres, the cell seems to grow away from the bundle, and more commonly its long axis corresponds to the direction in which the fibres of the bundle run. The two fibres passing from this cell run amongst the bundle of nerve fibres to which their course is at first more or less at right angles. The two fibres may then be seen to alter their course and run with other fibres of the bundle, but in opposite directions."

Upon reference to the plates of Dr. Beales's work, it will be seen that, close to the cell, in which there is a considerable extent of spiral, the course of the fibres is almost transverse. Then the fibres pass spirally round the straight fibres away from the cell, and each turn becomes more oblique than the one above it, until at last the fibre (or fibres) lies parallel with the other fibre which leaves the cell. The spiral fibres are necessarily longer than the straight fibre. The spiral fibres can be shown to be continuous with the material with which the body of the cell is composed, as well as the straight fibre, but the former are connected with its surface, whilst the latter proceeds from the more central part; so that in the most perfect cells the straight fibre forms a stem round which the spiral fibres are coiled. As a general rule, those ganglion cells which have the longest stems, or are separated by the greatest distance from the general mass of the ganglion, are the oldest cells. Now these are the very cells in which the spiral exhibits the greatest number of coils, and Dr. Beale says that "from numerous observations *I am convinced that the number of coils increases as the fibre advances in age.* The age of the cell is also marked by an alteration in shape and bulk, in some cells scarcely anything is left but the large nucleus. It is also ascertained that there is only one large nucleus at any early period of development of the cell; whilst in a fully formed cell there may be from ten to twenty smaller oval nuclei, at the lower part of the cell, and some of which are connected with the spiral fibres." For the better consideration of the changes which occur during the formation of new cells Dr. Beale divides the matter from which such cells are built up into germinal matter and formed material, and he colours the germinal matter with a solution of carmine. In young specimens the germinal matter is seen to pass into formed material. No living tissue, he says, exists without there being living germinal matter in connection with it. The youngest cells consist almost entirely of germinal matter, while in the fully formed cell there is from ten to twenty times as much *formed material* as there is of germinal matter. In the fully formed cell the germinal matter (nucleus) exhibits a line around it, but there is no cell wall. The nuclei, the nucleoli, and the nucleoluli, are found one within the other, and the last or smallest centres are most darkly coloured. In the nucleoli the colour is not so intense, the nuclei again are

still paler, and the matter more external is very faintly coloured; or it remains perfectly colourless, so that in this as in many instances elsewhere, it is to be noticed that the outer part of each cell, or that in *actual contact with the coloured solution* is not coloured, while the intensity of the colour gradually increases as we pass towards the innermost part of the germinal matter, although this may be situated at the greatest distance from the colouring solution. To reach the *nucleus and nucleolus* it is obvious the solution must pass through a *considerable thickness of tissue; the colour, however, is here deposited in greater quantity.* Dr. Beale also says " I believe it is a very important fact that wherever the ganglion cell-increases in size or the fibre in connection with it increases in length, a certain amount of germinal matter undergoes conversion into formed material, and that the process of conversion is much more simple than is generally supposed."

With regard to the formation of spiral fibre, Dr. Beale remarks that there is *" a great* accumulation of evidence in favour of the general conclusion *that all living matter possesses a power of movement,"* and " in these peculiar ganglion-cells we have a very convincing evidence that movements have taken place uninterruptedly since the earliest change occurring in their formation. The spiral fibre appears to result partly from a sort of splitting and subsequent condensation of the lower part of the cell itself, and partly by the growing from the nuclei connected with the fibres, while at the same time the fundus moves away and spiral after spiral is left round the central fibre which is of course gradually increasing in length also." It appears doubtful to Dr. Beale " whether the entire cell rotates, because the central fibre does not appear to be twisted, but it is obviously possible, he says, that the outer portion of the cell might rotate slowly round the inner portion without causing a twisting of the fibre, the mass of which the cell is composed, being in its neutral state very plastic, and there is a fact in favour of rotation which Dr. Beale has so often observed that it may be termed constant, viz., in peripheral parts where a dark-bordered fibre is being developed, a fine fibre passes spirally round it, and this may be accounted for precisely in the same way as I have attempted to explain the production of the spiral fibre of the ganglion cells." "The *cause of the formation of these spiral fibres* (Dr. Beale remarks) is one of the utmost *interest, and well deserves the most searching and minute investigation, for it is certain that the settlement of many of the questions raised must lead to the establishment of new general principles of wide application."* Dr. Beale also states that "the arrangement and structure of the ganglion-cells of the heart differ in no essential particulars from those he has described in other ganglia." Ganglia and ganglion-cells are formed in considerable number in connection with the arteries of the viscera, abdomen, heart, and lungs. It is

important also to remark connective tissue and connective-tissue corpuscles are produced from the very same masses of germinal matter as those from which nerve-cells and nerve-fibres are developed, and "I think (he says) that it must be admitted that many fibres which resist the action of acetic acid, and which are generally regarded as consisting of yellow elastic tissue, were once nerves." I conclude these long but very important extracts with the mention of the fact that the muscular coat of all arteries of the frog and probably of other animals is supplied with nerve-fibres.

Recapitulation.—1st. The muscular structure of the heart consists of a series of coils or spirals, which are especially complete and more developed in the left ventricle than in the right. 2nd. The blood is arranged in spiral columns during diastole of left ventricle, and sent out of ventricle with an impetus of the like character. 3rd. The heart is surrounded by nerves which wind more or less spirally round it, and the most superficial form chains of ganglia from which branches are sent into the most intimate structure of the organ. 4th, Ganglia are developed throughout the heart, and these also have a most perfect spiral arrangement, and keep moving in a certain direction during life. 5th. That the ganglia are being constantly formed during life, and as constantly undergoing waste and decay. 6th. Both Dr. Lee and Dr. Beale attribute the action of the heart to these ganglia. 7th. The mode in which the coloured solution enters the most interior cells of the ganglion corpuscles is worthy attention, as showing polar influences are at work.

I would next direct attention to the cause for these peculiarities of structure, for with regard to the ganglion-cells described by Dr. Beale, it must be evident that from the first commencement of their formation until they have attained their greatest number of coils and other structural development, they must be under the influence of a peculiar force, a force by which aggregation of particles first took place in the nerve-fibre, which then causes the nerve-fibre to remove from the trunk of the main nerve, and subsequently not only further combines the particles of germinal matter aggregated in the distal portion, but also adds to the quantity, and then causes the pear-shaped ganglia to revolve on its centre, so as to form the spiral fibre. What known force is there then, that would fulfil these conditions? In reply, I do not hesitate to state that the electro-magnetic force not only could accomplish all, but that it is the *only known force* that could do so ; and for the purpose of making this clear, I will at once pass to the consideration of some of the laws which have reference to the subject. 1st, With regard to the cause of the formation and aggregation of the germinal matter, in some one or more of the nerve-fibres, it is now clearly established that during the action of a nerve currents of electricity are circulating through it. Now, when such currents are passing through a fluid conductor, should they meet

with any obstructive medium and their progress be retarded, a centre of action, in other words a polar influence is established, by means of which matter which previously existed in a state of solution may be collected and its particles deposited in a solid state.   Electro-plating is a familiar example with a slight modification of the action, but I performed and published, in 1863, some experiments which I think more especially bear on this subject, so I relate them.   Experiment 1. Water was mixed with the sap of plants and the solution carefully filtered through blotting-paper, and a simple galvanic circuit was then inserted.   A short time sufficed to form a film on the surface of the water; this film gradually increased in thickness, and when examined microscopically, was seen to consist of minute particles of matter exhibiting vigorous molecular action, and although I have not seen cells formed in such specimens, I have seen cell after cell appear, and then drawn by some invisible agency to a part where there had been previous accumulation of tissue and adapt themselves to one another, so as to form tubes, apparently by a bursting of that portion of the cell-wall which had adapted itself to the previous cell. Exp. 2. Forty grains of gutta-percha were dissolved in six drachms of chloroform; the solution was put into a wide-mouthed bottle, and a galvanic circuit immersed, and the mouth of the bottle was then accurately closed by a cork and bladder.   The gutta-percha, when first dissolved, is much lighter than the chloroform, but very shortly acquires a higher specific gravity, and sinks to the bottom of the vessel, previously, however, assuming a flocculent appearance in the solution.   A good shaking will again cause intimate mixture, and before the gutta-percha sinks it will be once more collected into flocculi, although each time it is so treated it will sink more rapidly to the bottom of the vessel.   Both these experiments are instructive as, setting aside the consideration of any chemical changes that may take place, showing the power the voltaic circuit possesses of seizing particles of matter held in solution, and collecting them into appreciable particles.   Is it not probable that the process by which the atoms of germinal matter are aggregated and converted into formed material, as the first step in the formation of ganglion-cells, is analogous if not identical?

I have next to consider the cause of the fibre or fibres containing the aggregated particles moving away from the main trunk.   If I am right in the conclusion that similar polar influences are at work, the cause of the repulsion is clear at once.   Of course the nerve-fibres, as conducting currents of electricity, must be magnetic in their transverse diameter, according to the same law which causes a copper wire to be magnetic during the time it is conducting a current of electricity; but owing to the deposition of matter in a certain fibre of the nerve, that portion must become a centre of action, because the matter deposited would act upon the nerve-fibre as

impurity does upon conductors generally, and under such action the polar influences would undergo considerable modification, just as an ordinary bar magnet will have two similar poles in juxta-position by heat applied in a certain way; indeed, by the application of heat a magnetic bar may be made to point east and west, *i. e.* it is magnetic and diamagnetic at one and the same time. Now, let the main trunk of the nerve exhibit a north pole on the surface next the fibre to be separated, and that fibre have a north pole on the side next to the main trunk, and the smaller bundles of fibres will immediately begin to recede, and the extent to which it would separate itself would depend in great measure upon the magnetic influence of the main trunk.

I will next point out the mode by which it appears to me the external fibre becomes twisted or coiled round the straight fibre. The law which governs electro-magnetic rotation, I think, applies admirably here; thus, if the action of the electric current be limited to a single pole of the magnet, a continuous rotation of the pole round the conducting wire may be obtained. Faraday was led to the discovery of these rotations by observing the manner in which a voltaic current acted upon a magnetic needle which moved in its vicinity. If the conducting wire be placed perpendicularly, and a needle poised horizontally at its centre be made gradually to approach the wire on one side, each pole of the needle is first attracted, and on continuing the movement across the wire, is then repelled; on the other side of the wire the needle is repelled where it was previously attracted. From these results Faraday concluded that each pole has a tendency to revolve round the wire, the revolution of the
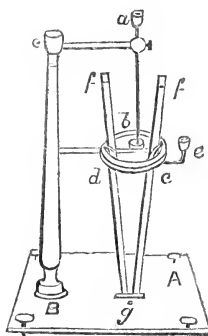
north end of the wire it was expected would be in a direction the reverse of that assumed by the south end. Experiments completely verified these expectations. No. I, Fig. 249, 'Miller's Ele-

ments,' Part I, shows an arrangement by which the magnet may be made to revolve round the fixed wire *a b*; *f f* are the north ends of the bar magnets which are united below and terminate in a point *g*; this point works in a steel plate in the board A B; *c d* is a wooden ring which contains mercury, and is in metallic communication with the cup *e*. At the centre of each of the magnets is a brass hook which dips into the mercury of the trough *c d*, for conveying the current transmitted through the wire *a b* which is supported by the arm C. As soon as the connection of the cups *a* and *e* is made with the battery, the magnet begins to rotate round the wire *a b*, and continues to do so as long as the current passes. Now supposing the straight nerve-fibre to be the afferent fibre or that corresponding with *a* in the diagram, and the spinal fibre that at which the current makes its exit, and these ganglion-cells magnetic, which they must be if a current of electricity is passing through them, then the poles nearest the nerve would rotate round the straight fibre, just as the poles of the magnet in the diagram rotate round the fixed wire, to coil itself round the afferent fibre, and the efferent fibre would elongate itself by increasing its length from the body of the ganglion; and this would be effected by the current of electricity collecting the particles of matter, and arranging them in the form of fibres, and these fibres according to another electrical law being traversed by similar currents of electricity, would be drawn towards each other and collected into one fibre. This last law also establishes the spiral fibre as the efferent fibre becomes like lines of electric force attract one another, and these fibres are being drawn (as Dr. Beale has shown) closer and closer to each other, as they approach the smaller end of the ganglion. It must be evident that as these fibres are perfected in their structural formation, they must become better conductors of the nerve or electric force, and the more perfect they become as conductors, the more force they would transmit in a given time, and the greater would be the amount of attraction for each other, until at last they would be bound up in one common fibre, which would then, as we have seen, assume a sinuosity corresponding with the revolutions made by the ganglion itself.

One of the chief purposes these ganglia are supposed to serve, is that of acting as originators and intensifiers of impressions. When we consider their nature, we perceive at once how they may act as originators of sensation or motion and as intensifiers of each, provided they are conductors of electricity. Thus, with regard to sensation, when a current was being sent through the trunk of the nerve, they would act precisely in the same mode as the resistance coils of Professor Wheatstone's bridge, by means of which resistance coils, the passage of a current of electricity is retarded in one part of a circuit which includes a galvanometer; the needle of the galvanometer is deflected immediately the resistance coil is included in such

circuit.   In like manner these ganglia and coils would act as resist-
ance coils, and a sensation would result.

There are two modes in which these spiral ganglia would act as
originators of motion, *i. e.*, of muscular contraction according to
electrical laws ; first, if a current of electricity, instead of following
a rectilinear course, deviate alternately to the right or left, its action
is the same as that of a rectilinear current of the same extension.
The combination of a rectilinear current with a sinuous current is
called a solenoid, and is a system of circular currents equal and
parallel formed by twisting a silk-covered copper wire corkscrew
fashion back upon itself, but to make it perfect the straight part of
the wire must be as exactly as possible in the centre of the helix.
Thus arranged, when the circuit is traversed by a current, the action
of the solenoid in the direction of its length is destroyed by that of
the rectilinear current, and the only effect produced is due to the
system of circular currents equal and parallel moving in a direction
perpendicular to its axis.   Now, as the action of fixed currents on
moveable ones is to bring them into a position parallel to themselves,
with their currents moving in the same direction, a solenoid freely
suspended on a vertical axis should, when acted upon by a rectilinear
current, range itself with its circles parallel to the current.   It is
accordingly found, that on passing a strong voltaic current through
a solenoid suspended from two mercury cups, so as to allow it perfect
freedom of motion round a vertical axis, and passing at the same
time *underneath* and parallel to its axis, a *rectilinear current, the
solenoid* turns itself *across that current,* taking up a position with its
circles parallel to it.   If instead of passing the rectilinear current
horizontally underneath the solenoid, it be passed vertically, and near
one end, the latter is attracted or repelled according as the currents
are passing in the same or in opposite directions through the wire,
and through the continuous parts of the solenoid.   Two solenoids
exhibit towards each other the phenomena of attraction and repulsion
in a manner precisely similar to two magnets, because a solenoid has
all the properties of a magnet.   Now it is quite certain, that if a
strong current were sent through the main trunk, from which these
ganglia emanated, such as we should get when a muscle was con-
tracted, the ganglia would be attracted to the main trunk, and at the
same time to the neighbouring ganglia, and the same current for the
reasons before given would cause the ganglia not only to revolve on
their axes, but also to place themselves as nearly as possible with
their circles parallel to the current in the nerve.   Now all these
movements would tend to produce, and no doubt would produce
muscular contraction, by giving rise to a change in the axes of force;
and taking the magnetic axis of force to be transverse to the
direction of the fibres of the muscle in the relaxed state, then the
muscular fibre in such relaxed state would be electrical in its long

axis, and by changing the axis of force we should have the shortening of the muscle from end to end, and the protrusion of the myolemma laterally, and currents of electricity developed in that direction, by the cutting of the rays of magnetic force. To recapitulate, it is quite evident that if the ganglia described by Dr. Lee exist when the nerves are crossing the arteries, that those arteries have great influence in promoting the enlargement or formation of ganglia on the nerves.

2nd. That some force must be acting on the nerves to produce these structures, formed with such great regularity, as described by Dr. Lionel Beale.

3rd. That the mode of growth of these formations corresponds minutely even from the first aggregation of particles of germinal matter, to that which they ought to assume were they under the influence of electro-magnetic force.

4th. That the muscular fibres of the heart have a similar spiral arrangement to the nerve-fibres in the nerve-ganglia, and that such an arrangement renders them specially adapted under certain conditions to be hereafter entered upon to maintain the rhythmical action of the heart.

The researches of Mr. Lockhart Clarke on the development of the spinal cord in man, mammalia, and birds, are so important and instructive with reference to the force that is acting upon matter, causing it to assume definite forms in its growth, that they require attentive consideration. It will be found from his paper on this subject, published in Part ii of the 'Philosophical Transactions' for 1862, that the grey substance at first occupies nearly the whole of the area of the cord, and is composed of closely aggregated nuclei, connected together by a continuous network of fibres. These nuclei in size are nearly equal, the average diameter being about equal to that of the blood globules; in shape they vary from round to oval, pyriform, or variously angular. The nuclei subsequently become more and more aggregated, and the fibres more and more distinct, and from the examination of the spinal cords of ova of different periods of their growth, Mr. Lockhart Clarke found that as the process of growth went on, the grey substance became altered in all its parts, and the nuclei increased considerably in diameter in the anterior portion of the grey substance, whilst in the posterior part they remained much in the same state; the nuclei in the anterior grey substance being nearly twice the size of those in the posterior part. They also became more granular, more distinctly circumscribed by well-defined walls, and were seen to lie at greater distances from each other; whilst the fibres that support them at the same time became coarser and more or less granular in appearance.

In the fœtal sheep of six, seven and eight inches in length, these changes were yet more marked, and a complete system of transverse,

longitudinal, and oblique nerve-fibres were readily distinguishable; subsequently the coarse network was interspersed with cells differing from each other in size and shape, the majority being fusiform from before backwards, and more or less wavy or sigmoid, or perfectly straight, with processes which extended to amazing distances. In some cases they were bent into a crescent, and formed part of the circumference of an oval or circular space, and Mr. Lockhart Clarke has no hesitation in stating that "there is every reason to believe, that the fibres of the white columns are developed from the grey substance as prolongations of the network by which its nuclei are connected." Very excellent representations of the various processes of growth are given in the drawings that accompany Mr. Lockhart Clarke's communication to the Royal Society. The question now arises as to whether electro-magnetism is or is not the force operating to promote these processes of growth. How far it is so we shall be able to judge by a brief summary of those processes of growth, and a consideration of the laws regulating electro magnetism. Thus we have :

1st. The formation or deposition of the germs or nuclei in shape round, oval, or angular, of the size of blood-corpuscles.

2nd. The aggregation of these nuclei into clusters, and the formation of a network of fibres to connect the nuclei together.

3rd. The still further aggregation of the nuclei into larger clusters and the formation of cell-walls around them.

4th. The conversion of these more or less spherical cells into elongated, wavy or crescentic cells, with long processes attached to their ends connected with the roots of nerves.

5th. The bending round of the two horns of the crescentic cells, and the formation of those peculiar cells or roots of nerves shown in fig. 27, Pl. xlviii.

Now it is quite certain that all these processes of growth are the result of the operations of the vital force, a force which is shown to have the power of aggregating particles of matter into clusters, converting such clusters into cells, with cell wall, and subsequently giving out lines of force, by means of which fibres are formed. It is clear, therefore, that the process of growth in living structures differs but in degree, and in its continuance from the coagulation of the blood, for whilst in the one case (growth of tissue) we have a number of centres formed, and each centre endowed with the power of forming fibres, and not only maintaining its own vitality, but also capable of adding to the vitality of others; in the other, *i.e.* the coagulation of the blood, we have one centre only formed, with its connecting fibres; and the vital act ceasing with the formation of those fibres. But in addition we have at the same time corroborative proof that the coagulation of blood is due to a vital act, inherent in the corpuscular portion. For such vital act causes the corpuscles

to aggregate into a nucleus, with the formation of fibres by lines of force emanating from those corpuscles, even as during life these lines of force emanate from the nuclei.

If we consider now the nature of the magnet, we find that it possesses at one and the same time the property of drawing certain particles of matter to itself, and of repelling others. Now these lines of magnetic force exhibit at right angles to them currents of electric force, and if we reverse the process and generate currents of electricity, these currents of electricity would be magnetic at their right angles. Supposing, then, we have a magnetic centre, that centre would polarize surrounding matter, if such matter was capable of being polarized, and such polarized particles, if they existed in a menstruum in which they were capable of moving, must move in obedience to the laws of the polarising force, and aggregation of particles must be the result, and at the same time a clearing of the surrounding space must be effected in equal ratio, whilst the force emanating from the magnetic centre must be increased with each particle of magnetic matter added to it. We have already seen that each line of magnetic force must, according to electrical laws, have currents of electricity circulating round it. Now one result of these electrical currents would be to establish centrifugal and centripetal forces, by means of which minute particles of magnetic matter would be drawn towards the nucleus, and afterwards repelled from it with these motions imparted to them, and these double currents must take place in obedience to the law that currents of electricity never circulate in one direction without passing in the opposite direction also. Another result of these electrical currents would be to form cell-walls, by the compression, or union, or coagulation, of certain particles of matter capable of being so compressed and united by the force of the electric currents. For it is a well-known fact that currents of electricity passed through an albuminous fluid, have the power of coagulating the albumen; and the currents in question, minute though they be, would have the power of acting upon albuminous particles, and converting them into a cell-wall; the structure of which would be subsequently thickened by particles of matter which had been attracted to the nucleus, and in all probability had undergone chemical action there, and then repelled again with a different nature imparted to them, to be deposited on the interior of the cell-wall, and thus build up the structure of the cell itself. But these cells once formed and *perfected* in the mode above described, the force emanating from the cell, or perhaps to speak more correctly from the nucleus of the cell, would send out more powerful lines of force, and the cell itself becoming polarised as a whole, the electric current would tend to elongate it in one direction, and the magnetic axis of force would tend to shorten it in the other, according to the laws already referred to; consequently we should

have these cells becoming elongated, as described by Mr. Lockhart Clarke, whilst the crescentic cells would result from the tendencies of the two opposite electrical currents to unite again by their distal extremities; they would then give rise to that state of things represented in fig. 27, also in various stages of their growth in figs. 16, 25, 26, 28, and 29. In fig. 16 the nucleus is seen occupying the centre of the elongated cell, in the others it is seen to be placed at the base or large extremity of the cell, and it is very evident what shaped cell must result from the doubling up of the elongated cells in the mode I have attempted but very imperfectly to describe. The extension of the lines of force from the extremities of the elongated cells, would also give rise to the formation of nerve-fibres or roots of nerves, for the same law which caused the formation of cell-walls, would be in operation here; but instead of its operating in every direction round a nucleus or centre, it would be circulating round an extended line of force, and the result would be the formation of tubes, which would in fact constitute the nerves.

If we now turn to the mode of development of muscular fibres, and examine carefully Mr. Lockhart Clarke's description of the process, and the plates which accompany his treatise as published in the 'Microscopical Journal' for 1862 and 1863, we shall find, I think, still further exemplification of these matters. Thus, the fibre is formed from a granular semifluid blastema or matrix, in which are developed free nuclei, and nucleated fibres. The granules, says Mr. Lockhart Clarke, vary in size, the largest are but little inferior to the smallest nuclei, as if they formed a transition the one from the other. The nuclei, thickly crowded together, are in shape globular, oval, triangular, pyriform, fusiform or somewhat crescentic, and they each contain one, or a pair of nucleoli. It thus appears that a nucleus is first formed, by aggregation of particles, as in the case of the nerve-fibres; that it then becomes elongated (to use Mr. Clarke's words), as if by pressure, that cell is adapted to cell at variable distances, and that the fibres result from the union of the elongated processes extending from the cells, and as a rule the greater the distance between the nuclei, the narrower are the processes which unite them; moreover, the sheaths of the muscular fibres are like the sheaths of the nerve-fibres, tubular, which may be proved by making a transverse section of them. Want of space prevents my dwelling longer on the development of these structures, but it appears certain that the same force is at work in the aggregation of particles, and the formation of nuclei and muscular fibres as is in operation in the formation of nerve-fibres; but I cannot leave this part of the subject without very briefly referring to the rotations of the embryoes of the frog within the egg, as published in the Chronicle of Physiology in the 'British and Foreign Medico-Chirurgical Review' for July last. Dr. Schenck observes that the embryo of the frog exhibits constant

movements of rotation, the direction being the reverse of that of the hands of a watch, supposing the head of the animal to be directed away from him.   These rotations continue without interruption, and may be watched for hours together; they vary considerably in rapidity, but in a series of observations each rotation was found to be effected in from five minutes and thirteen seconds to twelve minutes and two seconds.   Dr. Schenck gives several reasons for the rotations being the result of pressure from ciliated cells, but whatever be the remote cause, one thing is quite certain, and that is that they give evidence of a dextrorsal current of electricity, and the effects of such currents would be the formation and growth of tissues by the process described above.

But the question may fairly be put whence the source of this electricity, for if it be the vital force its supply must be well regulated and constant.   To those who will dispassionately and without prejudice look upon the evidence I bring before them, I believe, even in the absence of direct and positive proof, I can show very conclusive testimony that the arterial blood owes its stimulating and vital properties to the magnetism; that it is made the medium of conveying from the lungs to the tissues of the body, and moreover that such magnetism is acquired by the blood in the lungs.   It may easily be conceived that direct proof of this is very difficult to obtain with the amount of knowledge we at present possess, inasmuch as any manipulation of a vital fluid or structure must interfere very materially with the vitality of that structure or fluid sought to be investigated.   I therefore pass at once to the consideration of the blood.

When dark, unstimulating venous blood has been converted into bright and stimulating arterial blood in the lungs, the corpuscles have undergone a change in shape by means of which, *it is said,* they reflect light differently, and the bright colour is produced.   That they are so changed in shape there can be no question, and such being the case I shall endeavour to show that the shape the blood-corpuscles assume when they have been converted into arterial blood (or as being still more definite in blood which is said to be inflamed) is an evidence of their being under the influence of electro-magnetism, and, moreover, is a change in shape that they could not assume under the influence of any other known force, especially heat or chemical action.

Thus the venous corpuscles which are more or less flattened spheres, become more deeply *biconcave in one direction and elongated in the other,* a change that is particularly marked in inflammatory blood —a state, be it noted, in which there is a considerable increase of fibrine.

Now, if we turn to the laws that regulate the electric and electromagnetic lines of force, we find that an electric current has a tendency

to elongate itself, but a magnetic axis of force has a tendency to shorten itself; again, like electric currents attract each other, but like lines of magnetic force exercise mutual repulsion. Now these tendencies seem at first not analogies but contrasts, but they coincide when it is considered that the two axes of power are at right angles to each other. Consequently bodies electrified are electric in one direction and magnetic in the other, and whilst they are elongated in one direction (the electrical) they would be shortened in the other (the magnetic), and the more powerful the influences brought to bear upon them of this character, the more marked would be the effect produced, just as we find is the case with regard to the blood-corpuscles under inflammation. Again, if this be their real state there are two causes why they should adhere to one another by their flat surfaces, as they are known to do, for we may suppose that during the arterial state currents of electricity are always circulating in them from end to end, and these currents being the same in all the corpuscles for the direction of the line of electrical force, would determine the long axis of the corpuscle) they would adhere to each other by their flat surfaces, because like lines of electric force attract one another, and also because they would exhibit magnetic polarity on their flat surfaces, which would cause them to adhere to one another by their poles.[1]

But it has been said that osmosis is the cause of the change in the shape of the corpuscles.

That water does escape from the corpuscles during the process of coagulation, I believe has been proved by several investigators, but if we go a step further I think it can be shown that osmosis itself is an evidence *of the passage of a current of electricity*, and does not occur without such current, and, if so, must be regarded as a proof of currents of electricity passing away from the corpuscles during the process of coagulation. I do not here refer simply to that process of electrical endosmose first observed by Porrett and afterwards confirmed by Miller, Wiedemann, Cross, and others, by which the fluid from one vessel is made to pass into another vessel simply by a current of electricity, the force of the current of water being in direct proportion to the current of electricity, but I wish to show that osmosis is at all times dependent upon electrical force.

Now osmosis consists of the passage of liquids of different degrees of density towards each other, through a porous membrane, until the density of the two solutions becomes equal. A solution consists of particles of matter so finely divided that the density of any one particle is less than that of the fluid it displaces. It is well known that matter cannot be separated from electricity, and equally well

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[1] I am now making a series of experiments on this subject, which I trust soon to bring before the public, but I may add that the results already obtained justify the above conclusions.

known that all matter stands in relation to other matter electrically as plus or minus. The law is equally well defined that when bodies in different degrees of electric tension are brought into sufficiently close approximation, a disposition to *equalization of force is at once* established, and they *mutually attract one another;* consequently, when solutions of different degrees of density are brought into electric affinity to each other, *electric currents must be established* and continued until the fluids on either side of the membranes have attained an equal degree of density and electric equilibrium, so that osmosis is none other than an electrical process. Dr. Norris, of Birmingham, who lately read a paper before the Royal Society on the Physics of the Blood-corpuscles, shows that the varying degree of attraction exhibited by the blood-corpuscles is explained by the law of osmosis. It being, he says, readily seen that when the exosmotic current is in excess the corpuscles would become more cohesive, and on the contrary less so when the endosmotic current prevails. In any case he refers the increased cohesiveness to the increased extension on the surface of the corpuscular contents.

Now, if we once admit the fact that currents of electricity are given off from the blood during the process of coagulation, we not only find a cause for the extrusion on the surface of the corpuscular contents, the osmosis, and the flaccid and unstimulating character of the venous blood-corpuscles, but we also establish a cause for the formation of fibrine in the blood, and the reason of its rapid coagulation when at rest out of the body by its being brought into contact with a foreign solid, which Mr. Lister has shown to be a cause of the coagulation of the blood. The fact that electricity exists on the surface of all bodies is established, and also that it is manifested by rubbing two bodies of variable electric character together, and I take it that the cause of the metals and *good conductors* generally not showing this property is the result of electricity being conducted away from the surface as soon as developed. Such being the case, it necessarily obtains that when the arterial blood which contains electricity in an appreciable state be brought into contact with the air or any foreign body, currents of electricity must be established at once, fibrillation of fibrine must occur (for the effect of currents of electricity in this respect are too well known to need comment), and the coagulation of the blood must continue so long as the surrounding media are able to exert an attractive influence over the electricity of the blood.

A few words now as to the mode in which this magnetism is obtained by the blood.

One of the chief characteristics of arterial blood is that it contains a large amount of oxygen. Now oxygen is one of the most powerful magnetic bodies known, and acts the same part to the atmosphere that iron does to the earth, but it must be remembered that

in this case we are not dealing with oxygen simply, but with oxygen in its allotropic condition of ozone, that is the state of its greatest density, and the state in which its magnetic and electronegative characteristics are most marked ; so that we do not hesitate in coming to the conclusion that arterial blood must by its absorption of oxygen be rendered magnetic. Acting upon this opinion, and notwithstanding that the late Professor Faraday had stated that fresh blood was diamagnetic, I deemed it expedient to find out whether arterial and venous blood did not differ in this physical respect. I consequently allowed arterial blood to flow through a tube, which tube had been previously tested between the poles of an electromagnet, and found to be slightly diamagnetic, and then (whilst the blood was flowing through) secured the blood in the tube. The tube was next suspended as soon as possible between the poles of the same electro-magnet. The result was conclusive and most marked. The tube was then removed, and after a while suspended again, when it was found to be less decidedly magnetic. The blood was next removed and the tube washed, and upon being suspended again it was found to have resumed its diamagnetic properties.

A second specimen of arterial blood taken subsequently from the same animal, which then appeared to be faint, was suspended in like manner, and found to be slightly diamagnetic, whilst venous blood was decidedly diamagnetic. The above were followed by other experiments of the same kind, and although it was difficult to obtain decided evidences of magnetism, the diamagnetic characters varied very considerably.

It is not difficult upon this assumption to explain the mode in which the rhythmical action of the heart, as well as the interchange of gases under respiration, is effected and maintained. In the first place, the cavities of the left side of the heart are filled with the stimulating arterial blood, the magnetic effects of which would be appreciated by the ganglia of Beale ; these ganglia would have currents of electricity generated in them, and they would communicate the stimulus through the nerves to the neighbouring ganglia, and we have already seen why a muscular contraction must then take place. But whilst, on the one hand, a muscular contraction resulted from the presence of arterial blood in the ventricle, the same currents would act secondarily upon the blood in the ventricle. This blood, it should be remembered, has been poured into the auricle from the pulmonary veins, and subsequently passed from the auricle into the ventricle. Now, it could scarcely be supposed that the magnetism which existed in the corpuscles could readily and rapidly arrange the corpuscles into a magnetic column, but these currents of electricity passed through the coils of nerves encircling the ventricle would immediately not only effect this, precisely in the same way as the core of soft iron becomes magnetic in the electro-magnetic machine, but in-

duce, at the same time, and independent of any more direct agency, currents of electricity in the muscular fibres or coils, and the column of blood thus mechanically arranged would be pumped out of the ventricle with a twist or screwlike motion imparted to it, as proved by the dissections of Dr. Pettigrew already referred to, and that after it had acquired polar influences.   But inasmuch as these currents of electricity must be transmitted to the lungs, another and very important result would accrue, for, circulating around the capillaries of the lungs, they would materially assist, if not solely cause and determine, by their polar influence, the absorption of oxygen and the elimination of carbon; moreover the chemical change which is known to take place here would determine the lungs as the zincode, and the heart and systemic capillaries as the platinode, and yet again for every wave of electricity sent from the heart, a corresponding wave must take place to the lungs, and by the consideration of these physical laws we establish a cause for the urgent dyspnœa which results from anything that interferes with the balance between respiration and circulation.

Dr. W. B. Richardson has lately conducted some very interesting experiments at the Royal Polytechnic Institution, by which he shows that the course of electricity through the animal body is preferentially by the blood.

That the blood diluted with water conducts electricity less perfectly than blood in the natural state.

That blood in the natural state is less perfect as a conducting medium than condensed blood.

That blood deprived of its water is the most perfect conducting medium of the three.

All these experiments go to establish the fact that of all the component parts of the body, the blood, and especially the corpuscular portion of it, has the greatest affinity for electricity; a fact of the greatest importance in this investigation.

I would now simply summarise the chief points upon which I have insisted in the foregoing paper.

1st. The principal trunks and branches of the nerves wind spirally round the heart.

2nd. That the muscular fibres are arranged in like manner, so as to form interminable coils.

3rd. That the nerve-fibres may be compared to the primary and the muscular fibres to the secondary coils of an electro-magnetic machine.

4th. That currents of electricity are known to pass through the nerves during their active state, and such currents must induce like currents in the muscular fibres.

5th. That the ganglia to which Dr. Beale and others attribute the action of the heart are formed in a most peculiar way, and must be amenable to certain fixed laws.

6th. That there is one force, and only one known force, viz., the electro-magnetic, that could cause the formation of such ganglia, and by a consideration of the laws of that force we find a precise law, even to the most minute particulars, by which these ganglia not only may be formed but kept moving, in obedience to the conclusions arrived at by Dr. Beale.

7th. That the mode in which the spinal cord and striped muscular fibres are built up, as proved by the dissections of Mr. Lockhart Clarke, bear equal testimony to the nature of the vital force.

8th. That the blood-corpuscles are made the medium of conducting this force from the pulmonic to the systemic capillaries, where it is made the medium of carrying on and determining the nature of the chemical action.

9th. That oxgen, especially in its allotropic condition, by the magnetic force it contains is the principle that renders the blood-corpuscles magnetic.

10th. That the process of osmosis, which is known to go on during the coagulation of the blood, is especially an electric action, and, consequently, an evidence of electricity escaping from the corpuscles during coagulation of the blood.

11th. That waves of electricity must, during life, be constantly passing from the heart to the lungs, and also from the lungs to the heart, which currents exert a most powerful influence in maintaining the balance between the rhythmical action of the heart and respiration.

12th. That direct experiment has proved that the blood may be magnetic or diamagnetic; and further, it would appear that exposure to air or withdrawal from the body, or any interference with its natural flow in the vessels, causes it to lose its magnetism, and that when drawn from the vessels in a magnetic state, it gradually becomes more and more decidedly diamagnetic.

III.—On a long Sea Voyage in Phthisis Pulmonalis.   By Roderick Maclaren, M.D., Surgeon to the Carlisle Dispensary.

The subject of this paper is one on which I can speak from some practical experience, having had phthisis myself, and having recovered on a sea voyage, during which I had several phthisical patients under my care.   It is also a matter which has to no small extent occupied my attention both before and since I received benefit from my own trip.

The voyage to which I more especially refer is the Australian one, and performed in a sailing vessel.   It probably possesses advantages over any other, for it necessarily occupies about three months either way; the changes of temperature are gradual, and if the patient desires to stay in the colonies, he will be within ready access of climates varying from tropical to temperate, though not so changeable as our own.

I will, in the first place, consider what kind of climate an Australian voyage affords. It is, of course, a moist one throughout, for the prevailing winds play over a large exposed surface of water, sucking up vapour therefrom.   There is also frequently much moisture in the air in the form of spray when the wind is at all high.   During my own voyage out, not taking into consideration the days spent in the Channel, I find that I have registered ninety-two days as fine, twenty as showery and twenty as wet, *i.e.*, rain fell during the whole, or almost the whole, of these latter.   From the time of leaving England the temperature steadily rises until the vessel is close on the line, generally in a month or five weeks; it then gradually falls, until the most southerly point in the passage is gained, which may perhaps be in another month; during the remainder of the time it rises slightly until Australia is reached.   To illustrate this, I will give a few of the extreme temperatures during the voyage; they were taken at noon in a cabin without a fire.   As we took 142 days on the passage, and from 80 to 90 is the average length, the " days out " should be diminished by more than a third, to give the time when a similiar temperature would be experienced ordinarily. We left England on November 28th, and on December 1st, off the Welsh coast, the thermometer stood at 46° F.; when 51 days out it was 84° F.; and two days afterwards, on the line, it stood at 82° F.; at 88 days out it had sunk to 50° F.; on the 104th day out it was 69° F.; on the 122nd 52° F.; and during the remainder of the voyage it varied between 60° F. and 70° F.   A return voyage from Australia would have very much the above temperatures read backwards, except that during the early part of the voyage a much lower temperature would be felt.   Thus a patient, a few days after leaving England, finds that he has left

behind him its sudden changes of temperature, its mists and fogs, and that he is in a mild equable climate (with perhaps occasional showers), which is soothing to his cough and lessens the liability to bronchitic or other acute exacerbations. As time goes on the weather becomes warmer; but the heat is not oppressive until the southern limit of the north-east trades is approached. The next portion of the voyage, however, is very trying to many from the extreme heat; it varies in extent at different seasons of the year, but may be generally stated as extending from about 5° N. to 10° S. Lat. In my own case I did not find it injurious, for I kept a good appetite and slept well; and although the feeling of oppression was sometimes marked, yet my general health improved. When this portion of the voyage is passed, and the south-east trades are fairly entered, we begin to have the gradual reduction of temperature. It is from this point that the gain in flesh was most observable in the cases I saw. I am disposed to regard the influence of the voyage so far as this stage as a sedative one; and that much as we might treat an acute inflammation with sedatives locally and generally until the disease resolve; and then employ a tonic treatment until the affected organ and the patient are able to stand the wear and tear of ordinary life, so the rest of the voyage in a gradually cooling atmosphere, with strong fresh breezes, may be looked on as the tonic, which is to repair the effects of the already subdued disease.

Beyond what influence such climates may have, many circumstances join in rendering a sea voyage beneficial. The patient is placed in the grandest hygienic conditions one could conceive; he breathes the purest air utterly uncontaminated, for even at night, in a well ventilated ship, it is very difficult, suppose the passenger tries, so to shut up his cabin that the air becomes foul; he drinks the purest water, for vessels now, instead of carrying hundreds of tons of this, have a few tons of coals and a condenser, and daily distil water for daily use. No drains fill the abode with the gases of decaying matter, and it floats upon an antiseptic medium salt-water. There is good and abundant food whatever class the patient may travel in; it generally contains a large proportion of fat, and in the second and third cabins salt pork and salt butter form a portion of the weekly ration; these I have repeatedly seen agree well with a stomach, which rejected other kinds of fat, including cod-liver oil. In the first cabin the variety on the table is a great advantage to the phthisical who often have a capricious appetite. A condition which I believe to be of great service, is the well recognised tolerance of alcohol in all its forms, which is established by sea life; for quanties of stimulants, which in the same individual leading an ordinary town life would produce excitement and subsequent gastric disturbance, can be taken without the least signs of either. And alcohol, well diluted so as not injuriously to affect the stomach, must be of great service in a disease attended

with elevated temperature and rapid waste, for after its adminis-
tration the former is lowered in a marked manner.   In an instance
that came under my own observation, a phthisical patient made the
experiment of taking no stimulants for a week, and his experience
was that he did not feel so well, and his cough was more troublesome,
than when taking his allowance, which was never less than four
ounces of brandy and one pint of ale per diem.   It is also worthy of
mention that the passengers' employment, if any, is trivial and under
his own control; he is freed from the worry of business, and the
heavier cares of life in general, and is thus able to devote his energies
solely to the occupation of getting well.   He is of necessity almost
constantly at rest, which of course has a modifying effect on tissue
waste.   May it not be also that the lungs are specially rested? for a
considerable portion of the time is spent in a hot and therefore rare
atmosphere, so that if the respiration is not quicker than in colder
regions, less oxygen must pass through the lungs, and consequently
less work be done by them, the free action of the skin must also to
some extent relieve them.   Sea-life has wonderful recuperative
power; it is the very antithesis of town life in a crowded locality.
Though not connected with my present subject, I will mention a case
in point.   An old gentleman, above sixty, when about three months
out, while reading an old newspaper, was astonished on putting up
his hand to rub his eye, to find that he had not his spectacles on, as
for many years before he left home he could not read newspaper type
without them.   He now found on further trial that his glasses were
no more use to him, at least for the rest of the voyage.   He told his
discovery to a fellow passenger with a like infirmity, and he soon
found that a similar improvement had taken place.

Among the various methods of treating phthisis, I select three for
notice.   Firstly, the promotion of the assimilation of fat, either by pre-
senting this in an easily digestible form, or by improving the condition
of the organs whose office it is to digest or absorb it.   Secondly, the
treatment of the disease by alcohol as the principal remedial agent;
and thirdly, by pure air, good food, &c., apart from special medication.
From the above remarks it will be seen, that a sea voyage carries
out in a thoroughly natural manner all these indications for treat-
ment: it promotes the assimilation of fat, which is procurable in
a digestible form; it increases the tolerance for alcohol, and affords
the purest air; so that, given a well selected case, we may look for-
ward to the best results.

But a sea voyage is a rough remedy, and it cannot be expected
that it will be beneficial in every case.   To send away a patient who
is in the last stage of phthisis, with night sweats, diarrhœa, and
cavities in his lungs, is only cruelty; to hope even to survive the
remedy, he must be able to stand some fatigue, to bear even some
further reduction in strength without being brought to a stage from

which there is no return : for the possibility of sea-sickness at the
outset must be considered, or even without this—for, strange to say,
phthisical patients often escape it—there is change of mode of life
and probability of stormy weather to be taken into account, and
there is the chance of detention in the tropical calms, which produce
loss of appetite, profuse perspiration, and often diarrhœa. Of this
portion of the voyage (the region of the " equatorial doldrums," as
sailors call it) Lieut. Maury says,[1] " Besides being a region of
calms and baffling winds, it is noted for its rain and clouds, which
make it one of the most oppressive and disagreeable places at sea.
The emigrant ships from Europe for Australia have to cross it. They
are often baffled in it for two or three weeks ; the children and the
passengers who are of delicate health suffer most. It is a frightful
graveyard on the way side to that golden land."

The cases which offer the best prospects are those in which the
patient undertakes the voyage before pulmonary alteration is far
advanced ; and especially when, in addition, close confinement, long
hours at business, or close application to mental work, seems to have
been a predisposing cause of the illness ; also those in which the
progress of the disease is very slow, which improve during a favor-
able, and grow worse during an unfavorable season year after year.
When the infiltration of the lung is localised and chronic, when it is
confined to the one side, and there is absence of evidence of disease else-
where, it may be looked on as a favorable case, and the further the de-
parture from this condition the less are the patient's chances of benefit.
It is stated, that cases in which hæmoptysis is the first, or at least a
very early symptom, do especially well. Cases are unsuitable for a
voyage, in which there are signs of extensive progressive excavation,
and all in which there is great muscular weakness. When we have
evidence of the disease being general, or possibly tuberculous, as
shown by glandular bowel or laryngeal disease, our recommendation
should certainly be withheld. The bowels in particular should be in
good trim, for the sedentary life and peculiar diet of a ship are apt in
healthy people to produce intestinal disturbance (constipation and
subsequent diarrhœa, or either of these alone). In a case which
persistently goes worse under favorable circumstances of habitation,
&c., on shore, the prospect of benefit would be small. A phlegmatic
habit of body should, I think, also be looked upon to a con-
siderable extent as a contra-indication for this remedy. While
speaking on this part of the subject, it is to be borne in mind, that
during its early stage phthisis is a curable, I think I may without
exaggeration say, a very curable disease under proper treatment. In
its later stages it is cured with difficulty, and a sea voyage does not
seem to me in any degree to lessen this difficulty.

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[1] ' Physical Geography of the Sea,' p. 249.

When cases do well, the improvment of the appetite, both as to the amount and kind of food which can be digested, is the first sign of amendment ; though it does not invariably betoken improvement in the advanced stages of the malady ; for, as a writer observes, the patient may be merely laying up for himself future trouble in biliary disorder, diarrhœa, or dysentery.

An Australian voyage is not an expensive remedy : a third-class passenger is lodged, fed, and, if necessary, doctored for three months, or perhaps more, for fifteen pounds,—about the average cost, I am informed, of a bed in a London hospital for the same time.   But if the patient's means allow it, the first cabin in a good ship offers advantages which more than compensate for the increased outlay ; the diet is very suitable, the sleeping-room is larger than in the second and third classes, and the deck accommodation, a matter of the greatest importance, is the best, least crowded, and driest in the ship.   Should the patient not be able to afford first cabin fare, I believe that he or she will best promote recovery by travelling as a third-class passenger, and in a ship where single men and single women are accommodated in separate divisions of the vessel, each occupying a large compartment the full breadth of the ship, with the berths arranged in tiers along the sides.   This allows of much freer ventilation than where a similar space is cut up into cabins.   I do not think that the second cabin offers advantages to the consumptive invalid commensurate with the increased outlay, in particular the accommodation for exercise, the main deck is shared with the third-class passengers, and is very crowded ; it is also much more liable to be wet, and consequently dirty, than the poop allotted to first-cabin passengers.

In concluding these remarks, I wish to add a few words in regard to badly-selected cases.   It is a subject on which I feel strongly, for I have had painfully and helplessly to witness the disastrous results of errors of judgment in sending advanced cases on a sea voyage, and I wish I could as strongly impress upon every one the consequences of such errors, and the responsibility of recommending this proceeding, as I do myself feel them.   Let me endeavour to sketch the condition of a second or third cabin passenger who is for the whole, or even for the greater portion of the day, confined to bed.   He shares his cabin with several others, and cannot have that privacy which the sick require.   His bed is a fixture, and moves with every motion of the ship, itself a dreadful infliction.   There is no one whose duty it is to wait upon him (at least in the third-class), and he must trust to the kindness and thoughtfulness of his fellow-passengers for all attentions.   In many ships the only food which, probably, he will be able to take, soup from fresh meat, is unobtainable.   Such accidents as a sea wetting the floor of his cabin are liable to occur, and are very distressing.   Suppose it becomes necessary to

remove the patient to the hospital, the arrangements of bed, &c., are the same, if no one else is ill he has it to himself; but the hospital is also the drug shop, and conceive, if you can, the condition of a phthisical patient living in a druggist's shop which is being shaken up every two minutes. In spite of all care in stormy weather breakage will occur, and the diffusion of the odour of some volatile medicine through a cabin is highly irritating to lungs of which only portions are doing work. A patient told me once, so wretched was his condition under such circumstances, that he was sorely tempted to make use of his knowledge of the drugs around him to commit suicide, if " the Everlasting had not fixed his canon 'gainst self-slaughter." When the weather is cold there are no means of heating a cabin except by candles or an oil lamp,—no hardship to the healthy, who can protect themselves by extra clothing, but a great one to the debilitated consumptive, unable to assimilate sufficient hydro-carbon to keep his temperature up. On board ship a passenger lives in the midst of continual noise of all sorts, caused by the waves striking the vessel, by the crew in working the ship, by the movements and talk of his fellow-passengers, &c.; how unsuited this is to the comfort and progress of a much debilitated invalid I need not say. Should the traveller be wealthy, he may be spared many of the inconveniences above mentioned; he may have his own cabin, a servant to attend him, a swinging couch, and the best food that can be procured at sea; but to what end! (I still speak of an unsuitable case for a voyage) he is separated from friends and home; he, in addition to his malady, brings on himself all the risks inseparable from a sea life, he becomes worse, and at last dies a stranger amongst strangers, or reaches a distant land to linger out a short and miserable existence, having derived anything but benefit from his travels, and, perhaps, not grateful to the advisers of his bootless labours. One may easily fancy what the feelings of a dying consumptive would be who has been thus sent adrift on the world with the high hope of better health and prolonged days, when he finds these prospects but fallacies, and death in its most wretched form before him.

CASE 1.—This case is my own. I suffered from cough with slight mucous expectoration, for nine months before starting on a sea voyage. Slight hæmoptysis occurred at a very early period, and recurred several times. During the last six of those months I had dry chronic pleurisy on the left side at the base. I never had diarrhœa, but had occasionally profuse night sweats and loss of weight. Immediately before departure the symptoms were shortness of breath, frequent cough, slight mucous expectoration, pain in the left chest on taking a deep breath, and loss of appetite. I was somewhat emaciated, my weight being 9 st. 10 lbs. The physical signs were slight dulness on percussion and cog-wheel respiration, prolonged expiration with

increased vocal resonance at left pulmonary apex.   There was coarse
friction over whole left base.   Advised by Dr. J. Warburton Begbie
and Dr. Lockie, I started for Australia about the end of November,
1866.   Improvement commenced so soon as the sea-sickness was
got over, and continued steadily during the whole outward voyage
with only one hitch; this was when three and a half months out
the ship having got into the neighbourhood of ice, slight hæmoptysis
reappeared, with temporary aggravation of other symptoms.   After
starting, it was in the appetite that I first noticed change, and then
the cough became better.   The warm moist southern air I found
wonderfully soothing to the incessant bark of early phthisis.   At
the end of the outward voyage I had gained in weight, strength, and
breathing power, but still had chest pain.   On the return voyage I
had a very smart attack of bronchitis during the third week out, the
result of having my berth made wet by a sea which came into the
cabin; no blood appeared in sputum, and on recovering in about a
week's time, progress continued steadily.   On my return to England
I was free from cough and chest pain; there was still some shortness
of breathing on exertion, and interrupted breath sound at left apex,
but no dulness on percussion and no friction at the base.   My weight
a month before landing was 11 st. 5 lbs., during the last twelve
months it has varied from 11 st. 11 lbs. to 11 st. 13 lbs.; and
I have continued in good health up to the present time, Dec., 1870.
The outward voyage occupied 142 days, the homeward ninety-five,
and I spent sixteen days in Melbourne.

CASE 2.—J. H—, æt. 23, student of divinity, outward bound.
He had suffered from symptoms of phthisis for more than twelve
months.   He had hæmoptysis at an early stage of his disease.
When he came on board he had cavities in right pulmonary upper
lobe.   The physical signs were dulness on percussion over upper
two thirds of right lung, with cavernous breathing over second rib,
and at left apex there was dulness on percussion and increased vocal
resonance, with exaggerated respiratory murmur.   His cough was
not troublesome; the expectoration purulent but small in amount.
There was extreme muscular feebleness, more than his emaciation
seemed to account for; he required to rest some time after going
half the length of the ship.   During the early part of the voyage
he seemed to improve, he had very little sea-sickness, and acquired
a good appetite.   On entering the tropics, about five weeks out, he
was attacked with diarrhœa, which, though repeatedly checked, re-
turned again and again and, along with excessive perspiration,
weakened him much.   Œdema of the lower limbs next appeared
without albuminuria.   When twelve weeks out he became insane,
and remained so for a fortnight.   A week after recovering from this
he died exhausted.   The marked features of his case throughout

were the comparative abeyance of the pulmonary symptoms, considering the condition of the lungs as shown by physical signs and the great general weakness. For several days before his end, raising his head from the pillow threatened immediate death. Throughout he was little troubled with dyspnœa. Of a consumptive family, his brother had left for New Zealand a few months before himself, being advised a sea voyage for consumption; he also died on the road. J. H— had been addicted to hard mental work, and was a distinguished alumnus of his University.

Case 3.—J. McG— æt. 24, blacksmith, outward bound, had suffered from cough, debility, loss of weight, and occasional chest-pain for about six months before commencing sea voyage. Had, on physical examination, evidence of some consolidation at left apex. Never had hæmoptysis. He improved rapidly, and had not the slightest bad symptom after coming on board. He had very little sea-sickness. He landed with considerable gain in weight and without his cough.

Case 4.—M. C—, æt. 26, dressmaker, outward bound. She had marked dulness over left apex, with altered breath sounds. There was short troublesome cough and emaciation. She suffered much from sea-sickness, and when three weeks out had a very bad attack of diarrhœa, which reduced her much. So soon as this stopped she began to show signs of general improvement; her progress, however, was much more rapid after the line was passed. She landed in Melbourne plump, well nourished, and free from cough. She never menstruated after coming on board, and there was some reason to suspect that this might be due to pregnancy.

Case 5.—L. M—, æt. 36, stockman, homeward bound. Patient had suffered from symptoms of phthisis for about two years, during which time he had two severe attacks of hæmorrhage from the lungs. He had no sea-sickness. On the 3rd day out he had severe hæmoptysis after some muscular exertion, and expectorated more than a pint of florid blood. On physical examination signs of excavation existed in both apices furthest advanced on left side. In a few days blood ceased to appear in the sputum, which then became simply purulent. Three weeks afterwards hæmorrhage recurred but this time not with the same severity. After going through the usual last stages of phthisis, viz. hectic, diarrhœa, and œdema of the limbs, he died nine weeks out. He suffered much from the motion of the vessel, which latterly produced, or at least aggravated, bed sores. He also latterly suffered from a degree of mental irritability, which closely approached insanity.

Case 6.—W. B—, æt. 43, joiner, homeward bound. He had cough and expectoration for some months before starting. There

were physical signs of softening deposit in the upper portion of left lung. He had dyspnœa on slight exertion. Had been intemperate. When a month out, in very cold weather, he had pleurisy, with slight effusion on right side, confining him to his cabin for between two and three weeks. From this he rallied well, and gained in strength and weight during the succeeding three weeks. In the hot weather, after passing the southern tropic, he became jaundiced, suffered much from night sweats, and grew very weak. On getting again into mild weather he improved, and landed in this country in very much the same condition in which he left Victoria in regard to his general health and the pulmonary lesion.

Case 7.—W. G—, æt. 40, labourer, homeward bound. Came under observation when three weeks out. His history was that he had been in bad health for some time, suffering from debility, cough and shortness of breathing. He came under my care for an attack of acute pleurisy on the left side. On examining the right lung there was dulness on percussion under the clavicle, with moist crepitation and prolonged expiration. Breath sounds were puerile over whole lung. The pleurisy was followed by effusion, which at one time filled almost the whole of left pleura, and was attended with orthopnœa; had no rigors. He was unable to go on deck for more than a month, and then gradually improved. Before he landed in England the effusion had considerably diminished, and he had gained in strength. Posteriorly the line of dulness reached to midway between the angle and spine of scapula; breath sounds could be heard over whole left chest, though very distant at base. Breathing at right apex bronchial in character. His condition on leaving the ship as compared with it on coming on board may be said to be nearly the same, *plus* some pleural effusion.

Case 8.—J. M. M—, æt. 24, merchant, homeward bound. This case was in many respects similar to my own. Before leaving England, he had suffered from cough, hæmoptysis, and emaciation. The outward voyage had almost completely restored him to health, and he was able to spend two months actively travelling in Australia and New Zealand, sometimes encountering the hardships of the bush. On the return voyage he gained weight considerably, and was free from symptoms of chest disease, except at the outset, when the weather was very cold, and he had a temporary return of cough and chest pain. He arrived in England in perfect health.

Besides the above cases, which came directly under my observation or care, there were many passengers who, if not actually phthisical, certainly belonged to the class which might readily have phthisis, and although their condition was not such as to make them patients, I noticed the marked manner in which thin narrow-

chested, round-shouldered people, such as compose a large proportion of the inhabitants of considerable towns, developed during a passage into tanned, straight men or women, with well-covered bones and great digestions.

Case 9.—Dr. Wallace, of Liverpool, has kindly sent me the particulars of the following case, which I abridge from his account. W. J—, male, æt. 24, July, 1868. Had an attack of hæmoptysis. Physical examination showed moist crepitant râle over left apex. Of a highly consumptive family, several had died rapidly after hæmoptysis.

Oct. 26th. *Physical examination.*—Comparative dulness at right apex, with deficient respiratory murmur. Tubular breathing, with slight increase of percussion resonance at left apex. Had several attacks of hæmoptysis since July. Drs. Bruce and Wallace advised a long sea voyage, and he sailed for Valparaiso, touching at the Brazils and various South American ports. He had no return of hæmoptysis; and when he again came under observation, Dr. Bruce found no signs of active disease. During the last autumn and winter, patient has been actively engaged in business. "Judging," says Dr. Wallace, "from the way the other fatal cases in the family terminated, there is no doubt that this young man would have been dead long ago had he not taken the long sea voyage."

Case 10.—Dr. Rigg, of Burgh-by-Sands, has been so good as to give me the following:—Male, æt. 31, outward-bound to Melbourne. When patient came on board, he was very weak and emaciated. The pulmonary disease had advanced to the third stage. For a month patient did well, gaining strength and appetite, and losing night sweats. He had almost no sea sickness. When about a month out, on Christmas Eve, a few minutes after expressing to Dr. Rigg his satisfaction with his own improvement, he was seized with hæmorrhage from the lungs, induced by violent coughing. This recurred about the same time for several nights, and a week after the first-mentioned attack he died exhausted.

Dr. Clouston mentions that he knows of four cases in which a long sea voyage was undertaken for phthisis; three of these recovered and one died on the outward passage. He was not professionally connected with the cases, and thus his knowledge of them is limited to the disease and result. Dr. Henry Barnes, of Carlisle, tells me of a friend of his who went to Melbourne from this country for the benefit of the voyage, he having consumption not advanced to softening; he was very much improved by the outward passage, and gained eighteen pounds in weight.

IV.— Observations and Experiments on the Use of Opium, Bromide of Potassium, and Cannabis Indica in Insanity, especially in regard to the effects of the two latter given together. By T. S. Clouston, M.D., Medical Superintendent of the Cumberland and Westmoreland Asylum, Carlisle.[1]

(*Continued from vol.* xlvi, *p.* 511.)

Clinical Observations.—The preceding observations and experiments having been undertaken chiefly with the view of obtaining more accuracy as to the immediate and remote effects of bromide of potassium and its combinations, as compared with opium, on maniacal excitement, and on the general health of patients labouring under excitement, I shall now record my experience of the effects of the salt and its combinations when given in the ordinary course of my medical practice among the insane. I began to give the bromide in a tentative manner in the end of 1867, and have continued to use it ever since.   It had at that time been recommended for various forms of insanity in several of the home and foreign medical journals. My attention was first strongly directed to the powers of the salt in brain disorder by a case which I was treating in the beginning of 1868.   I had amongst other things been giving both bromide of potassium and tincture of cannabis Indica to procure sleep in this case, which was one of melancholia, with great excitement and hallucinations, and by way of experiment I gave the patient a combination of the two.   I found the effects to be so very wonderful in this case that I employed the bromide alone, and in conjunction with Indian hemp very largely thereafter in similar cases.   I need scarcely say (the subject being therapeutics) that my first impression, that I had discovered a panacea for some forms of brain disorder, was disappointed, but I have found very good results from this combination in very many patients, and I shall proceed to give a summary and an analysis of my cases.

I have given bromide of potassium alone or along with Indian hemp in fifty-one cases of various kinds of insanity. I mean that in those cases I have given it a fair trial to relieve or cure the disordered brain function.   I have used it in a more desultory way in many more cases, but of course such a mode of giving a drug is quite useless for any scientific purposes.   As regards the forms of insanity to which my cases belonged I have put them in a tabular form (see Table VII).   And in the same table I have distinguished between the cases in which its use seemed to be attended with benefit, and those in which this could not be said to be the case.   The first important

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[1] The essay for which the Fothergillian Gold Medal for 1870 was awarded by the Medical Society of London.

fact in regard to this table is (and it may be thought to be a suspicious one), that those forms of insanity which are well known to be most curable figure most largely among the benefited. Of course

TABLE VII.

Form of insanity.	Seemed to do good.			Seemed to do no good.		
	M.	F.	Total.	M.	F.	Total.
Acute mania	6	1	7	...	2	2
Chronic mania . . .	1	...	1	...	4	4
Periodic mania . . .	4	8	12	1	...	1
Puerperal mania . . .	...	9	9	...	1	1
Melancholia	1	2	3	...	2	2
Insanity at change of life .	...	4	4	...	...	...
General paralysis . .	2	3	5	...	...	...
Total	14	27	41	1	9	10

this might have been expected, but I exercised what care I could in each case, so that the effects of the drug might be distinguished from the improvement that must have occurred in many of those cases in the ordinary course of the disease. When a remedy is said to be very beneficial in such curable affections as acute mania, puerperal mania, and insanity occurring at the change of life in women, we must carefully test its real efficacy, if it is not to fall into the disrepute of those panaceas for measles, jaundice, and delirium tremens which our fathers so strongly believed in. The table as it stands was the result

TABLE VIII.

Form of insanity.	M.	F.	Total.
Acute mania	3	...	3
Periodic mania . . .	...	4	4
Puerperal mania . . .	...	2	2
Melancholia	...	1	1
Insanity at change of life .	...	2	2
General paralysis . .	...	1	1
Total . . .	3	10	13

of my first analysis of the cases, and I believe it to be so far correct, but in Table VIII I think I have excluded all possibly doubtful cases, and only claimed credit for the remedy where I had an opportunity of applying some crucial test, such as stopping the medicine, watching the progress of the disease without any medicine, and then giving it again. I think that not even the veriest medical sceptic in this sceptical

time would take exception to any of these thirteen cases.   I shall
presently quote some of the most typical of them.   They were many of
them obstinate examples of their respective forms of insanity, which
had " defied other modes of treatment."   If to a patient whom one
has known to have had regular attacks of periodic mania for years, we
give a medicine at the commencement of an attack, and the patient's
excitement ceases, contrary to anything known in the history of the
case before, then I think we may fairly conclude that the medicine
and the absence of mania are cause and effect.   If in a case of mild
melancholia at the change of life in a woman, the disorder has
existed for a year and a half, if most of the remedies ever before
recommended for that class of cases had been tried and had failed
to do good, and if at last the bromide of potassium procures sound
sleep, and immediate visible improvement in appetite, weight, and
mental state, surely some credit may be given to it.   But if in this
same woman its use is intermitted, and all the symptoms at once
return, and again immediate improvement follows its employment,
so that the patient becomes able to employ herself as she never did
before since her illness, and through healthy employment gains in
flesh and strength, and gets quite as well in three months as ever
she was in her life, surely we cannot deny to therapeutics a cure in
the best sense of the term.   Or if a cure cannot be expected, as in
a case of general paralysis, if a mixture of bromide of potassium
and Indian hemp so subdues intense excitement, that when not
taking this medicine the patient is noisy, violent, destructive, sleep-
less, and rapidly losing weight, and when taking it he is quiet, semi-
rational, dresses and eats properly, and remains in this state for six
weeks, till the disease in its natural course passes into its quiet
stage, I think here we have a palliative of great value and importance.
Or if an old lady gets irrational, restless, sleepless, and unmanageable
by her relatives, and if apparently the last alternative to sending her
to an asylum has been tried and failed, until half-drachm doses of
bromide of potassium and tincture of Indian hemp is found to subdue
and quiet this irritability and restlessness, so that she can be quite well
kept at home, for the month or two during which this excitement lasts,
and until the ordinary dotage of old age to which this excitement was
a prelude, comes on, surely the physician's power was augmented, and
the patient was unquestionably the better for the remedy he employed.
  In acute mania I seldom found the bromide given alone do any
good, or, indeed, have any perceptible effect.   I gave it in all doses
up to 120 grains three times a day, and I continued its use in some
cases for a few days.   But when combined with tincture of cannabis
Indica the effects of the mixture were in many cases very remarkable.
Sometimes if the excitement was very intense I began with drachm
doses of each three times a day, or, in some cases, every three hours
for the first day.   In the cases in which the effects were good, they

usually appeared by the end of the first day of its use. The patients became less restless, the shouting and violence were abated, and at night they slept. The skin, too, which is so often dry in acutely excited patients became more moist, and they perspired freely. The pulse usually lost in force. Indeed, this is the only objection I have to this mixture, that the force of the heart's action is undoubtedly lessened in most cases by it. But I have never seen a single case of syncope, except in one woman who fainted two hours after a dose, but soon recovered. The lessened force of the heart was shown, too, by the paleness of the face and skin generally. After the medicine has calmed the excitement the patient remains confused in mind. The intelligence and coherence of ideas, of course, do not usually return for some time. It is often sufficient if one or two doses per diem are given after the first day or two, and I have stopped its use altogether at that time—the patient remaining free from acute excitement. The greatest advantage of this sedative over every other that I have tried in acute mania was, that these patients took their food as well or better during its use as without it. Every one who has acute mania to treat knows that there are three great risks. The patient's appetite may fail, the excitement may cause complete exhaustion or death, or it may last so long that the power of the brain to become the medium of normal mental manifestations seems to be lost or impaired, and dementia results. There can be no doubt that the patients being got to take a large amount of nourishing food and stimulants is of the very first importance in all cases of acute mania, and it is the great risk of taking away the patient's appetite that prevents opium or henbane being more extensively used. Especially is this risk great if we give large doses of opium. It seems to me that the bromide and Indian hemp combined approached more nearly by far than any other drug to our great desideratum in treating acute excitement of the brain, viz. a medicine that will so alter or modify the morbid functions of the brain, that the patient will cease to exhaust all his bodily energy in muscular movement and constant wakefulness, and will at the same time allow the reparative effects of rest and food to act quickly in restoring the normal nutrition of the cerebrum. In some cases complete recovery of the mental powers took place very soon indeed after the excitement was subdued; in others, the confused and incoherent state remained for a long time. In the three cases I have put down in Table VIII the patients were rational or coherent or nearly so within a fortnight after getting the medicine, though one was of a month's duration; the excitement in each case being of about three days' duration after being put on the mixture. The cases in which the good effects are less marked are those in which the excitement is subdued, but the patients remain confused in mind, incoherent and suspicious, sometimes with delusions for

periods varying from one to six months.   The cases in which its use
is followed by no particular benefit as regards cure are those (and in
my experience they were rather the exceptions), in which it fails to
allay the excitement except when given in very large and continued
doses; and when after its use has been continued for a week or two
the excitement still remains as acute as ever if the medicine is stopped.
If good effects are not manifested within a fortnight of treatment in
a curable case of acute mania, my own opinion is that then the case
should be left for a time at least to nature, with appetizing tonics
and nourishment alone.   In all the cases of acute mania where I say
that the medicine did good, I mean that its effects were distinctly in
the direction of health, and not merely that the symptoms were re-
lieved.   In some of those cases in which the best effects resulted
from the use of the drug, I think that if it had been given at first
the patients need never have been sent to an asylum at all.   If my
anticipations in regard to it are realised, this will unquestionably
be one of the most important effects of the remedy.   To be able to
treat many cases of insanity, especially if attended with excitement,
at home has been impossible just because we had no remedy that
could safely be given to allay the excitement without the risk of in-
terfering with the recovery of the patient.   In the case of senile
mania to which I referred, the patient was treated quite well at
home.   Some cases of maniacal excitement of short duration which
now have to be sent to asylums will, I think, be saved from this by
the use of the bromide and Indian hemp combined.   There are few
risks attending its use, and its good effects, if there are to be good
effects, are so very soon seen and follow its use so manifestly, that
there generally can be but little question of mere coincidence.

In these forms of maniacal excitement which have hitherto been
found to be incurable, the bromide of potassium and its combina-
tions are no more powerful than other drugs have been found to be
in effecting cures.   But in many of those cases its effect is to modify
the symptoms of the disease so much that the lives of the patients
become far more tolerable to themselves and others.   In chronic and
periodic mania, I have given the bromide combined with Indian
hemp in eighteen cases, and it produced good effects in thirteen of
these.   In four cases of periodic mania to whom I gave it, the effects
were, perhaps, more wonderful than in any others, because the
patients had all confirmed excitement of a severe character; the his-
tory of their previous attacks was known, and could be contrasted
with their attacks when getting the drug.   In three cases the effect
of the drug was to cut short an attack when it was coming on in its
ordinary course as it had come on before.   In two of the latter the
attack was only postponed, as it were, but in the third case the
patient remained well, was discharged from the asylum, and has kept
well for twelve months—a far longer period than she has ever been

free from excitement before for five years. I shall relate the case more fully afterwards. The other two were not so striking, but still are curious. One was a woman who had in her youth taken epileptic fits. After these ceased she became subject to severe attacks of excitement, which came on about every two months, and lasted for a fortnight. At the beginning of one of these attacks I gave half-drachm doses of bromide of potassium three times a day, and the excitement ceased within twenty-four hours. The patient continued to take the medicine for two months and got better mentally than she had been for several years. It was discontinued to see if the effect was permanent, but an attack of excitement came on at once, and the medicine, though it has since controlled and modified such attacks, yet has never quite stopped them. Another case was that of a woman who for a long time had had an attack of acute excitement every three or four years, the attack usually lasting from six months to a year. She became suddenly maniacal, and got at first drachm doses of bromide thrice a day without any good effect, then half-drachm doses combined with half-drachm doses of tincture of cannabis, but still the excitement was daily getting more intense till she was incoherent, noisy, sleepless, dirty in her habits and violent. The quantity was increased after a few days to forty-five grains of the one and forty-five minims of the other every three hours, with the effect of completely allaying excitement, so that in two days she was removed back to the convalescent ward, remained rational, industrious, and apparently well in mind for a week, during which time she got no medicine. At the end of that time the excitement began again, and is now running its usual course; its symptoms, however, being wonderfully controlled by forty-five grain doses of the bromide with forty-five minims of tincture of cannabis twice or three times a day. She has taken this for three months, and though far from coherent or rational, yet sleeps, and is not destructive or dirty or violent, as she used to be and is now, when the medicine is stopped. She has lost in weight very much, but takes her food well. The comparative loss in weight as compared with former attacks I am not able to say, as she was not weighed in the different stages of former attacks.

Another case is that of an old woman who has taken periodic attacks of mania for at least twenty years, and has been so much better during her last attack under the use of drachm doses of the bromide and tincture of cannabis morning and evening, that she has been kept in the infirmary ward of the asylum during the nine months the attack has lasted, and has during that time slept in a dormitory with other patients, has taken her food, and is now passing into the quiet stage of her disorder. In every attack which had occurred before, she had been destructive, dirty, very noisy, and had to be all the time in the refractory ward.

In one or two cases of very severe excitement the attempt to suppress it by often repeated doses of the medicine has seemed to do harm.   The patients got into a state resembling acute dementia, and their nutrition was much interfered with.   In one case to which I referred, where the person was old, very weak, and the pulse very thready, she once fainted after getting a drachm dose of each, but she very soon revived.

The forms of insanity in which the bromide or its combination with Indian hemp did most good were puerperal mania, and that form of mild insanity which occurs at the change of life in women. I used it in ten cases of puerperal mania, and in four of such climacteric insanity (see Table VII), and in all except one its use was attended with benefit.   In two cases of puerperal mania, both very violently excited, the employment of forty-five grains of the bromide with forty-five minims of tincture of cannabis three times a day was followed almost at once by alleviation of the excitement, and in about a month by recovery.   In another case of puerperal mania of three days' duration, and of the most violent character, I gave drachm doses of each every three hours, with the view of cutting short the excitement at once, and in two days the excitement was quite subdued, but the patient remained stupid and vacuous in mind for a fortnight (taking her food quite well, however, during that time), and though now, after three months, quite coherent, industrious, and rational on most subjects, yet is suspicious, and has some delusions.   I do not think I should again give the medicine in such a case in quite such quantity, but rather endeavour to allay the excitement a little more gradually.   I am quite sure, however, that to have subdued the excitement in that way with any other drug I know would have been followed by total absence of appetite, dry tongue, and much feverishness.

In five of the cases where the excitement was milder, and where the chief characteristics of the disorder were sleeplessness, restlessness, delusions about husband and children, reduced bodily condition and impaired appetite, I found drachm doses of the bromide given every night procured sleep, and seemed also to increase the appetite, and allay the restlessness and unsettledness of mind, and the patients recovered sooner than my experience of similar cases would have led me to expect without the medicine.

In the cases of insanity at the change of life in women, I found that drachm doses of the bromide alone at night was most beneficial in procuring sleep and allaying the restless depression that usually accompanies this form of aberration.   In one of these I had tried opium most carefully, and it had failed to do any good, while the use of the bromide was at once followed by much benefit, and its continued use by complete recovery in two months.

I have given the bromide of potassium alone and in combination

with the Indian hemp in five cases of melancholia, and with slight benefit in three of them, but with decided benefit in only one case, and that I shall afterwards relate. In ordinary melancholia the bromide does not do much good, except by procuring sleep, and combined with cannabis it often seems to do harm. If there is much restless excitement, with hallucinations of hearing, they may do good, not otherwise.

The last form of insanity in which I have used the mixture of bromide and cannabis is general paralysis, and of course in that most fatal of diseases I merely expected, and only got, palliative results. But in no disease is a good palliative of the symptoms in the worst cases of more real value, especially in an asylum, and after my extensive trials of opium (the worst of all in this disease), henbane, digitalis, Indian hemp alone, and bromide of potassium alone, I have found the mixture of the two latter, given in doses of from half a drachm to a drachm of bromide with a drachm to a drachm and a half of the former, to be the safest, surest, and most manageable in its effects. All physicians who have had experience in the wards of an asylum know that of all cases of insanity a general paralytic in the first or beginning of the second stage of the disease passing through the period of excitement which often occurs then, is by far the most difficult to manage. In most other forms of maniacal excitement is there some faint approach to self-control or amenability to control by others, but in this the noise, the violence, the destructiveness, the entire absence of any sort of fear of consequences in annoying fellow-patients, the sleeplessness and restlessness, are simply unmitigated and incessant. An ordinary maniacal patient may generally be taken by an attendant and walked about in the open air, but an excited general paralytic fights and struggles until he or his attendant gets injured in some way. It can be imagined what a boon for such a case, for his attendants and for his fellow-patients, it would be to have some sedative medicine which would somewhat allay his violence and yet not interfere with his appetite until the period of excitement was tided over. Such cases are notoriously intolerant of opium; henbane has been hitherto most relied on in half-ounce and ounce doses of the tincture, but if long continued it causes dryness of the mouth and lips, and loss of appetite; digitalis has been strongly recommended, and in some cases its effects are admirable, but there is a wide-spread mistrust among those who have used it much that it is not a safe drug to give in all cases—one patient poisoned, or nearly so, by it, causes an excusable timidity in using it in most minds, and it is surprising how many asylum physicians have this timidity.

I have given the bromide and Indian hemp to five cases of general paralysis in the most excited and worst stage of the disease, and in all of them I found the worst and most troublesome features of the excitement abated, without causing much loss of appetite. In one

case of most violent excitement I was giving ninety-grain doses of the bromide with ninety minims of the tincture of Indian hemp for weeks, and the patient's tongue got thickly coated, the appetite was impaired, he became very sleepy, and all the other features of " bromidism " showed themselves. But this I attribute entirely to the large doses of the bromide so long continued. I do not think that the doses of this should exceed a drachm, or even forty-five grains if it has to be given three times a day and *long continued*. The great advantage of this mixture is that single doses will *never* do any harm, nor is there the least risk in going on with it for a few days; and that any bad effects come on gradually, and can be observed before any harm whatever is done to the patient. By lessening the doses of the bromide, the bad symptoms at once disappear. In one case of most violent general paralytic excitement I gave forty-five-grain doses of the bromide and forty-five minims of the cannabis morning and evening for many weeks, the patient during that time working out on the farm, sleeping at night, and behaving rationally, while if it was stopped for two days he got noisy, dirty, violent, unable to do any useful work, and quite maniacal. He quietly passed into the second stage of the disease, when the medicine was no longer required. In general paralysis in women it is most useful in half-drachm doses of each. If used in the end of the second or third stages of general paralysis it subdues excitement in small doses, but it increases the want of co-ordinating power of the muscles. Especially is this seen in the patient's walk. I have seen a drachm dose of each quite take away the power of walking for a day in a general paralytic who had previously been rather shaky on his legs. It does not in any way affect the peculiar delusions of general paralytics. When a patient is beginning to be excited, he should get one drachm of each at bedtime, and then half-drachm doses should be tried every three hours next day, or until the excitement is in some degree subdued. It will then be sufficient to give one dose in the morning and another at night in many cases, or at most three times a day. If the tongue gets much furred after using the medicine long it will be quite sufficient to stop its use for a few days.

I shall now give an abridged account of a few of the cases in which I employed either the bromide of potassium alone or along with Indian hemp.

Acute mania.—W. B——, æt. 18, a boy who had been insane for three months, but whose symptoms had become gradually worse until he had become quite maniacal.

On admission he was a small, ill-developed youth. He was quite incoherent, restless, violent, and destructive. No bodily disease. Temperature, 95°. Pulse, 80. Conjunctivæ suffused; right pupil more dilated than the left. Tongue slightly furred. He was quite sleepless. He was ordered half a drachm of bromide and of tinc-

ture of Indian hemp three times a day. The excitement was evidently lessened after each dose. He took his food well, and on the fourth day after admission the excitement became greatly more subdued, and his mental condition one of confusion of ideas and stupidity. The medicine was then stopped, and in a week he was coherent and rational, and rapidly gained in weight. In two months he had a very mild subacute attack for a few days, but has since then (six months) kept quite well.

Acute mania.—J. P—, æt. 27, a man who had been insane for a week. The maniacal excitement had come on suddenly, and after it commenced he was sleepless, restless, incoherent, and most dangerous. He tried to cut his mother's throat, and tore out all the windows out of a gentleman's dining-room. Maternal grandfather insane.

When admitted was in mechanical restraint (as he had been since attempting his mother's life), and was confused and suspicious looking, though partially coherent. He was a robust, healthy looking man, of 6 ft. 1 in., very strong, and his bodily functions all performed normally. He got worse mentally until in two months he was quite deliriously maniacal. He tried to choke everyone near him, sometimes making attempts on his own life, once very nearly killing both an attendant and himself. He was sleepless, his tongue got furred, and he had frequently to be secluded in a strong room for a day or two at a time. Hyoscyamus, opium, antimony, and stimulants were all tried in vain. He had the " ear of the insane " in October, and after that gradually got more quiet, till in the following January, a year from the time of his admission, he was rational, coherent, industrious, and quite free from excitement, though a little silly in mind. In the following September he suddenly took a violent fit of excitement when attending a concert one evening, and became as violent, dangerous, and incoherent as ever. He was at once put on drachm doses of the bromide with ninety-minim doses of tincture of cannabis, three times a day. In two days he was free from excitement to a great extent, and continued to get the medicine in half the above quantities. For the three months the excitement lasted he never required to be secluded, he worked on the farm regularly, he took his food, he exhibited none of the suddenly dangerous and violent paroxysms which characterised his former attack, though if the medicine was stopped he at once showed signs of being violent. The attack passed off, and he remains now free from excitement.

I think this case will have periodic attacks of excitement all his life, but after my experience of the power of bromide and Indian hemp to subdue the worst symptoms, I do not look forward to the coming on of the next attack with the anxiety and dread which I should have felt (and did feel when the second attack began) had I not known of this safe and powerful sedative.

Periodic mania.—H. S—, æt. 23. This young woman has had six attacks of mania in four years. She had been insane for four weeks previous to admission. All the attacks had begun during menstruation, and while maniacal she was always very erotic, especially at the beginning of the excitement. She was violent, incoherent, noisy, dirty in her habits, and sleepless before admission and for about three months afterwards. She then got well, but in six months had another similar attack of mania lasting for two months. She lost twenty-eight pounds in weight during this attack, and her temperature was always 1·5° above its normal rate when she was excited. She remained free from excitement for nine months, and then had another similar attack. After four months of sanity she one night suddenly got up, smashed the windows of her dormitory, saying that the devil was looking in, and became violently excited, her temperature that day being 100·8°, pulse 108 and strong. She was ordered drachm doses of the bromide every three hours with a drachm of ammoniated tincture of valerian with each dose. She was put into a dark room at her own suggestion. On the following day her temperature was 99·6°, and her pulse 108. She was still much excited, but not so much so as on the day before. On the second day her temperature was 99·3° and her pulse 130 and weak, the excitement being much allayed. The medicine was after this given only three times a day. She was kept in bed for a fortnight in a dark room, as she said that if she got up she would get worse. At the end of that time she was still rambling, partially incoherent, and full of delusions, but nearly free from active excitement, and the medicine was discontinued. She remained slightly affected in mind for another fortnight. At the end of a month from the day the excitement began, she was well, and was discharged from the asylum six months thereafter. I heard a few weeks ago that she was still keeping well, and it is now a year from the time her attack of mania was thus cut short (as it seems to me) by bromide of potassium. I gave the valerian because she was beginning to menstruate at the time the mania began.

It will be observed that the excitement in this attack only lasted about three days, and she had never been less than two months excited at a time in her nine previous attacks ; the aberration of mind was only of a month's duration, it had never been less than between three and four months previously, every symptom of an ordinary attack being clearly present at first ; and the interval of sanity has been even now longer than any such interval except that between the fifth and sixth attacks. The excitement disappeared as the patient showed signs of coming under the influence of the bromide and its constitutional symptoms were developed.

Periodic mania.—M. G—, æt. 56 ; a woman who has been rather

weak-minded from birth, but got married and had children. She has been subject to attacks of excitement at intervals of a year or two for twenty years.

On her admission from another asylum, she was found to be a little thin woman, who went on talking quite incoherently, was restless and destructive to her dress, and violent at times. Sometimes she refused her food, and had to be fed with the stomach pump. Though she got much food and stimulants she became quite run down, thin, and exhausted in mind and body before the attack was over. The first attack lasted from March till the following January; she had a short attack in April. In the beginning of the next year she had another short attack, and in the December following she had three epileptic fits (the first she ever had). They were the prelude to an attack of excitement which lasted for six months. In the following year she had another attack of excitement lasting for three months. In the beginning of this year she again became excited, and was put on drachm doses of bromide and tincture of Indian hemp, three times a day at first, and afterwards morning and evening. The medicine so completely moderated all the unpleasant symptoms of the excitement that she was kept in the infirmary ward among the sick patients. She was not noisy, destructive, and dirty in her habits as she had been before; she did not lose flesh to nearly the same extent as before, she took her food better than ever she had done before during excitement, and the attack terminated in September, leaving her far stronger than she had ever been before after a long attack of excitement.

This case illustrates the effect of the medicine on an old person very weak in body, and perhaps, therefore, more amenable to the effects of the drug. Such cases when violently excited in asylums, are far worse to manage, and cause far more anxiety than stronger patients, and, therefore, it is more important to have a mild and safe sedative.

Puerperal mania.—E. B—, æt. 33. This woman had been insane for four days, having been confined of her fifth child six weeks ago. She at first began to be suspicious and jealous of her husband, then became sleepless, restless, lost all interest in her children, and then got very violent.

On admission she was confused in mind, but soon became violently maniacal. Her temperature was 97·2°, pulse 92, strong; breasts full of milk. The usual measures were taken to stop the secretion of milk and relieve the breasts, and she was ordered a drachm of bromide of potassium and of tincture of cannabis every three hours during the day. By the end of a fortnight she was free from excitement, but was rambling in mind and full of queer constantly changing delusions. She ate and slept well most of the fortnight she was on the medicine. Her temperature fell to 96°. She has gone on

improving, but rather slowly, and it was three months before the confused suspicious state of mind passed away. She often got, during that time, a drachm of the bromide at night for sleeplessness with the best effects. She now is almost well. Her recovery has been delayed by menorrhagia.

I am inclined to think I pushed the medicine too far in this case, and subdued the violent excitement too quickly. The prolonged after stage of confusion of mind, and the great fall in temperature, makes me think so; still the sedative effects were here most marked.

Melancholia with excitement and hallucination.—M. C—, æt. 60; a sempstress, unmarried, who had been insane for about three months. The immediate cause of her insanity is stated to have been a sudden shock which she received from a nephew shouting in her ear that he would kill her. She had " brain fever " twenty years ago, and is stated to have been rather " nervous" and irritable ever since. After the shock she got depressed in mind, and began to take fancies that people were going to hang her, that dogs were going to worry her on account of the crimes she imagined she had committed. She got so depressed in mind that she many times attempted to commit suicide by strangling herself. Had been sleepless. No hereditary predisposition to insanity.

On admission she was dull in mind, but quite coherent and rational on all points except that she said she was to be hanged. She was short and rather stout; tongue furred; pulse 96, very weak and thready; morning temperature 97·6°; evening temperature 97·2°; weight, 134½ lbs. Her pupils are both contracted and her eyes suffused.

For the first month she got no medicine. During that time her average morning temperature was 98·1°, and her evening temperature 97°, and the pulse was 100 and remained weak. She ate pretty well, and gained 3½ lbs. in weight in that time. She did not sleep well. Her delusions remained, and she got more depressed in mind. She was then put on one grain of opium three times a day. She slept better while taking this, but her depression of mind got worse. She had hallucinations of hearing, and after a fortnight the opium had to be given up. While taking it her temperature in the morning was 7° lower than it had been, and in the evening 1° higher, while her pulse was ten beats lower. She ceased to gain in weight after getting the opium. After this, various modes of treatment were adopted, and amongst others she got occasional doses of tincture of cannabis indica; but she continued to get worse and to lose in weight until, at April 1st, 1868, her state was the following :—" Is much excited, sleepless, restless by night and day, cannot employ herself in any way, imagines that she is to be hanged every minute, begs every one about her for a ' reprieve,' tries to get forcibly out of the ward door to get one ; tries sometimes to commit suicide ; says her brain is

'on fire,' and cries out, 'My head, my head—I'm confused. I don't know what I'm doing—I'm mad.' Has lost a stone in weight."

She still got worse, requiring stimulants to keep her up until the beginning of August, when she was put on drachm doses of bromide of potassium thrice a day with scarcely any good effect. By way of experiment a drachm of tincture of cannabis Indica was added to each dose about the middle of August, and the effect of each dose of the mixture was quite marvellous. She at once became quiet, slept at night, took her food better, began to be industrious, and was sent to the convalescent ward, and to see whether this improvement was really due to the medicine it was discontinued and in two days she was nearly maniacal again. It was continued regularly for six weeks. She gained ten pounds in weight, and then began only to get a dose of the medicine when she felt her head getting confused. She used to ask for it to clear her head, and said its effects were "miraculous." She ceased to have the hallucinations. She remained in this state till December, requiring no medicine at times at all. At that time she began to get worse. She was then put on regular doses as before, and the attack was quite checked, but in January she got worse in mind and more stupid. She remained quiet till July following, getting the medicine regularly. It then lost some of its good effect, but still subdued the excitement.

It was through this case that my attention was first directed to the power of a mixture of tincture of cannabis and bromide of potassium to allay excitement of the brain. I never in my experience of over 2000 cases of insanity had seen anything so wonderful. It seemed a direct antidote to the morbid action of the cerebrum. I thought from the beginning that the woman had limited softening somewhere in the ganglia at the base of the brain. The contraction of the pupil, the small pulse, the hallucinations of hearing, and the unimpaired intelligence on many points seemed to point to some such lesion. If my diagnosis is correct, of course complete recovery could not have been expected. In no case in which I have given it since have I seen quite such good effects at once. Its sedative action I have seen as powerful, but it must be admitted that it is seldom, indeed, in therapeutics that we are able even temporarily to remedy a morbid action of the cerebrum so severe, so long continued, and so obstinate.

Insanity at the change of life.—A. H—, æt. 47, a married woman, who had lately ceased to menstruate, and who had been insane for three months; she had been restless, sleepless, noisy, complaining of all sorts of imaginary ailments, and had attempted to commit suicide.

On admission, she was depressed and restless looking. She complained of bodily weakness and many ailments. Pulse 75, good;

temperature, morning, 97·3°, evening, 97·1°; weight, 130 pounds; no bodily disease to be discovered.

She remained from May till the following January in the state described. During that time she got various medicines, chlorodyne, Pil. Aloes et Fer.; quinine and iron, and Tr. Valer. co., but she got no better. In January she was put on a grain of opium, three times a day. She was kept on this for about three months. It seemed to produce improvement, at first procuring sleep and allaying restlessness, but there was no permanent improvement in the mental depression. She lost six pounds in weight, and her average temperature rose ·9° in the morning, remaining the same at night while on the opium. In April she was put on half-drachm doses of bromide of potassium at bedtime. This at once procured sound sleep, and after about a fortnight the restlessness and depression were visibly allayed so that she could settle to regular useful employment. The medicine was continued till July, when she had gained more than a stone in weight, and was apparently well in mind. As the case had been so long insane she was kept in the asylum till September, 1868, in case of a relapse, was then discharged recovered, and has kept well since.

This is a good example of the good effects of the bromide alone in climacteric insanity. It is usually subacute in its character, and does not require such large doses. I was beginning to despair of seeing any improvement in the case when the bromide was tried.

General paralysis. —T. D—, æt. 50, in the end of the first stage of general paralysis. Before admission he had been much excited, and had all the characteristic delusions of the disease about his immense wealth, &c.

On admission his speech was affected slightly, and he had all the most characteristic symptoms of general paralysis. He became worse rapidly, getting more and more excited. He was exceedingly noisy by day and night, filthy in his habits, and so constantly attacking and interfering with other patients and attendants that it was nearly an impossibility to prevent him from being injured. Indeed, on two occasions he was severely hurt by fellow patients. There seemed to be no alternative between almost constant seclusion and the risk of accidents. In this state he was put on a drachm and a half of the bromide with the same amount of the tincture of Indian hemp thrice a day, and after he had taken it for two days he became quite manageable. After about a fortnight it was found necessary to reduce the quantity of the bromide, on account of the persistent drowsiness and the furred tongue it was causing; but five-grain doses, however, were given until that attack had passed off, and with the same sedative influence.

This case is merely a type of general paralysis in the excited stage.

Such a patient is, without exception, the most troublesome class of inmate of an asylum.

Summary.—1. The preceding observations consist of three parts. 1st. Experiments to determine the effect on maniacal excitement of single doses of certain medicines, stimulants, and food. 2nd. Experiments to determine the effect on maniacal excitement of prolonged courses of certain neurotic medicines. 3rd. An account of clinical observations and experience of the effects of the same medicines in all kinds of insanity.

2. To compare the effect of opium on maniacal excitement, with that of bromide of potassium, with that of cannabis Indica, and with that of a mixture of bromide of potassium and cannabis Indica, and to compare the effect of these with that of a pure stimulant in large quantity, and with that of a nutritive food, eleven maniacal patients were treated with drachm doses of each of the medicines, and with four ounces of whisky, and the beef tea made from a pound of beef on successive days, and the results noted. The experiments were repeated from fourteen to twenty-nine times.

3. A mixture of one drachm of bromide of potassium with one drachm of the tincture of cannabis Indica is more powerful to allay such excitement than any of the other drugs or stimulants tried. It is more uniform and certain in its effects, more lasting, interferes less with the appetite; and to produce the same effect the dose does not require to be increased after long-continued use.

4. Single doses of opium tended to raise the temperature and to lower the pulse; single doses of the mixture above-mentioned to lower the temperature and quicken and weaken the pulse, of bromide of potassium alone to raise the temperature and lower the pulse, of cannabis Indica alone to raise the temperature and quicken the pulse, of whisky to lower the temperature very much and slightly to quicken the pulse, and of beef tea to lower the temperature in the least degree and to lower and strengthen the pulse.

5. By giving bromide of potassium and cannabis Indica together, not only is the effect of either given separately immensely increased, but the combination has an essentially different action from either of them given alone.

6. Bromide of potassium alone can subdue the most violent maniacal excitement, but only when given in immense and dangerous quantities, and its effects are so cumulative while so given, that after they have once begun to appear they increase for days after the medicine has been stopped, almost paralysing the cerebrum and sympathetic.

7. To produce sleep in mild excitement, one drachm of the bromide of potassium is about equal to half a drachm of laudanum. To allay maniacal excitement, forty-five grains of the bromide and

forty-five minims of the tincture cannabis are rather more than equivalent to a drachm of laudanum.

8. Seven cases of chronic mania were treated for twelve weeks with opium, in doses rising gradually from twenty-five minims of the tincture up to ninety minims three times a day, and the results noted.   After getting no medicine for several months the same cases were treated with a mixture of bromide of potassium and cannabis Indica in gradually increasing doses, and the results noted and compared with those of the opium treatment.

9. Under the opium treatment the patients all lost in weight continuously; their morning temperature was lowered and also their evening temperature, but the latter (which was too high, and its being high was a bad sign) very slightly, and their pulse was decreased in frequency.   The opium allayed the excitement in the larger doses, but it soon lost its effect.

10. Under the bromide of potassium and cannabis Indica treatment the patients only lost in weight very slightly for the first six weeks, and after that they gained, their weight being more at the end of eight months' treatment than it was to begin with.   Their appetites were not interfered with.   Their temperature fell, especially their evening temperature, and the pulse was slightly increased in frequency and weakened in force, while the excitement was subdued, and the medicine showed no signs of losing its effect, even after being thus used for eight months.   The maximum of good effects and the minimum of the ill effects of a sedative drug were thus obtained by using the bromide of potassium and the cannabis Indica in combination.

11. The bromide of potassium alone may be continued for months in doses of half a drachm three times a day, and the patients gain in weight and remain healthy in body.

12. Cannabis Indica being a diuretic, and the bromide of potassium being carried off by the kidneys, it is probable that the former in that way helps to prevent the cumulative action of the latter when given alone.

13. When the two are given together, the first symptoms developed are those of the cannabis Indica, but these soon merge into a state of drowsy calmness of the nervous system which is in all respects the opposite of nervous irritability.

14. Fifty-one cases of various forms of insanity were treated by bromide of potassium alone or along with Indian hemp, and the results were that eighty per cent. of these were benefited more or less in some way, and twenty-five per cent. were most decidedly benefited.

15. The milder cases of puerperal and climacteric insanity were sometimes remarkably benefited by drachm doses of the bromide of potassium given at night.

16. In some of the cases of acute mania the excitement was subdued in a few days by the bromide combined with Indian hemp in doses of from half a drachm to a drachm of each given three times a day.

17. In some cases of periodic mania and general paralysis all the worst symptoms of maniacal excitement were allayed by giving a mixture of bromide of potassium and cannabis indica in doses of from half a drachm to a drachm and a half of each three times a day. This was continued in one case for nine months with the best effect.

18. In three cases of periodic mania, attacks were cut short by a mixture of the two medicines, or by the bromide alone. In one of these complete recovery followed.

19. Fewer cases of simple melancholia were benefited by the bromide alone or along with Indian hemp than any other form of insanity. Some were made worse by them, but in one case of this disease where there was great excitement and hallucination of hearing and suspected organic disease of the brain, the combination gave immediate and complete relief of all the symptoms for four months.

20. One case of senile mania was successfully treated at home by a mixture of the bromide of potassium and tincture of cannabis Indica, when she was to have been sent to an asylum. It seems probable that some such cases, and also patients with short attacks of mania might be treated by the same medicines at home, when at present they have to be sent to lunatic asylums, on account of the want of such a safe and powerful sedative.

Reclamation of Dr. G. Hamilton.

To the Editor of the 'British and Foreign Medico-Chirurgical Review.'

Sir,—In the number of your Journal for July, 1870, page 14, I notice some remarks on my obstetrical practice which are so confused and incorrect that I must ask you, both in justice to myself, and from the great importance of the subject, to give insertion in your next number to the following extracts from the 'Edinburgh Medical Journal' for October, 1861, in which a short summary of my practice is given, with its results on child and mother :—

"I have long held that a more frequent use of the forceps than has been usual in tedious labours is called for, in order that the maximum of success should be attained in obstetric practice; and I attempted to support my views on this point in papers published in the 'Brit. and For. Med.-Chir. Rev.' for April, 1853, and in the 'Edin. Med. Jour.' for May, 1855. In the former of these I stated that by using the forceps on an average in between every seventh and eighth case, a ratio of mortality to the child had been attained of 1 in 317; and in the latter I stated that I had then delivered in succession 416 cases, in all of which the child was born alive. At that time the numbers were still being added to; and I now think it interesting, as connected with this practice, to state that the successful deliveries continued to go on, until the numbers attained were 731 children delivered successively, not one of which was still-born.[1] As far as I am aware, this result is altogether unprecedented in obstetrical history; and when I look at the ease with which my experience tells me the forceps can usually be applied, when resorted to in good time, I cannot but think that the prejudice against their more frequent use has been altogether without foundation. I explained my views on the management of tedious labours so fully in the papers referred to, that I need not repeat them here. I may, however, say, that all the experience I have since had confirms me in the soundness of the position I then maintained, that it is not generally in the early portion of tedious labours that danger is to be apprehended, and that the labour may go on frequently even for days without anything more serious than some inconvenience to the mother. I think that during this stage, and until the head has fairly entered the pelvis, meddlesome interference, in urging on the labour, is for the most part uncalled for and pernicious, and that usually, with the exception of rupturing the membranes, little more is required than the exercise of patience. When, however, the os uteri has become dilated, and the head has entered the pelvis, so that an

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[1] "I must repeat here what I formerly explained, that this series includes—1st, only those labours that were under my own care from their commencement, and 2nd, that children that were not viable, or were dead when I took charge of the cases, are excluded." The same remarks apply to my subsequent practice, to which allusion will afterwards be made.

ear can be easily felt, I hold that the dangers to the child usually becomes imminent if it be allowed to remain undelivered more than two hours, especially where the pains are smart, or the compression is considerable. When mother and child have been much exhausted by a protracted or very severe labour, my rule is, when an ear comes within reach, not to wait more than a quarter or half an hour, or even, if the case is urgent, to deliver immediately. I always feel anxious, in such instances as I have mentioned, to get quickly over the latter half of the labour ; for though no serious harm may yet have happened to mother or child, there can be no question that to the latter, at least, much additional delay would be fatal. If, therefore, nature is getting over this portion of the labour quickly, I am content ; if not, I use the forceps and deliver." . . .

"It seems almost self-evident, that a low rate of fœtal mortality ought, *cæteris paribus,* to be equally favorable to the mother, for an easy delivery is certainly the first, though not the only condition for securing a good recovery. On the other hand, every one knows how, occasionally, an even frightful maternal mortality may attend labours of the most favorable kind. It is quite clear, therefore, that this circumstance vitiates statistics where the rate of mortality to the mother is used as a test of the comparative value of any line of practice. The true test, it appears to me, is the ratio of the fœtal loss. If this be low, I think we are entitled to hold, that the maternal mortality *ought* to be low also. Of course, it is always satisfactory to find that the two co-exist. In the 731 cases I have referred to there were six maternal deaths, but in only three of these were the forceps used. Of the latter cases, one death took place from disease of the heart, and another from asthma. In one of the others, also, the patient was previously in the last stage of phthisis."

The extracts which I have given will show how utterly incorrect the author of the article I have referred to is, when he says, "Dr. Hamilton recommends us to use the forceps within a quarter of an hour after an ear can be felt, if no progress is being made ;" and also when he states that in my practice, I have "arrived at a fœtal mortality of about 1 in 317 cases." What is meant by the sentence "The more customary rule is to wait two hours or more, and not to interfere until spontaneous delivery seems hopeless," I do not exactly understand. I am aware that many very eminent obstetricians have advised us "not to interfere until spontaneous delivery seems hopeless," but that is a very different thing from waiting "two hours," *as I have recommended.* If it be *now* the "customary rule," as stated, to wait only two hours, I feel assured the forceps will be used much more frequently than what, in the article referred to, is said to be the practice of the "Dublin School," viz. 1 in 684, and also that the results will not be a fœtal mortality of "1 in 20 or 30," but will approach to the results which my practice has yielded.

To those interested in this question (and what general practitioner is not?), it is well for me to state that I have followed up the same practice with the like favorable results. Since my article was published in the 'Edin. Med. Journ.' in 1861, I have delivered with the forceps as usual, and have had *no deaths* in these cases, and in the whole practice, *under my own care,* since then, with one exception, a footling case, *all the children have been born alive.*

I am, Sir, yours, &c., G. HAMILTON, M.D.

We extremely regret that Dr. Hamilton conceives us to have misrepresented his views. Any one taking the trouble of referring to our article will see that we were specially desirous of approving Dr. Hamilton's practice, and of giving him due credit for arriving at a rate of fœtal mortality which he justly calls "altogether unprecedented." We say, "Dr. Hamilton recommends us to use the forceps within a quarter of an hour after an ear can be felt if no progress is being made." In his present letter Dr. Hamilton says, "When mother or child seem much exhausted by a protracted or very severe labour my rule is, when an ear comes within reach, not to wait more than a quarter or half an hour." The omission of the qualifying clause is to be regretted, since it materially modifies the rule, and is due to the fact that we were writing from our recollection of Dr. Hamilton's paper, which we had not at hand at the moment. The object of the succeeding sentence, the meaning of which Dr. Hamilton cannot understand, and which no doubt might have been more clearly worded, is evidently to contrast Dr. Hamilton's practice favorably with that of those who wait two or more hours after an ear can be felt, and *even then* do not interfere as long as there is any hope of the unassisted pains completing the delivery, however long that might take.

In our article we have very distinctly stated that we consider Dr. Hamilton's views to be right, and we fail to see that we have done him any injustice.

Reclamation of Dr. Murray.

[WE willingly give insertion to the following reclamation of Inspector-General Dr. Murray, in respect of our notice of his report on cholera in our number for July last, p. 171. His long Indian experience, and his high position in the medical department of Bengal, justly entitle his remarks to respectful consideration. Among other points we took exception to the evidence, as being quite insufficient, on which he rested the proposition that "there are numerous well-authenticated cases of the poison (of cholera) having been mixed with the water of wells and tanks, those using the water being attacked by the disease." The two cases cited by Dr. Murray are the only instances adduced out of the replies of 500 medical officers who responded to his queries. It is, moreover, to be observed that there seem to have been no replies whatever to the question as

to " the effects of admixture (in water) of evacuations from affected individuals," nor yet to another which asks for information respecting "the dissemination of the disease through the evacuations of those affected." We attach the more importance to what seems to us as extremely meagre evidence upon a point relating to the causation and diffusion of cholera outbreaks, in consequence of the high favour which the water-propagation theory of the disease has met with from some of our leading sanitary authorities of late years. When such men as Farr, Simon, and Jenner, in this country, and Murray, Macnamara, and others in India have accepted it, it is only but right that we exact clear and unmistakable proof of a doctrine so highly patronised. The profession looks for much stronger evidence than has yet been adduced before they can generally accept it as a verity. Dr. Murray would do a great service if, from the ample means of information at his command, he would collect and make public all the well-authenticated evidence from Indian experience bearing on the subject.

On the other point to which he refers, viz., that the outbreak and diffusion of cholera are mainly due to human intercourse, as " proved by the history of the progress of the epidemic attacks in India, Europe, and America," we still maintain that the proposition is far from " having been *proved*." He confidently declares, in his official letter to the Government at the end of 1869, that " the question of the communicability of the disease was set at rest, as far as any medical question can be settled, by the opinion of 99 per cent. of the medical officers in India, as shown in (Table) No. VII of my report on the treatment of cholera." On referring to that table it will be observed that under the general term of " communicability," Dr. Murray includes five different channels or media by which the poison of the disease may be transmitted or conveyed; these are, " from person," " from place," " by atmosphere," " by water," " through evacuation." Are we to understand by this classification that cholera is propagable not only by personal communication with the sick, but also by visiting sickly localities, as well as by atmospheric infection and by water communication? On these points we must ask for much more exact testimony than we have been able to find in the documentary evidence appended to Dr. Murray's report. We should like, too, to learn, among other subjects, what have been the results of his experience as to the comparative number of attacks among the medical and other attendants in Indian hospitals, and among the general community.[1]]

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[1] After these remarks had been written we saw the report of the Sanitary Commissioner with the Government of India, for 1869, recently issued. In respect of the great epidemic of that year in the Bengal and Bombay presidencies, " the evidence," Dr. Cunningham says, " does not show that cholera was spread over the country by human intercourse;" and as to the opinion that its spread was due to water tainted with cholera discharges, he declares that " there is no evi-

SIR,—In reviewing my report on the treatment of cholera, and in reference to my views on the communicability of the disease through the medium of water, it is remarked, p. 171, " No detailed evidence for these vague statements is recorded." On this point there was no intentional ambiguity in the body of the report, and no want of illustration in Appendix II. In the extracts from the Reports under Query 12, the two following, which had previously been submitted to Government in my report on the Hurdwar epidemic of 1867, are those alluded to by the reviewer :—" A pilgrim was taken ill of cholera at noon on the 28th April, 1867, at a well in the village of Joogh Kullan, and he died next day. His soiled clothes were washed in an adjacent pond. Other parties who afterwards visited the well and the pond for water and ablution, caught the infection. The disease broke out on the 30th, and up to the 15th May fifty-three were attacked, of whom twenty-seven died." " At the village of Besubat two men who had returned from the Hurdwar fair died of cholera on the 30th April, 1867, and their clothes were not burned according to orders given, but were washed in a pond which was inside the village, the water of which was used for domestic purposes. On the 1st and 2nd May in the same village sixteen attacks occurred."

It may be said that such reports are merely opinions in reference to the appearance of the disease, and that it was a mere coincidence in the time of the two events ; such language may be used in reference to the dissemination of all diseases. In a case depending on circumstantial evidence, an opinion founded on the facts observed by one individual has little weight, unless in connection with that of others, when it may supply a missing link in the chain of evidence. Here lies the great value of numerous and detailed opinions. Individual experience is defective in different links ; a statement which is invaluable in supplying a defect to one, may only be a repetition of former information to another whose doubts referred to a different portion of the chain. That may appear a trifling incident to one which may supply the missing link, or keystone, to another more experienced investigator whose opinion thus confirmed is valuable. The opinions of intelligent men may be considered as the result of evidence collected from different sources, as well as that obtained in their own individual experience of facts. A careful observer learns more from watching a succession of epidemics than from all the books that have been printed ; but the observation of the disease as it appears in the hospitals of a large city, and limited to one epidemic, must be partial and very imperfect.

I am far from supposing that each opinion is of equal value,

dence of any such contamination in the general history of the epidemic over the country." This report is a highly instructive document, and its value is enhanced by an elaborate communication from Dr. Bryden on the epidemic of 1869, and by one from Dr. Lewis on the Microscopy of Cholera Evacuations.

even when equal opportunities have been afforded of observation. This is a source of uncertainty in the valuable statistical table No. VII, more especially where there is great diversity of opinion; but this cannot diminish the value of the result where the opinions are unanimous, or nearly so. Such an opinion is unequivocally expressed on some of the most important points of the disease. That cholera is communicable is the opinion of more than 500 educated men who have studied the history of the disease since its manifestation in 1817 up to the present day, and who have, in some instances, had opportunities of gaining experience for upwards of thirty years. It must be observed that there is a column in the table showing when the officer had had no opportunity of observing the point in question, or had not made up his mind regarding it. These votes should be eliminated, but they are of great value in showing the conscientiousness with which the votes are given, as no one willingly confesses ignorance. The value of this table cannot be over-estimated in determining the important question of the communicability of cholera. On this single question, out of 505 opinions there are 478 affirmative and only 5 negative. There is a slight variety of opinion in reference to the individual method of transmission; but on thirty questions bearing on this point, including 15,150 votes, 13,817 are affirmative, or 91·20 per cent.; 1,107 are doubtful, or 7·31 per cent.; and only 222 are negative, or 1·49 per cent.

The investigation by the Indian Government has thus settled the question of communicability in the opinion of the medical profession of India. It is to be hoped the Governments in Europe and America will obtain a similar expression of opinion from the medical profession in other countries.

The opinions elicited in this report on all important sanitary questions are very generally in accord. There is no doubt that imperfect sanitary arrangements aggravate the severity and prolong the duration of attacks. The uncertainty is seen when the question leaves the *sanitary* and advances to the *medical* period, and it should then be treated as a *medical* subject. There is a peculiarity in relating facts when coloured glasses are unconsciously used to view them. This tendency to look at cholera through sanitary spectacles has proved a powerful lever to advance sanitary measures, but it has naturally distracted attention from the more essential object now under discussion, *the disease of cholera*, and it appears doubtful if the *sanitary* commission in London is better suited, either by locality or composition, to conduct an inquiry of this nature than a *medical* commission in India. The unanimity of opinion on sanitary points shown in Table VII, would indicate that full information has been already collected, and is available for medical investigation.

JOHN MURRAY,

Calcutta, 10*th September*, 1870   *Inspector-General of Hospitals.*

Chronicle of Medical Science.

CHRONICLE OF PHYSIOLOGY.

By HENRY POWER, F.R.C.S., M.B. Lond.,

Senior Ophthalmic Surgeon to, and Lecturer on Ophthalmic Diseases at, St. Bartholomew's Hospital.

BLOOD—CIRCULATION.

1. N. O. BERNSTEIN. *On the Exchange of Gases between Arterial and Venous Blood.* ('Berichte d. Sächs. Ges. d. Wiss. Math. Phys. Classe,' 1870, p. 124.)

2. SAMUEL HAUGHTON, F.R.S. *On the Mechanical Work done by the Human Heart.* ('Dublin Quarterly Journal of Medical Science,' Feb. 1870.)

3. ANDREW BUCHANAN, M.D. *On the Force of the Human Heart.* ('Lancet,' Nov. 12, 1870.)

4. FRANZ RIEGEL. *Essay on the Phenomena of the Circulation in the Smaller Vessels.* ('Centralblatt für die Medizinische Wissenschaften,' No. 29, 1870.)

1. Bernstein made diffusion experiments in Ludwig's laboratory with two test specimens of defibrinated blood taken from the same dog, of which one was arterial and from the carotid artery, the other taken from the carotid after the trachea had been tied, and which, consequently, resembled closely the blood of an asphyxiated animal. The septum was a thin membrane composed of a cæcum that had been purified by water and alcohol to remove all soluble materials, and thus to obviate any tendency to chemical change. From each chamber a quantity of the blood was taken at once for analysis, whilst a second portion was analysed after diffusion had continued for a period of from five to seven and a half hours. No noticeable passage of oxygen from the arterial into the venous blood occurred, but a small quantity of carbonic acid diffused from the venous into the arterial blood. The experiments were not numerous enough to admit of any deductions being drawn between them and the conditions present in the placenta.

2. Dr. Haughton estimates that the left ventricle of the human heart has a capacity, when in action, of 3 oz. or 5·2 cubic inches, and beats 75 times in a minute, whilst the value of the arterial pressure or the weight of the hæmostatic column is 9·923 feet of blood, which approximates that given by Donders (10·527 feet). From these data he proceeds to calculate in feet tons the daily work done by the left ventricle of the human heart, which lifts at each stroke three ounces through a height of 9·923 feet, and gives the value as follows :

Daily work of left ventricle $= \dfrac{3 \times 9\cdot923 \times 75 \times 60 \times 24}{16 \times 2240} = 89\cdot706$ feet tons.

The daily work of the right ventricle he estimates at $34\cdot502$ feet tons, which gives the total daily work of both ventricles $124\cdot208$ feet tons.

On comparing this result with the work done by other muscles, we find that the work done by the heart in a given time ($20\cdot576$ feet pounds per ounce per minute) exceeds considerably the work done by the muscles in a boat race ($15\cdot17$ feet pounds per ounce per minute). In a boat-race the labour can be maintained for a few minutes only, while the heart labours at a greater rate throughout the whole of life.

Professor Helmholtz states, as the result of his own calculations, that the heart is able to raise its own weight through 20,250 feet in one hour. It has been frequently stated that an active climber can ascend 9000 feet in nine hours, which is only at the rate of 1000 feet per hour, or one twentieth part of the energy of the heart.

3. Dr. Buchanan remarks that in addition to the above elements employed by Prof. Haughton for determining the force of the human heart, he avails himself of a fourth, viz. the area of the ventricular orifice of the aorta, which he estimates with Kiel as equal to $\cdot4187$ of a square inch, which he regards as an element of the very highest importance, especially as it can be determined with ease. Taking Dr. Haughton's estimate, the following is the mode in which he employs these elements. The weight of a cylinder of blood $9\cdot923$ feet in height, and having a base of $\cdot4187$ of an inch, is $30\cdot20838$ ounces. Three ounces of blood which the heart discharges at each contraction fill of such a cylinder $11\cdot8245$ inches or $\cdot985375$ of a foot; multiplying these together, he obtains a product of $29\cdot769$, which represents the number of ounces that are raised one foot by each contraction, and is the same as Dr. Haughton's estimate. On another calculation, however, he assumes that the heart beats 72 times in a minute, that it discharges *two* ounces of blood at each contraction, and that the height of the hæmostatic column in man is 88 inches. Now, the weight of a cylinder of blood 88 inches in height, and having a basis of $\cdot4187$ of a square inch, is 22 ounces. Further, 2 ounces of blood, the quantity discharged at each contraction, fill exactly of such a cylinder 8 inches. Multiplying 22 by 8, the common product is 176, which denotes the number of ounces that are lifted one inch at each contraction; and by dividing 176 by 12 we obtain the number of ounces that are lifted one foot, viz. $14\cdot66$, or less than half Dr. Haughton's estimate. Now, $14\cdot66$ ounces lifted one foot during the period of a single pulsation of the heart gives $65\cdot9$ feet pounds in a minute, or $42\cdot3$ feet tons in twenty-four hours. The following table shortly expresses Dr. Buchanan's views:

A is the calculated hæmostatical column.
B is the observed   ,,   ,,
C is a column equal in volume to the capacity of the left ventricle of the heart.

Weight in oz. avoird.						Volume, as height of column, in inches.
A = $22\cdot301$	.	.	.	.	.	$89\cdot165797$
B = $22\cdot$	.	.	.	.	.	$88\cdot$
C = $2\cdot$	.	.	.	.	.	$8\cdot$

Force of Heart.

1. Statical equivalent = A = 22· oz. + 129·28 grains.

2. Dynamical equivalent = B × C the weight of the one into the volume of the other.

$$\left.\begin{array}{c} 22 \times 8· \\ 2 \times 88· \end{array}\right\} = 176 \text{ inch ounces} = 14\frac{2}{3} \text{ feet ounces.}$$

3. Momentum of blood as emitted from heart = weight B × vol. C = 22 oz. moved over a space of 8 inches at each pulsation, or with a velocity of 10 inches per second.

4. Dr. Riegel's experiments were made in Professor Stricker's laboratory, and upon curarized frogs. As an aid to the determination of the rapidity of the circulation, an artificially regulated current was placed by the real one. Section of the sciatic nerve about the middle of the thigh produced no change in the rapidity of the current, either immediately after the section or after the lapse of several hours or days, though there was a distinct change in the calibre of the vessels. If the divided central extremity of the sciatic be excited with weak induction currents after about ten minutes, distinct acceleration of the current may be perceived, especially in the large arteries, without comparing it with the artificial current; but with this an augmentation could be seen to occur in from one half to a whole minute from the commencement of the excitation. As a general rule the contraction of the vessel and the acceleration of the current go hand in hand to their maximum, but in different animals the maximum of each is reached at different periods. When the acme has been reached both conditions remain for a time stationary, providing the excitation is maintained. The longer the stimulus has acted the longer in general are the vessels in returning to their natural condition. Prolonged observations never established that the veins contracted under irritation of the sciatic, though dilatation was occasionally observed. When the circulation was seen to be accelerated through the arteries, it could be distinctly perceived that the current in the capillaries and veins participated in the acceleration, and a corresponding but less marked acceleration was observed in the vessels of the opposite limb. It was clearly ascertained that the increased speed of the circulation was not due to augmented frequency of the heart's beats. In cases where the sciatic nerve had been excited for hours, one or more of the arteries sometimes underwent sudden dilatation, and then again, after a few seconds or minutes, relaxed. In experiments made with croton oil, M. Riegel found that when locally applied it first causes acceleration of the circulation, which is sometimes transient, sometimes persistent. The current then returns to its former state, then becomes slower, and finally altogether stops. The acceleration is less marked after section of the sciatic. Soon after the application of the oil the arteries contract for a very short time, and this is succeeded by great dilatation; subsequently the veins also expand. The retardation of the current after the application of croton oil constantly begins in the capillaries or small veins, and when in these there is almost complete stasis it may be observed to be as rapid as usual in the arteries. In all cases where the pigment cells were rounded before the application of the oil, they became branched and ramified a few hours after.

DIGESTION.

1. LEGROS ET ONIMUS. *Experimental Researches on the Movements of the Intestine.* ('Journal de l'Anatomie et de la Physiologie,' t. vi, pp. 37 and 163.)
2. E. BRÜCKE. *On the Physiological Importance of the Partial Decomposition of the Fats in the Intestine.* ('Wien. Acad. Sitzungsber,' Band lxi, Abth. ii.)
3. MM. v. VINTSCHGAU and DIETL. *Researches on the Variation in Temperature of the Stomach and Rectum during Digestion.* ('Wien. Acad. Ber. Math-naturw. Classe,' Band lx, Abth. ii, p. 697.)
4. Dr. PASCHUTIN. *Further Researches on the Process of Digestion.* ('Centralblatt für die Medicinischen Wissenschaften,' No. 36, 1870.)

1. In order to study the movements of the intestines, MM. Legros and Onimus introduced a sound to the extremity of which a caoutchouc ball was fastened into the intestines through a fistulous orifice. Various stimuli were applied to the intestines. They found that under ordinary circumstances regular peristaltic (rarely antiperistaltic) contractions take place with intervening periods of rest. Very rarely a part of the intestine contracts *per se.* The contractions of the upper part of the intestine succeed one another more quickly than those of the lower. The contractions of the larger intestine differ in amount, duration, and force from those of the small. The movements of the stomach are not so regular as those of the intestines, and differ in the fundus and pyloric regions. Interruption of the arterial current increases the peristaltic movements, but interruption of the venous current is without effect. Induction currents of electricity cause contraction at the poles, but relaxation between them. Constant currents stop the peristaltic movements and cause relaxation of the intestinal walls, providing they are passed in the direction of the normal movements; but contraction when in the opposite direction. Excitation of the central extremity of the cut vagus in the neck stops the intestinal movements, relaxing the walls of the intestines. Excitation of the distal extremity is inoperative. Iced water causes contraction, warm water or solution of common salts increases the movements, as do also croton oil and ipecacuanha and atropia in small doses. Morphia retards them. Strychnia causes contraction of the intestines coincidently with the general convulsions.

2. Brücke has instituted some researches to determine how far disintegration of the fatty compounds by pancreatic juice proceeds in the intestines under normal conditions. To this end chyle was taken from a recently killed dog, and extracted with 94 per cent., or absolute alcohol, and the flocculi boiled six or eight times with the same fluid. In spite of this treatment only the smallest flocculi lose their fat, the larger ones retaining it. Æther, on the other hand, completely removes the fat after the chyle has been twice treated with it. From hence it follows that the chyle particles consist of neutral fat, and not of any of the fluid fatty acids, since in the latter case they would have been dissolved by the alcohol. It becomes

a question as to the significance of the slight disintegration of the fats that is thus shown to occur in the intestine, and whether it is of any value in promoting the absorption of the unaltered fats. M. Brücke found that oil containing free fatty acids formed an emulsion with solution of soda or borax, with extraordinary facility, whilst pure oil, even after long agitation, only formed large drops, and soon separated. The significance of the disintegrating action of the pancreatic juice upon the fats therefore seems to be that the fatty acids produced, which are converted into soaps by the alkaline juice of the intestine, effect emulsification of the neutral fats, and consequently promote absorption.

3. MM. v. Vintschgau and Dietl found that, in a dog with gastric fistula, the food differing but slightly from the temperature of the body, first falls in temperature and then rises. The minimum temperature, which was about 0·05° C. below that when ingested, occurred two to three hours after the food had been taken ; the temperature then rose again to about 0·2° C. to 0·5° C. above that which it had when swallowed. The temperature of the body generally presented the same variations, both when measured in the rectum of the same dog and in another that had no fistula. They are of opinion that the primary depression of temperature depends upon the absorption of heat during the conversion of solid food into the liquid condition, although they were unable to demonstrate any fall in temperature during the artificial digestion of albumen. The secondary rise in temperature, which coincides with the completion of the process of absorption, they attribute to increased oxidation processes.

4. Dr. Paschutin's researches on digestion were conducted in the laboratory of Professor Setschenow, of St. Petersburg, and contain some important conclusions, amongst which the following may be noticed :—1. Watery infusions of the intestinal mucous membrane of the dog exposed to a temperature of about 100° Fahr., to effect self-digestion, give in the course of from three to four hours voluminous precipitates that remain unaltered till putrefaction sets in ; and whilst these are forming the alkaline reaction becomes more and more feeble, or even changes to acid. Coincidently, the substance always present in the fresh solution that reduces oxide of copper disappears. The juice of the small intestine, obtained from a loop in the manner suggested by M. Thiry, possesses, according to Dr. Paschutin, no action on fats, and scarcely any upon fibrin of blood or other albuminous compounds. The infusion of the intestine of the dog, however, can convert starch into sugar, in this acting like, only more energetically than, infusions of other mucous membranes, as those of the trachea and urinary bladder, which also contain much of the diastatic ferment. Next in order to these stand the mucous lining of the gall-bladder, then that of the cæcum and large intestine, and finally that of the rectum and stomach. The juice of the small intestine obtained by a fistula converted starch into sugar. No secretion could be obtained from a fistula of the large intestine. Of all mucous membranes, that of the small intestine alone contains the

material that is capable of converting cane into grape sugar. This is also contained in the secretion of the small intestine. It is remarkable, however, that this power is only possessed by the small intestines of certain animals, as the dog, pig, rat, mouse, rabbit, and others, whilst it is absent in the ruminants.

Those infusions that act both in converting starch into sugar (A), and cane sugar into grape (B), contain, not one, but two ferments (A and B), which can be separated from one another by mechanical means, or by filtration through an animal membrane, and the details of the methods to be pursued are given in the original paper. A temperature exceeding 104° Fahr. operates destructively on the animal ferment that converts starch into sugar; but temperatures below 68° and 104° do not check its action.

The temperature at which human saliva diluted with ten or twelve parts of water acts most energetically on boiled starch is from 100° to 106° Fahr. Above or below these degrees the action is feebler. The temperature at which the action of the malt ferments on boiled starch is 138° Fahr.

Glands.

1. S. Mayer. *On the Nerves of the Salivary Glands.* (' Schultze's Archiv f. Mikroskop. Anatomie,' Bd. vi, p. 100.)
2. A. Ewald. *Essays on the Histology and Physiology of the Salivary Glands of the Dog.* (' Inaug. Dissert.,' Berlin, 1870.)
3. E. Cyon. *On the Formation of Urea in the Liver.* (Provisional communication in the ' Centralblatt f. d. Med. Wissenschaften,' No. 37, 1870.
4. M. A. Béchamp. *On the Formation of Urea by the Action of Hypermanganate of Potash on Albuminoid Matters.* (' Comptes Rendus,' lxx, p. 866.)
5. A. Basaroff. *Direct Formation of Urea from Carbonic Acid and Ammonia.* (' Journal f. Pract. Chemie,' N. F., Bd. i, p. 283.)

1. Pflüger, it is well known (see my translation of Stricker's Histology, vol. i, chap. 14), considers that nerves and the processes of multipolar ganglion cells may be traced into direct continuity with the salivary cells. Mayer states that after a very careful investigation of the salivary glands of a large number of animals, in part prepared according to Pflüger's instructions, and in part by other methods, he finds that, contrary to Pflüger's statement, nerves rarely occur in the parenchyma of the glands, those that are present chiefly belonging to the non-medullated fibres. He has never been able to trace any connection between medullated nerve-fibres and the alveoli, or to discover the free extremity of a non-medullated fibre in them. When the appearances resembled those described and delineated by Pflüger, further examination showed that the supposed nerves were really capillary vessels. He corroborates, however, the statement of Pflüger that the nuclei have processes communicating with corresponding ones from adjoining cells. He thinks that these may, *perhaps*, be the terminations of the finest non-medullated secretory nerve-fibres.

2. Ewald, by means of injections made by means of constant mercurial pressure, corroborates the recent statements that have been made respecting the configuration of the finest salivary ducts. He is opposed to the views of Heidenhain in respect to the so-called " crescent " or " demi lune " found in the alveoli. Heidenhain demonstrated that the form of the excited gland differed considerably from the gland at rest; the alveoli in the former, moreover, being filled with protoplasmatic, the latter with disintegrated mucous cells, and has sought to establish that in the place of the disintegrated mucous cells. Young cells are developed in the " crescent," which constitutes their brooding place, and is a marginal zone of protoplasmic cells existing in every alveolus. Ewald, however, declares he has never seen any such process of formation of cells from the " crescent." On the other hand, the mucous cells undergo very important changes, the protoplasm of the cell that here ordinarily surrounds a lateral nucleus swelling out, and the cell contents becoming granular, the nucleus itself taking up a more central position, so that ultimately no difference can be discerned between the central and the marginal cells. These two kinds of cells only differ in that the former possess, the latter are destitute of, mucus, and they are consequently only varieties of the same cell.

3. The researches of Gréhant show indisputably that the kidneys in no way form secretory but only excretory organs so far as regards the urea. M. Cyon, by a well-devised experiment, demonstrates that the blood in traversing the liver becomes considerably richer in urea, or, in other words, that the liver is an organ in which urea is generated.

Respiration.—Animal Heat.

1. F. W. C. Berns. *On the Influence of Various Kinds Gas on the Respiration.* (In the ' Nederlands Archiv,' Band v, p. 179.)
2. W. Marcet. *Observations on the Temperature of the Body at different heights, when at rest and during the ascent.* (' Archiv des Sciences Physiques,' xxxvi, p. 247.)
3. Horwath (of Kiew). *Essays on the Effects of the Withdrawal of Heat from the Body (Heat-inanition).* (' Wiener Academ.,' Anz. 1870, No. 11.)
4. Andral. *Note on the Temperature of the New-born Child.* (' Comptes Rendus,' t. lxx, p. 825.)
5. R. Simons. *Provisional Communication on a new Cause for Depression of the Animal Heat.* (' Inaug. Dissert.,' Bonn, 1870.)
6. Dr. Horwath (Kiew). *On the Physiology of Animal Heat.* (' Centralblatt für die Medicinischen Wissenschaften,' No. 35, 1870.)

1. The main result arrived at by M. Berns is, that carbonic acid is an excitant for the extremities of the vagus nerve in the lungs, and that in ordinary respiration the expiratory *air* constitutes the stimulus that excites the vagus to induce rhythmical contraction.

2. Marcet made observations on the temperature of his body during an ascent of Mont Blanc. He found that when at rest the temperature at various heights was not essentially different. The highest temperatures occurred shortly after meal times and in pauses of the descent. During the ascent the temperature sank, as Lortel had previously found. The fall was greatest when the stomach was empty and the perspiration considerable. The temperature rose immediately on resting or on beginning again slowly to ascend. When the malaise experienced on ascending great heights was most severe, the temperature was lowest, and he believes this sensation is chiefly due to a deficient generation of heat. Frequent supplies of food most surely augmented the temperature and removed the unpleasant sensation.

3. In a rabbit cooled, by being surrounded with snow, to a temperature of 73° Fahr., the heart was found by Horwath to beat slowly. Excitation of the vagi was inoperative, the intestines motionless, and not responding to irritation; suffocation caused neither increase of the blood pressure nor convulsions. All these phenomena recur, however, when the temperature is raised to 100° Fahr.

4. Andral found the temperature of newly-born children to be higher than the average temperature of the axilla of adults, and about equal to that of the uterus of the mother. Immediately after birth the temperature fell for the space of half an hour, when it again rose till it reached the ordinary temperature of the adult.

5. V. Recklinghausen originally called attention to the fact that the presence of carbonic acid gas in the abdominal cavity caused shivering and depression of temperature. Simons repeated this experiment, not only with carbonic acid, but with carbonic oxide, hydrogen, and air, and found that, in all instances, even when the gas was warmed prior to its introduction, it occasioned a reduction of the temperature of the body. The subcutaneous injection of the gas and its injection into the intestine produced the same effect, the depression commencing immediately after the injection, attaining its maximum in from two to six hours, and rising again gradually from this time. Shivering occurred constantly in guinea-pigs, but only occasionally in other animals. The maximum depression amounted to 10° C. = 18° Fahr. With the reduction of temperature the pulse and respiration fell, though to a less remarkable extent.

5. The principal interest of Dr. Horwath's communication centres in the fact to which he draws attention, as influencing previous experiments, that the mere act of binding or tying down a rabbit is sufficient, without making any incision or performing any experiment to lower the temperature of the body, as much in some instances as 2° C. He attributes this to the excitation of the sensory nerves that necessarily occurs in the process of binding, and which, in a previous essay (in the 'Moderne Médecin' of Professor Walther) he had shown to be the constant result of such irritation.

Nerve—Special Sense—Muscle—Bone.

1. K. Vierordt.   *On the Causes of the different Development of the Sense of Locality of the Skin.*   ('Pflüger's Archiv,') 1870, Bd. ii, p. 297.)
2. R. Kottenkamp and H. Ullrich.   *Investigations on the Sense of Space in the Skin of the Upper Extremity.*   ('Zeitschrift für Biologie,' Bd. vi, p. 37.)
3. K. Vierordt.   *The Relation of the Sense of Space with the Mobility of the several parts of the Body.*   (Ib., p. 53.)
4. Prof. Rudinger, of Munich.   'Beiträge zur Histologie des Gehör-organes.'   With 5 Plates, 1870, pp. 30.
5. Th. Klunder.   *Preliminary Investigation into the Duration of Muscular Contraction.*   ('Arbeiten aus der Kiel. Physiolog. Institut.,' p. 107.)
6. Dr. Schmulewitsch.   *On the Essential Nature of Muscular Contraction.*   ('Centralblatt für die Medicinishen Wissenschaften,' No. 39, 1870.)
7. Papillon.   *Experimental Researches on the Modifications of the Internal Structure of Bone.*   ('Comptes Rendus,' t. lxxii, p. 372.)

MM. Kottenkamp and Ullrich undertook, at Vierordt's suggestion, a careful inquiry into the sense of locality possessed by the skin of the upper extremity.   They fastened pins at definite distances into pieces of wood, and touched the skin with the heads of the pins.   By previous experiments they had approximatively determined the distances between the pins required to produce double impressions on different parts of the limb.   With these the proper experiments were compared, no answer being deemed correct unless not only two pins were distinctly felt, but the direction of the line uniting these in regard to the axis of the limb, whether longitudinal or transverse, could be accurately stated.   In another series of experiments the plan suggested by Weber was adopted, in which the subject was blindfolded, and a point of skin touched with a needle.   He was then asked to point out the spot with another needle.   The results of all these experiments, excluding gross errors, were then tabulated, and it appeared that the greatest acuteness of the sense of distance or locality increases towards the tips of the fingers, and is greater in the transverse than in the longitudinal direction, the difference between the two being greater on the dorsal than on the palmar surface, though the latter is, as is well known, more sensitive than the former.

These valuations have been employed by M. Vierordt to demonstrate the truth of his hypothesis made in 'Pflüger's Archiv,' that the delicacy of the sense of space stands in relation to the mobility of the part.

A superficial examination of the numbers obtained by Kottenkamp and Ullrich shows that the perceptivity of the parts of the several segments of the limb stand in direct proportion to their distance from the axis of rotation of that part.   He lays down this proposition that the delicacy of the sense of space in a given region of the skin

is represented by the sum of two factors, of which one indicates the mobility of the articular axis, whilst the second is proportional to the distance of the part from that axis.   The application of this law to the upper arm, forearm, hand, and finger, as deduced from the average numbers obtained by experiment, gives for these regions respectively, as 1 : 3·5 : 29 : 160.

Klünder instituted his investigations on muscular contraction with a kind of vibration-chronoscope constructed by Hensen.   The contraction was registered on a reddened glass plate, attached to one limb of a tuning-fork, with which of course it vibrated.   The described curve is consequently a wavy line, and the ascending cuts the descending line.   If a vertical median line be drawn down the plate it constitutes a basis for measurements.   In these experiments the stage of latent excitation was found to amount to 3-400th of a second, increasing with greater weighting and exhaustion to above 0·01 of a second.   It diminished where the muscle had been previously subjected to extension, as was also noted by Helmholtz.   The true curve of contraction at its middle portion represented a parabola modified by the elasticity of the muscle.   At the end of the curve the muscle is quite inactive.   The greatest increase in the rapidity occurs in the ascending portion of the curve, which corresponds to the greatest development of force between the third and fourth 1-400th of a second, the absolute greatest rapidity of the ascent being in the eighth 1-400th.   The form of the curve is considerably modified when the muscle has a heavy weight to lift.   The period of both elevation and of the descent is protracted, the retardation affecting chiefly the commencement of the ascent.

Dr. Schmulewitsch states that his researches on the influence of warmth upon the muscles have led him to the conclusion that heat augments the elasticity of muscular lesion—a circumstance that is in its turn a cause of greater capability of performing work on the part of the muscle, from which it may be deduced that the mechanical power of a muscle at a given moment is essentially a function of the condition of elasticity of this muscle at this moment; and hence the essential rôle in the act of contraction is played by the constantly existing attractive force exerted by the molecules on one another.

4. The interesting little brochure published by Professor Rüdinger, of Munich, contains the results of his recent investigations into the minute anatomy of the ear.   He remarks in the first place, that the region over which the auditory nerve is distributed in the sacculi and ampullæ in different animals is characterised by the presence of a peculiar yellowish coloured epithelium lining the internal surface of these parts, the cells of which are provided with delicate cilia, so that there appears to be an intimate connection between the epithelial and the nervous tissues.   For the purposes of microscopical investigation he finds it best to place fresh sections of the ear made in different directions into chromic acid, and to subsequently stain them with various reagents.   He refers to the ridge-like elevation on the floor of the inner surface of the ampullæ, discovered by Scarpa and

E. H. Weber, and called 'septum' by the former author, which was shown by Steifensand, in 1835, from investigations made on fishes, reptiles, birds, mammals, and man, to consist of a peculiar involution and thickening of the tunica propria of the wall of the ampullæ. This elevation was more correctly designated *crista acustica* in the ampullæ and *macula acustica* in the sacculus by Schultze. In the majority of animals each twig of the nervus vestibuli that passes to an ampulla penetrates the furrow on its external surface, divides into two flat bundles, and mingled with ganglion-cells, runs straight through the tunica propria to the epithelium of the crista acustica. The cells at this part are two or three times the usual size, and are bounded internally by a basal seam or border. Other fibrils of the nerve run some distance up the sides of the ampulla between the membrana propria and the epithelium. The primitive nerve-fibres possess a double contour as they traverse the tunica propria, but undergo considerable diminution in diameter in the vicinity of the crista. It is not difficult to demonstrate in the ampullæ of fishes, treated with perosmic acid, as stated by Reich and Schultze, that a pale, thin fibre, constituting a direct prolongation of a primitive fibre, extends beyond the inner border of the wall of the ampulla, without communication with ganglion-cells, and then breaks up into a number of fine fibrils. The fibres certainly do not end, as Hartmann contends, in loops. The best observers—M. Schultze, E. Schultze, Odenius, Kölliker, Deiters, Hensen, Henle, and Hasse— agree in stating that the pale fibres are continuations of the contoured nerves, and enter the epithelium. The nervous epithelial layer is sometimes smooth, as in man, mammals, and birds, and sometimes folded, as in many fishes. It is thickest in fishes (0·080 mm.), thinner in mammals and man, and thinnest in birds (0·016 mm.). The deepest layer of the nerve-epithelium resting on the ampullary wall is soft, loose, and nucleated. The cells are thicker near the middle, and towards the free border present a sharply defined line like the limitans externa of the retina, and beyond this is the stiff hair. In the sacculi the nervous epithelial layer is somewhat flatter than in the ampullæ. In the latter it assumes, at the parts where no nerves enter, a very flattened form; but in the sacculi it is never flatter than transitional epithelium. If the epithelial layer be broken up several cell-forms may be distinguished in it. First, and most internally, are elongated cylinders, broad at one end and bluntly conical at the other, with large nuclei, and of yellow colour in the fish and frog.

These constitute supporting cells lying between the extremities of the fibre-cells. The spindle, fibre or rod-cells are much more numerous than the cylinder cells, and have been described by Schultze, Odenius, Kölliker, Henle, and Hasse, in similar terms. These cells are fusiform, with a long process running towards the centre, and a rod-shaped process running towards the periphery. They are characterised also by their pale appearance and by their blackening like, and coincidently with, the nerves on the addition of perosmic acid. Dark striæ are also seen traversing at regular distances the deeper part of the epithelial layer, and can be followed to the surface.

If the maceration in the acid be prolonged for some time, the several cells can be isolated, and now a black coloured stria may be seen in each of the fusiform fibre-cells, which Rudinger believes is enclosed within the cell. The striæ are continuous with the nerve-fibres, and are in connection with the nuclei of the cells, whilst at the opposite or free extremity of the several cells they seem to be continuous with the auditory hair. These appearances are especially distinct in the cyprinoid fishes, but the black stria within the cell is not visible in the cat. As soon as the delicate nerve-fibres—which it is impossible to distinguish from the axis cylinders—have entered the loose epithelial layer they form a plexus, at the anastomosing points of which, as well as elsewhere on the fibres, are minute swellings, respecting the nature of which he is doubtful, though he thinks evidence is accumulating to show they, like the similar swellings in the retina, are of a ganglionic nature; and from this plexus the fibres entering the cells are given off. In the cyprinoid fishes the auditory hairs appear to be united by a sticky substance, so as to form a mound-like elevation on the epithelial layer at the bottom of the ampullæ.

7. On the 6th September, 1869, M. Papillon subjected a young pigeon to the following regimen:—Distilled water, containing hydrochlorate, sulphate and nitrate of potash and soda, with grain ground down to a paste with strontia. It remained in perfect health till the 1st April, 1870, when it was killed. Its bones were calcined, and an analysis of the ashes gave the following per-centage results:

Lime	.	.	.	46·75
Strontia	.	.	.	8·45
Phosphoric acid	.	.	.	41·80
Phosphate of magnesia	.	.	.	1·80
Residue	.	.	.	1·10
				99·80

In another experiment, commenced on the 16th September, 1869, a young white rat, ten days old, was subjected to a similar regimen, except that phosphate of alumina was substituted for the strontia given to the pigeon, in proportion of about 1·5 grain per diem. The animal apparently remained in good health, but on the 29th November, 1869, it died suddenly in convulsions. Examination of the body showed the presence of intense enteritis. The analysis of the bones gave the following results:—In 100 parts there were of—

Alum	.	.	.	6·95
Lime	.	.	.	41·10

A sister of the foregoing rat was supplied with phosphate of magnesia instead of phosphate of alumina, and was killed on the 25th November. Analysis showed the presence of magnesia in the following proportions in 100 parts:

Magnesia	.	.	.	3·56
Lime	.	.	.	46·15

In all the animals the bones presented their normal appearance, and appeared to possess their natural physiological peculiarities.

REPORT ON SURGERY.

SELECTION OF CASES FROM THE FOREIGN JOURNALS.

BY ALFRED POLAND, F.R.C.S.

On the Influence of the Weather over the Results of Surgical Operation.—Dr. A. Hewson enters into this subject very fully, and discusses the value of the barometer as a guide in the choice of the time for the prognosis in such operations, as shown by the results of " immediate amputations " during a period of thirty years in the Pennsylvania Hospital. He thus sums up his conclusions : " I shall, to avoid the error which would otherwise arise from novel differences in the barometric indications, compare those of the same hour of each day ; and to secure further accuracy I shall, in all instances, state the results from observations extending from the day previous to the operation to that of the fourth day after it.

In this way it would appear that on the occasions of the 259 operations the barometer was ascending in 102, descending in 123, and stationary in 34.

Fifty-four of the whole number were fatal. Eleven of them were operated on when the barometer was ascending, 35 when it was descending, and 8 when it was stationary.

Of the successful cases 91 were operated on with an ascending barometer, 88 with it descending, and 26 with it stationary.

From which it would seem that we get a mortality where operations were performed with the barometer ascending, of not quite 11 (10·7) per cent.; of over 20 (20·6) per cent. with it stationary ; and over 28 (28·4) per cent. with it descending.

Of the fatal cases the average length of time which the patient survived the operation was only 7 days when the barometer was ascending, and 13 when it was descending ; and of the cases which died within three days over 7·5 per cent. were when the barometer was ascending.

Surely these figures need no commentary as to how well they sustain the idea that the results of the operations are materially influenced by the weather, and that the risks from shock and fever are increased by opposite conditions.

The practical deductions to be drawn from them are quite evident. One can certainly rely on the barometer to guide him in the choice of occasions for doing operations where he had the power to choose, or in the prognosis of the results in cases where he is deprived of such option.—*Pennsylvania Hospital Reports,* vol. ii, p. 17, 1870.

Hypodermic Injection of Ergotine in a Case of Aneurism of the Innominata.—M. Albanese (' Gazetta Clinica di Palermo,' No. 1, 1870) relates the following case :—

A female, æt. 38, was admitted into the hospital on April 27th with an aneurismal tumour of the brachio-cephalic trunk of six months' duration. It was of the size of a mandarine orange, situated

in the supra-sternal fossa, and reached four centimetres above the clavicle, pulsatile and synchronous with the right radial pulse. The circulation in the arm was impeded; there was œdema, and the hand and fingers bluish. The patient could not lay down, and complained of pain in the shoulder, and had had frequent syncopes, often attended with danger of death. The movements of the arm were very impeded. Air entered with difficulty into the apex of the right lung; there was obscurity in the sounds of the heart. The temperature in the right axilla was 37·6° centigrade, and pulsation of right radial 72; temperature of left axilla 37°, and pulsation of radial 70. On the 1st of May a solution of ergotine was injected between the subcutaneous cellular tissue and the sac; and on the following day a second injection. Immediately there followed severe dyspnœa, cyanosis of the face, and coldness of the extremities; the pulsations of the radials became imperceptible, and these alarming phenomena yielded to warm fomentations to the hand, dry-cupping over cardiac region, and two small venesections.

On the 4th of May another injection was practised. Since this the pulsations in the tumour were manifestly more feeble, and on the 5th of May she could move freely the head and arm, and the respiration was easy. From the 6th to the 8th of May four injections were performed night and morning. The local amelioration was very marked, the tumour diminished in size; there was a slight induration at the seat of punctures. Another injection was made on the 9th, and there was a fresh threatening of syncope, which yielded to stimulants. From the 10th to the 30th of May seven more injections were made. The state of the patient improved daily; she could get up, speak freely; the swelling of the arm disappeared. On the night of the 31st of May there was a fresh syncope, which subsided under ordinary means. On the 1st of June all local measures were given up, and the patient, finding herself better, left the hospital.—*Gazette Hebdom. de Méd. et de Chir.*, May 13th, 1870.

Statistics of Tumours.

Billroth (' Chirurg. Erfahr. Zurich,' 1860—1867; ' Archiv. f. Klin. Chir.,' Bd. x) gives a tabular survey of 558 cases of tumours observed by him in Zurich, and with regard to the frequency of the different kinds and their relations to the sex.

As to frequency they are grouped in the following order:—Carcinoma 212, lymphoma 82, fibroma and myo-fibroma 67, cysts 57, adenoma 46, sarcoma 42, lipoma 22, angioma 22, chondroma 5, osteoma 3.

As regards the sex, fibroma, fibro-myoma, and carcinoma were more frequent in males (uterine myoma and uterine carcinoma were seldom treated in the surgical wards); whilst lipoma, sarcoma, adenoma, and cysts were more common in females.

With respect to the seat of the tumours the most frequent situation was the scalp and face, skin of the gluteal region, and the extremities. The influence of the atmosphere on the face as a cause of its frequency

is not established. The disposition to formation of tumours in different periods of life showed that the tumour diathesis in the first decennium is exceedingly small, from the second decennium it increases rapidly up to the fourth, remaining then of equal height, and afterwards it proceeds slowly, largely increasing in the sixth, seventh, and eighth decennium. The average duration of life in cancer was two and a half years; the ordinary course of a sarcoma was from one year and three and a half months to thirty-nine years.

Meckel's Ganglion and the Propriety of its Removal for the Relief of Neuralgia of the Second Branch of the Fifth Pair of Nerves.— Dr. Conner, Professor of Surgical Anatomy in the Medical College of Ohio, commences his observations with an extract from Dr. Carnochan's well-known report of the cure of three cases of neuralgia of the second branch of the fifth pair by exsection of the superior maxillary trunk:

"I believe that in such aggravated cases of neuralgia the key of the operation is *the removal of the ganglion of Meckel, or its insulation from the encephalon.* Where even a large portion of the trunk of the second branch of the fifth has been simply excited from the infra-orbital canal, the ganglion of Meckel continues to provide to a great extent the nervous ramifications which will still maintain and keep up the diversified neuralgic pains. Besides the ganglion of Meckel, being composed of *grey matter, must play an important part as a generator of nervous power,* of which, like a galvanic battery, it affords a continual supply; while the branches of the ganglion, under the influence of the diseased trunk, serve as conductors of the accumulated morbid nervous sensibility."

Dr. Conner enters into a very elaborate detail of the anatomy and physiology of the ganglion and its branches, and after adverting to the pathology thereof in reference to neuralgia, he refers to the practical bearing of operative interference. He says:

"But whether the disease, for the cure of which the operation is performed, is of central or peripheral origin, is a question of little importance, if it can be shown that permanent relief may be expected from exsection of the superior maxillary trunk back to the foramen rotundum. But if it is a fact that the relief afforded by it is only temporary, in a considerable proportion of cases of not longer duration than the intermissions secured by other and less formidable operations, or by medication, then it becomes a serious question if the "Carnochan operation" is not an "act of desperation" to which recourse should be had hardly sooner than to the division of the sympathetic in the neck, that Charles Bell wished could be performed with safety, believing it would relieve the neuralgia under consideration.

Dr. Conner gives the record of thirteen cases of exsection of the superior maxillary nerve with the following results, seven in which pain is known to have recurred, and six in which return of pain has not been reported. The return of the pain in the seven cases was,— within one month one case, within two months one case, in three

months two cases, in eight months one case, in sixteen months one case, and the time not stated in one case. The non-return of pain in the six cases is thus stated : for several years one case, for several months one case, for fourteen months one case, for two months one case, for twenty-eight days one case, dubious in one case at time of report. Granting that in all the six cases in which we have no knowledge of return of pain, there was no such return, the operations were successes, and the neuralgia was in each *permanently* relieved by the exsection of the superior maxillary nerve back to the foramen rotundum ; yet in at least 50 per cent. of the operations the freedom from pain afforded did not continue a year and a half. It may with propriety be supposed that the percentage of failures much exceeds the fifty per cent. just stated. In accepting as successful cases all in which the result of the operation has not been fully given, we cannot certainly be accused of want of liberality. Is a few months' freedom from pain to be considered indicative of the success of the operation, and is this operation the only means by which such freedom has been or can be secured ? In Stromeyer's opinion "fourteen months is no success ;" and there are numerous cases on record of prolonged relief secured by medical treatment, and by section of the nerve in the infra-orbital canal, or just external to it. If surgical interference seems necessary, infra-orbital neurotomy ought to precede deep section of the superior maxillary trunk ; the latter should be performed, if ever, only after the most thorough trial of every other recognised means of treatment has failed to secure relief, and when the superior maxillary trunk is exsected back to the foramen rotundum the "removal of Meckel's ganglion, or its insulation from the encephalon," cannot on either anatomical or physiological grounds be considered of importance, much less the "key of the operation." —*Amer. Journ. of Med. Science*, p. 359, October, 1870.

Disease of the Alveolar Process, causing Neuralgia, cured by Removal.—Dr. S. W. Gross, of Philadelphia, describes a form of neuralgia of the jaw-bone. Its seat is in the remnants of the alveolar process of edentulous persons, or in the alveolar structure and in the overlying gums, and is met with chiefly if not exclusively in elderly subjects. It is also more common in the upper than in the lower jaw. The part affected is usually very small, often not exceeding a few lines in extent. The soft tissues around do not seem to suffer, at least not in the same degree, as is so frequently the case in the more ordinary form of neuralgia of the jaws and face. On the contrary, the morbid action is generally limited to the osseous structure. The pain is generally paroxysmal, very much as in ordinary neuralgia, the slightest causes being sufficient to produce it, as talking, mastication, the contact of hot and cold fluids, deglutition or mental excitement. Sometimes it is momentary ; occasionally it lasts for hours together ; and in rare instances it continues for an indefinite period. The pain varies in character ; it may be sharp and darting, dull, heavy, boring or gnawing ; pressure generally relieves rather than aggravates it. The pathology of the affection

seems to be compression of the minute nerves distributed through the wasted alveolar process, dependent upon the encroachment of osseous matter upon the walls of the canals in which they are naturally inclosed. The osseous structure is always abnormally hard, from the deposit of new substance which imparts to it almost an ivory-like consistence.

The disease usually comes on gradually and proceeds from bad to worse, until the suffering is rendered nearly intolerable. The general health becomes impaired; the appetite deranged; countenance anxious; sleep disturbed and unrefreshing; bowels habitually constipated, and digestion imperfectly performed; the vital powers become lowered, thus aggravating the pain and prolonging the paroxysm.

From all that I know of this complaint, I am free to believe that the only effectual remedy is excision of the affected alveolar process. I carry an incision along the alveolar ridge to the requisite extent, and then turn aside the soft parts including the periosteum, and remove by means of the cutting pliers and the gauge the affected bone to a level with the palatine process. No particular attention need be bestowed upon the after-treatment; a mild course of chalybeate tonics may be required when the patient is anæmic or affected with flatulence and indigestion.

Dr. Gross has selected five cases as examples, and gives short abstracts of them.—*Amer. Journ. Med. Soc.*, July, 1870, p. 48.

Supra-laryngeal Encysted Tumours; or Encysted Bursal Tumours in front of the Larynx.—Dr. F. H. Hamilton describes a small encysted tumour which forms pretty frequently upon the front of the larynx. Of the nine or ten cases which have come under his care, the position has ranged from a point just above the thyroid cartilage to the front of the cricoid cartilage; but in most cases they have been situated directly in front of the crico-thyroid space. Seven of the whole number have occurred in females; several of these commenced in early childhood or during infancy, and possibly some were congenital. They have presented themselves uniformly exactly or almost exactly in the median line. They have been globular in form, smooth, elastic, painless, and generally without discoloration. They have seldom caused any inconvenience, unless it has been a slight sense of constriction. In most cases they have not been larger than a pullet's egg, and he has never seen them attain a larger size than a small orange. Occasionally, they have disappeared somewhat suddenly, but only to reappear after a short period; and in one instance the sac was evidently emptied into the larynx, the contents being coughed up. In one case the tumour disappeared, and had not returned at the end of two years.

The contents of the tumours have, with one exception, been found to be a thin yellowish serum. The walls of the cysts have been uniformly thin and firmly attached to the portions of the larynx over which they were situated.

The surgical treatment adopted has been incision and excision.

Excision is difficult, owing to the thinness of the walls and to the close attachment of the base to the larynx. Latterly, he has simply laid them open freely and cut away the projecting portions of the sac, leaving them to suppurate. In every instance a complete cure has been effected.

He considers these tumours as examples of enlarged bursæ; those situated behind the top of the thyroid cartilage he regards as prolongations of the thyro-hyoid bursa. Certainly none of them had any connection with the isthmus of the thyroid gland, in no case nearer within half an inch; and there has been no simultaneous enlargement of the thyroid gland. In some cases the cyst may be attributable to a superficial subcutaneous bursa, occasionally observed in front of the larynx, caused probably by the motion or sliding of the integument over the thyroid and cricoid cartilages.—*Amer. Journ. Med. Sc.*, April, 1870, p. 576.

On the Removal of the Thyroid Gland by Caustic Enucleation.—Dr E. G. Figg, of Williamstown, Australia, refers to three cases in which he has obtained a successful issue, and gives the following manner of the performance of the operation:

Saturate half a dozen pieces of lint, each about one inch square, with Liq. Ferri Perchloridi; and having placed the patient under the influence of chloroform, grasp the tumour with the left hand, repressing the skin to render it tense, and with a bistoury make a longitudinal incision in the median line, about two inches in extent, dividing all the subjacent tissues to the surface of the tumour itself. With the finger or handle of the instrument rather than the blade separate the connection between the areolar tissue and the gland as far as may be conveniently reached, arresting the bleeding and destroying the possibility of the integument and gland reuniting, by interposing pieces of the lint referred to. This accomplished, make an incision in the gland itself corresponding in length to the superficial one, but in depth varying from one to one and a half inches; now introduce a pair of Fergusson's forceps, one blade passed into the incision in the gland, and the other on the circumference of the gland, external to it, but within the integument, and break up the substance of the gland by pressure repeated in every direction; plug the cavity thus formed to its utmost capacity with the lint saturated with the Liq. Ferri Perchl. The influence of the chloroform having passed away remain long enough to insure safety from bleeding; direct the application of a large warm poultice over the wound as soon as the lint and parts operated on have fairly concreted.

On your next visit at the end of a couple of days, having bathed the wound with warm water, remove the lint and scrape off with your nail the coagulated blood, so as to obtain as far as possible a raw surface for further operation. Anoint the skin in the immediate vicinity with oil; dip a small piece of lint in undiluted nitric acid, cauterising therewith the circumference of the cavity—a painless process not requiring chloroform; direct warm poultices and fomentations to be applied for two days longer, when a fetid sanious discharge will ensue.

At your next visit, with the finger tear through the centre of the gland until the cartilage and tracheal rings are felt, thus assuring yourself that the lobes are permanently divided ; remove with the nail as much of the *débris* of the organ formed by the nitric acid as you can ; reapply the caustic and poultice as before.

Thus proceeding, it is perfectly evident that the whole structure will gradually be exfoliated, ultimately coming out in masses the size of an acorn, vitality being destroyed by detachment of the skin and the destructive power of the acid.

The removal of the largest of the three tumours he had thus operated on, about a pound weight, being effected by ten applications.

A caution is necessary in identifying the proper locality to be cauterised, for the base of the tumour is often diffused or laterally expanded, insinuating itself in thin layers beneath the sterno-mastoid muscles and enveloping the sheath of the carotids, to the texture of which it is tenaciously adherent, and so difficult to detach by the nail that it is better to leave a small portion rather than use the nitric acid and risk the destruction of the pneumogastric nerve, or burning through the coat of the vessel, the full round pulse of which is most distinctly felt under pressure of the finger.

In the second case, where the removal was effected by eight applications, the patient being of an emaciated, weakly constitution, with chronic bronchial cough, the evidences of deterioration from the first day's proceedings were so apparent that my utmost efforts were required to persuade the relatives to allow me to proceed. The low pulse, cold skin, areolæ round the eyes and mouth, the atrabilious hue of the countenance, vomiting, want of sleep, and inability to take nourishment, all established immediately consequent on the first stage of operation, made me heartily regret ever undertaking the case. But I reasoned that, left under existing circumstances, the woman would certainly die—an event attributable to the conjoint influence of her original malady, and the morbid state of my artificial induction. I therefore endured reproof and censure, liberally administered, was gratified with permission accorded to continue further efforts, and ultimately had the satisfaction of seeing a complete recovery.—*Australian Medical Gazette*, Dec. 15th, 1869.

Intercostal Pulmonary Hernia, in all probability developed spontaneously.—Professor Buntzen, of Copenhagen, details the following account of a case thereof :

A girl, æt. 13, had up to her fifth year been in perfect health, and nothing abnormal noticed in the conformation of her body or in its functions, when at this period there was observed for the first time a tumour on the front of her chest, a little below the left clavicle, and towards its middle. At this time it was small, but prominent and rounded ; one could see it and feel it. It gave no inconvenience ; she breathed well, had free use of limbs, and the tumour was considered a kind of anomaly, having no influence on the general health. At the end of a certain time it was accidentally found to have dis-

appeared, and the site of the tumour was found flattened.   Nothing more was thought of it, but at times it reappeared and subsided again.   Coughing or crying never seemed to have any effect upon the tumour.   It disappeared for more than a year, but again recurred at the same spot and of same size.   At the age of eleven the tumour disappeared for the last time, and never again appeared until two years after, at the present age of thirteen, when she came under notice.   The mother stated that she had remarked a small depression into which she could pass the finger when the tumour disappeared, and pointed out its seat as being between the second and third ribs, towards the axilla, but could not tell the depth.   The tumour had been examined by several medical men, who gave no direct opinion of its nature to the mother ; many remedies were used without effect, and the tumour always disappeared suddenly and completely.

On examination the tumour had existed from ten to twelve days. The girl was well developed.   There was nothing abnormal in her conformation ; not the slightest anomaly in her spine, pelvis, and bones, &c.   On exposing the chest there was a swelling of the size of a fist, seated on the left side under the clavicle, and extended obliquely towards the hollow of the axilla.   In this direction the long diameter attained three to four inches ; the tumour was raised above the level of the ribs to two inches.   It was everywhere regularly rounded ; one could not feel it immediately under the skin, as the pectoralis major was stretched over it.   It was at the external border, at the side of the axilla, that it was most appreciable, as it projected from under the pectoral muscle.   It formed there a uniform, firm, rounded, elastic mass.   One could not trace its deeper relations, as it completely covered the osseous surfaces, especially a portion of the superior ribs, leaving no limitation of separation between it and the ribs.

On the supposition of its being a pulmonary hernia, the respiratory murmurs were attentively examined during respiration ; but during deep inspirations, although slightly distressing to the patient, nothing remarkable was evident.   The tumour preserved its roundness and solidity.   On percussion it gave a sound slightly dull over whole surface, but with the stethescope very distinct respiratory bruit was heard, both in inspiration and expiration ; there was no crepitation or mucous râle.   The respiration was natural ; there was no cough or reaction in the thoracic organs.   No enlargement of the gland in the axilla.

On examining the thorax the left side seemed a little narrower ; at its inferior part the circumference of the left half measured one inch less than the right half.   On applying the ear the respiratory murmur did not extend so low down as on the opposite side.   Heart normal, a little more pressed to the left side.   The attitude of the body when erect was remarkably inclined, as in cases of scoliosis ; the trunk was greatly inclined to the left side, so that the right shoulder was one and a half inches more elevated than the left, and the scapula was drawn up.   The spine presented a slight curve to the left ; the neck and head were likewise inclined to the left side,

and this attitude was permanent in all positions of the body. Movements of body and limbs perfectly free.

The tumour was painful when much handled, and was irreducible. The patient refused chloroform, and the mother preferred spontaneous reduction, of which she did not doubt, and merely required the application of a contentive bandage.—*Journ. für Kinderkrank*, November and December, 1868.

On Wounds and Aneurisms of the Gluteal and Ischiadic Arteries.— Dr. George Fischer first of all gives a very accurate account of the anatomy of these vessels; next he considers the wounds of these arteries, which on account of their deep and protected situation are of rare occurrence, but his chief research is in respect to aneurisms. The following is a brief abstract on this point:

Twenty-five cases of aneurism of the gluteal artery, 11 being traumatic, and 14 spontaneous;

Six cases of aneurism of the ischiadic artery, 2 traumatic, and 4 spontaneous;

Two questionable as to whether gluteal or ischiadic, 1 traumatic, and 1 spontaneous;

One spontaneous of the ischiadico-popliteal artery;

One spontaneous of the anastomotic vessels of the gluteal and ischiadic.

Of the 14 traumatic arterial aneurisms 5 were diffused, and 7 circumscribed; and in 2 the aneurisms were varicose. Their causes were in 12 from wounds of the artery by puncture with scissors, file, knife, nail, &c.; in 1 from gunshot wound, and in 1 from severe jolting in the saddle whilst riding.

Of the 21 spontaneous aneurisms the causes in 10 were uncertain, in 9 from severe contusions, of which 2 were accompanied with fractured pelvis, in 1 during pregnancy, and in 1 from straining at stool.

The *sex*:—28 males and 7 females. All the traumatic cases were males, and the 7 females were spontaneous.

The *age* in the traumatic cases was between 14 and 50 years; in the spontaneous more than half (10 out of 17) were between 20 and 40 years; the youngest was a male æt. 22, and the oldest a female æt. 66.

Respecting the country.—11 occurred in England, 5 spontaneous and 6 traumatic; 7 in Germany, 5 spontaneous and 2 traumatic; 8 in America, 6 spontaneous and 2 traumatic; 6 in France, 5 spontaneous and 1 traumatic; 2 in Italy, traumatic; and 1 in Russia, traumatic.

After reviewing the development, progress, pathological anatomy, and symptoms of these aneurisms, he passes on to the diagnosis, which he states to have been always very difficult; in 6 of the traumautic cases it was mistaken for abscess; in 1 for medullary sarcoma; in another for ischiadic hernia.

The course, prognosis, and treatment are then fully discussed, and with regard to the latter Dr. Fischer remarks that the valsalva treat-

ment had no chance; that direct compression was attended with 1 cured and 2 relieved, the latter, however, relapsed; that indirect compression was uncertain, it could be employed in the gluteal region in thin subjects and in 1 case compression of the aorta was had recourse to for 4 weeks, but it proved painful and useless; that ligature was the most common method of treatment. It was adopted in traumatic aneurisms of the gluteal artery in 6 cases, by the laying open of the sac and securing of the vessel, and of these 4 recovered, 1 died of hæmorrhage, and 1 entirely failed. In the spontaneous aneurisms ligature of the hypogastric artery was performed in 4 cases, with 3 recoveries and 1 death; and ligature of the common iliac artery in 3 cases, all of whom died. Galvano-puncture was tried in 1 case without any benefit.

Dr. Fischer gives the following summary:

1. Wounds of the gluteal artery, whether by puncture, operation, or gunshot, are very rare. The punctured wounds lead more frequently to aneurism. Their diagnosis will be the situation of the wound, and the recurrent dangerous hæmorrhage. The best mode of treatment will be ligature, although difficult, and if this fails ligature of the common iliac or hypogastric artery must be performed.

2. Aneurisms of the gluteal and ischiatic arteries as not so rare as is generally considered. There are thirty-five cases on record, of which three fourths were aneurisms of the gluteal. There was one case of aneurism of the ischiadico-popliteal artery. The traumatic aneurisms comprised circumscribed, diffused, and varicose varieties, and were less frequent than the spontaneous aneurisms.

3. The traumatic aneurisms followed punctured and gunshot wounds; the spontaneous were most frequent after contusions, but in several the cause was unknown.

4. The traumatic cases occurred in males, the spontaneous in both males and females; and the aneurisms were more frequent on the left side than the right. Most of the patients with spontaneous aneurisms were between thirty and forty years of age; they were workmen and chiefly in good health.

5. The traumatic aneurisms followed severe hæmorrhage, either immediately or some few days later; the spontaneous occurred either within a short time after the supposed cause, or also supervened slowly, with more or less pain, and, in some cases, even years elapsed before the patient sought advice.

6. Aneurisms of the gluteal artery, as a rule, were generally seated at the upper border of the great sciatic notch, but might extend over a greater part of the gluteal region. Aneurisms of the ischiadic were more deeply placed towards the tuber ischii, and were extended towards the thigh or reached into the pelvis.

7. The size of the aneurism varied in both forms, from a slight projection of the size of a hen's egg to that of a child's head. They were soft, elastic, and fluctuating, and might become inflamed.

8. There was nearly always constant a pretty strong pulsation synchronous with the heart's action, whereby the swelling was

rhythmically moved up and down, and seldom was it absent. A hissing, whizzing, bellows murmur was also heard. In both forms there was pain in the tumour and in the course of the sciatic nerve, and often accompanied with numbness and lameness.

9. The diagnosis, often most difficult, is to be based upon the pulsation, the aneurismal sounds and sciatic pains, so as to distinguish them from abscesses, medullary sarcoma and hernia; but, above all, the most important point is the situation.

10. The aneurism if left alone leads to rupture, hæmorrhage, and death.

11. The treatment adopted has been, compression with or without the Valsalva method; laying open the sac with ligature of the gluteal artery; ligature of the gluteal artery alone; ligature of the ischiadic, hypogastric, and common iliac arteries: galvano-puncture; and injections of perchloride of iron.

12. The injection of the perchloride of iron is recommended as the best treatment on account of its simplicity, greater safety, less danger, and shorter duration. It can always be employed, except in ischiadico-popliteal aneurisms, with prospects of a permanent cure.

Recovery after Fracture and Extrusion of the Odontoid Process.— Dr. Bayard describes in the ' Canada Medical Journal ' an interesting and unique case of recovery after fracture and extrusion of the odontoid process of the axis. The patient, a little girl aged six years, fell from a pile of boards about five feet high, striking on her head and neck. No indication of injury, other than pain and inability to move the head, was observed; but this pain in the neck much increased, to such an extent that medical aid was sought. When Dr. Bayard first saw her she was able to walk well, though she moved carefully and supported her head with her hand placed under the chin. The head was inclined forwards and to the right side, and any attempt to rotate or move it caused great pain; there was little swelling or pain upon pressure on the occipito-cervical region, and no irregularity could be discovered in the vertebræ of the neck; the pulse was natural, and the general system was undisturbed.

Two months afterwards the child was suddenly seized with paroxysms, in which the arms and legs were powerfully thrown back, and moving convulsively, with loss of power to support the head, which fell from side to side. Her mind was not impaired; she conversed freely, and did not complain of pain. She was immediately placed in bed, when the spasmodic action of the limb subsided; she fell asleep, and slept quietly through the night. The next morning she was perfectly powerless from the neck down; she swallowed with difficulty, but articulated well, and the sphincter muscles retained their power. She continued in this state for three months, after which time the power of locomotion very gradually returned. Nine months after the accident she walked well, though she constantly supported the chin with her hand placed under it. The head rested upon the right shoulder, and could not be raised from it without causing severe pain. The neck was much altered in shape, and

there was an irregularity in the region of the atlas and axis that gave the idea of a partial luxation of these vertebræ. Her general health was good, and the muscular power was perfect.

Fearing fatal pressure on the spinal cord as the possible result of any sudden movement, an apparatus was constructed by which the head could be fixed and *gradually* raised from its position on the shoulder. This was worn for nearly a year, when she was able to leave it off with the head nearly erect, the neck tolerably straight, and possessing considerable power of rotation. There is a depression behind the right mastoid process, and a corresponding elevation upon the opposite side.

She continued thus, with more or less pain, for about another year, when she complained of sore-throat, and was again brought to Dr. Bayard, who finding tumefaction and redness in the posterior fauces over the body of the axis, and suspecting the formation of an abscess, directed her to gargle frequently with warm water, and to return in a week, before the expiration of which time the child coughed up what was evidently the odontoid process. An opening corresponding in size to the bone was found near the body of the axis, which soon closed. After the lapse of over two years the power of locomotion was perfect; she could run or walk at pleasure, and rotate the head pretty well. She had a severe attack of whooping-cough, and on several occasions during a paroxysm lost all muscular power, and fallen, in consequence of pressure on the spinal cord, but the effect was momentary.

The report of this interesting case is accompanied by photographs of the extruded bone, which leave no doubts as to its character.— *The New York Med. Gazette,* Jan. 22nd, 1869, p. 94.

On the final results of Resection among the Peasant Class of the Danish Army in the war of 1864.— Dr. Adolph Hannover, of Copenhagen, endeavours to ascertain the use and value of a limb which has been successfully saved by resection of the joint. He has collected and given in detail fourteen cases of the resection of the head of the humerus, sixteen cases of resection of the elbow-joint, and one case of resection of the knee. The following is a summary as to their ultimate condition.

Of resection of the head of the humerus there are 14 cases, 8 on the right side and 6 on the left. Two of these, however, must be excluded, as they died afterwards from other causes, but, nevertheless, the condition of their joints were not favorable. Of the remaining 12 cases, 3 of these we may regard as tolerably favorable, inasmuch as one had great use of his limb; although the upper arm was of no good to him, yet when the elbow was supported he could grasp and hold various things as long as they were not too small; in the second case, the man had great difficulty in lifting the upper arm but he could make good use of the limb for such work as permitted the upper arm to hang down; in the third case, although the man could not move the upper arm, yet he could make use of the forearm and hand with some benefit. The remaining nine

patients could only use the hand under certain conditions, either when the upper arm and elbow were fixed against the body, or when the forearm was secured horizontally either in a bandage, or on a splint. But even then the use of the arm was very insignificant, for if the fingers could be moved their power was either altogether deficient or at most very slight.

This is all that can be brought forward respecting the favorable results, for in every other respect the end-result was unfortunate. In 1 the fingers were bent; in 3 the hand was cold and had always to be protected; in another the hand was without feeling. Atrophy of the whole arm and hand occurred in 4 cases, and of the upper arm and pectoral muscles in 4 cases likewise. Spontaneous pains attacked two cases, and in 4 there was pain on motion and on external pressure. Active motion in the elbow-joint was either very slight or not at all; but in general the patient could only bend the joint, when the forearm was brought forward in front of the chest and after fixing firmly the upper arm; and even then this movement was not worth much on account of the very slight use of the hand. Scarcely any one of the patients had any active motion in the shoulder-joint. In 7 cases, and probably in one other after several years there was no consolidation of the shoulder-joint, whilst in 4 there was anchylosis. In 2 cases the upper arm was shortened; in 3 there were fistulous openings remaining. These cases prove that an excised shoulder-joint is often an encumbrance to the patient, and in one case the man made the remark that he would be better without his arm.

Of resection of the elbow-joint there were 16 recoveries, 5 on the right side and 11 on the left side. In 10 cases the three articular ends were removed; in 3, the lower end of the humerus; in 2 the lower end of the humerus and olecranon; and in 1 the lower end of the humerus and head of the radius. The operation was performed in 2 cases on the same day as the injury; in 3 cases within 3 days; in 3 cases from 8 to 10 days; in 5 from 15 to 27 days; and in 3 from 61 to 120 days; but the final result of all, without any difference and with only one exception, was bad.

Among these cases, therefore, there was only one patient who had a tolerably good result. He had fracture of the epiphysis of the humerus and head of the radius on the left side, and at the end of four weeks the epiphysis and the head of the radius were resected. He subsequently had a free movable shoulder-joint, an ankylosed elbow at an obtuse angle, a firm grasp of the hand, and good use of the limb as a whole, although it was thinner and shorter. Another case might also be favorably considered; the elbow was stiff, the arm atrophied and weakened, yet he had a tolerably useful limb.

The remaining fourteen cases had a loose, dangling joint, as the result of the resection. This occurred in a marked manner in ten cases, and to a less degree in the other four cases. The loose joint rendered the arm useless; but this was not the only defect, for the arm, at the same time, became burdensome and inconvenient to the patient, thus rendering him helpless. This condition occurred in seven cases, so much so that in two of these the patient, as well as

the surgeon, wished for amputation. There was only one patient who expressed himself satisfied; but he had a perfectly useless, atrophied, and painful arm. When the limb hangs vertically down, the forearm appears to be attached to the upper arm as if by a rope, and is dangling about in all directions. The forearm becomes as a dead weight, and is so heavy that the patient cannot move the arm from the side of the body, or if at all, only in a very limited degree. The loss of power of the whole arm involves also the usefulness of the hand. The patient is obliged to carry the forearm in a sling or stiff bandage, with the upper arm fixed to the body. The forearm likewise has to be enveloped in wool or fur, so as to retain warmth. One would imagine that where the elbow is bent, and the forearm carried in a sling, that the hand and fingers would be of some use; but only in three cases could the patient grasp with the fingers in a slight degree to be of any use. In ten cases the fingers were either immovable, or only so far movable as to grasp with a very limited and scarcely any power at all.

In more than half the cases there was atrophy of the arm, forearm, and hand, in a very marked degree, and in the others there were evidences of its supervening. Six suffered spontaneous pains. One had loss of sensation in the fingers; in two there were fistulous openings about the elbow; and there was shortening of the limb in eight cases to a very great extent.

In conclusion, resection of the elbow-joint has been followed by a final result in the highest degree to be regretted.

Resection of the knee-joint was followed by recovery in one case; but the ultimate result thereof was unsatisfactory. There was very great shortening of the whole extremity, atrophy, loss of power, and difficulty in walking.—*Archiv f. Klin. Chir.*, Bd. xii, Heft 2, 1870.

Excision of the Hip-joint for Caries.—In the analysis of Mr. Good's essays on the subject (Thèse de Paris, 1869) in the 'American Journal of Med. Science,' January, 1870, p. 207 *et seq.*, the reviewer (Dr. J. Ashurst, jun.) gives the following summary:—Comparing our author's statistics with those published by ourselves ('Pennsylvania Hosp. Rep.,' vol. ii), we find 66 cases included in both tables; with regard to some of these, however, Dr. Good's researches furnish additional information. We have, therefore, to add to the 242 cases, which we ourselves collected, 46 from Good's tables, together with 10 out of 21 which he has collected but not tabulated, the remaining 11 being already included in our own tables. Four of these 10 cases were recoveries, though with fistulæ, while the result of the other 6 cases were undetermined. We have thus a total of 298 cases, in 246 of which the results are known. The total number of recoveries (including those with fistulæ) is 130, and the total number of deaths 116, being a mortality of 47·15 per cent. of terminated cases, or of 38·93 per cent. of all cases submitted to operation. The death rate for different ages and the comparative results of partial and total excision will appear from the following tables:

Age.	Recovered.	Died.	Result undetermined.	Total.	Mortality per cent.	
					Of terminated cases.	Of whole number of cases.
Under 5 years . .	9	7	1	17	43·75	41·18
Between 5 and 10 years	51	23	15	89	31·08	25·84
„ 10 „ 15 „	39	25	16	80	39·06	31·25
„ 15 „ 20 „	11	15	1	27	57·69	55·56
„ 20 „ 30 „	10	17	3	30	62·96	56·67
Over 30 years . .	2	11	1	14	84·61	78·57
Age not stated . .	8	18	15	41	69·23	43·90
Total . . .	130	116	52	298	47·15	38·93

Total.	Recovered.	Died.	Result undetermined.	Total.	Mortality per cent.	
					Of terminated cases.	Of whole number of cases.
Total excision . .	58	44	12	114	43·14	38·60
Partial excision . .	20	17	...	37	45·95	45·95
Form not stated . .	52	55	·40	147	51·40	37·41
Total . . .	130	116	52	298	47·15	38·93

" It is thus seen that the mortality of hip excision is least between the ages of five and ten years, and after fifteen years rises very rapidly, so that in adult life the operation becomes one of very great risk, probably quite as much so as hip-joint-amputations, of which the death rate is estimated at 58·56 per cent. for all cases occurring in civil practice and at all ages. The second table shows that total are rather more successful than partial excisions ; and if those cases where this point is not indicated be considered as partial excisions the difference will still be maintained, the mortality per-centages being then 43·14 against 50 for terminated cases, and 38·60 against 39·13 for all cases submitted to operation—an unanswerable argument, it seems to us, in favour of freely gauging the acetabulum whenever it is found diseased."

REPORT ON OBSTETRICS AND GYNÆCOLOGY.

By Robert Barnes, M.D. Lond., F.R.C.P.,

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I.—The Non-Pregnant State.

1. *Contributions to the Diagnosis of Chronic Abdominal Tumours.* By Dr. Schetelig.

2. *Echinococcus of the left Kidney, taken for Ovarian Cystoma.* By O. Spiegelberg.

1. Dr. Schetelig illustrates by three cases some points in the diagnosis of abdominal tumours. The first was an enormous hydronephrosis; adhesions were found extending into the pelvis; extirpation by gastrotomy; death. On dissection no trace of left kidney could be found. Discussing Spencer Wells' dicta upon the diagnosis of kidney-cysts from ovarian, Dr. Schetelig shows that none could distinguish this particular case from ovarian. He thinks even exploratory incision would not have been of much use, since the entire distinction must be founded upon the character of the cyst-contents, and no urine-constituents may be found, whilst paralbumen and cholesterin, which have been considered characteristic of ovarian-cysts, may be present. The fact is that in such a cyst, the natural function of a kidney is perverted.

In the second case there was unilocular ovarian cyst united with a hæmatoma of the fundus uteri and ·of the tubes, and extensive adhesions with the small intestine. Operation; death.

The third case was a cystomyoma of the right broad ligament with chronic peritonitis.—*Archiv f. Gynäkol.*, 1870.

2. O. Spiegelberg relates a case in which echinococcus of the left

kidney was mistaken for an ovarian cystoma. A deadened tympanitic sound was made out only above the anterior pelvic wall, as is often the case in ovarian tumours. At the operation both ovaries were found normal. The cyst was divided throughout its length to facilitate removal, one half was traced up to the kidney; twenty-two vessels were tied. Death next day. Numerous echinoccocus-scolices were found in the fluid. Spiegelberg regrets that exploratory tapping was not practised.—*Archiv f. Gynäkol.*, 1870.

3. Dr. O. Spiegelberg discusses the causes of perforation of ovarian cysts into the peritoneal cavity. He relates three cases: 1. Left papillary cystoma with ascites and perforation; exploratory incision; ovariotomy; death. This patient had been tapped several times. The fluid drawn contained paralbumen, clots did not form spontaneously, cholesterin-crystals. Hence escape of contents of cyst into abdominal cavity was diagnosed. Ovariotomy was proceeded with. Dissection showed recent peritonitis, purulent exudation, old intestinal adhesions. 2. Glandular ovarian cystomes, with numerous ruptures and escape of gelatinous masses into the peritoneal cavity; diagnostic tapping made; death through recent purulent peritonitis. The tumour was perforated in about thirty places, the apertures varying from the size of a bean to that of a small plate; from all the openings yellow-red masses protruded. The chief cyst-wall was very thin. Even the secondary cysts showed perforations. In other respects it was an ordinary glandular cystoma. 3. Glandular cystoma; hæmorrhagic breaking down of the anterior wall; escape into the peritoneal cavity; death by peritonitis.

The causes of perforation, apart from bursting from violence, are frequently a wearing through of the cyst-wall by partial pressure of the growths of a papillary cystoma. The dendritic cauliflower growths springing from any spot advance to the opposite part, and if large cause perforation by pressure. They may then grow unhindered in the peritoneal space, and sooner or later cause fatal peritonitis. There is no doubt that the so-called papilloma of the abdominal cavity described as arising there, are perforated cystomata. Dr. Spiegelberg knows no other instance like the second here described. The most frequent cause of perforation of cysts is suppuration, but this seldom leads to opening into the peritoneum; it mostly opens externally or into a neighbouring hollow organ.— *Arch. f. Gynäkol.*, 1870.

4. Dr. Fuller relates a case in which hair and cheesy matter were passed by the urethra. It occurred in a lady æt. 50, who had two children grown up. A vaginal tumour was present. Under firm pressure this tumour was evacuated, and the tumour was felt empty. Next morning there was much pain and retention of urine. The urine was loaded with pus, and contained numerous fragments of yellowish-white cheesy matter and masses of hair, perfect with bulbs attached. The tumour again filled rapidly and was voided again by pressure. This was repeated several times. It appears that a dermoid cyst had ruptured at the time of a fall when hunting some

years before, and that a communication was made with the bladder. —*Pathological Transactions*, 1870.

5. Dr. Kidd relates a case of axial twisting of an ovarian tumour. During life two tumours were felt, one of which in the left hypochondriac region was very movable. Examining after death this movable tumour could not be felt through the abdominal wall. It turned out that this supposed separate tumour was a projection or prominence on the surface of the large tumour. The pedicle was twisted, one complete turn. This rotation it was that threw the apparently separate smaller tumour out of the way, and embarrassed the diagnosis. The tumour was black from strangulation.—*Dublin Quart. Journ. of Med.*, Aug., 1870.

6. Dr. Bristowe relates an interesting case of a girl, æt. 21, who died under abdominal disease. Scattered all over the parietal peritoneum were innumerable small nodules, some pedunculated, some sessile. A few small nodules were attached to the surface of the liver. There was a group in the neighbourhood of the left groin. There was, in addition, a large irregular tumour springing from the pelvis. This originated in the left ovary. There were two or three cancerous lumps in the substance of the cervix uteri. An interesting feature consists in Dr. Bristowe's opinion that the cancerous growth belonged originally to the peritoneum, and that the ovarian tumour consisted of an originally cystic ovary, the parietes of which had become secondarily involved from its peritoneal connections.— *Pathological Transactions*, 1870.

7. Professor Waldeyer describes minutely his investigations into the epithelial ovarian tumours. These are chiefly represented by adenoma, cystoma, and carcinoma. The ovarian cystomas are of two kinds, *myxoid* and *dermoid*. He prefers the term myxoid cystoma to the more usual colloid cystoma, because the contents are never pure colloid substance, and also in order to point out more clearly the relations of myxoid and dermoid tumours to each other and to the normal formations of the organism. Whilst the inner surface of the dermoid cystoma shows the character of the outer skin invested with epidermis, the myxoma has exactly the aspect and bearing of a common glandular and vascular mucous membrane, *e.g.* of the mucous membrane of the stomach. This Waldeyer proceeds to prove even in detail. He describes the different forms of pedicle in reference to ovariotomy. Where the pedicle merges in the tumour he has sometimes found remains of ordinary ovarian structure ; in one case he found several old corpora lutea.—*Arch. f. Gynäkol.*, 1870.

8. Prof. Spiegelberg gives the histories of eight additional ovariotomies ; three ended fatally, five recovering. One died from the torn cellular tissue of the broad ligament; there was no pedicle ; the tumour had pullulated through the peritoneum ; it was impossible to secure all the vessels. One died having a perforated cyst, a diseased omentum, and breaking-down of papillary excrescences in the abdominal cavity. One died on the seventh day from suppuration of the pedicle, which was thick and short, and had been divided by cautery,

then secured by ligature, and dropped into the belly. His cases, he says, prove the convenience and safety of dropping the pedicle into the belly. Complete closure of the wound is obtained. The main condition of a successful issue is the resisting capacity of the constitution.—*Arch. f. Gynäkol,* 1870.

9. Mr. Keith reports a second series of fifty cases of ovariotomy. the first series of fifty having been published in the ' Lancet,' 1867, The 100 operations give eighty-one recoveries. There has been a gain of six per cent. in the last fifty. No malignant tumour was met with until the sixty-first case. This patient recovered after a very severe operation, remained perfectly well for eight months, and died within a year from cancer of the peritoneum. The sixty-fifth case died on the thirty-third day after operation. She had recovered perfectly, and was about to leave, when, after a day of much excitement, and having eaten very freely of hard grapes, symptoms of intestinal obstruction suddenly set in, the bowels having acted freely without medicine a few hours previously. After waiting some days, the abdomen was a second time exposed by an incision an inch to the right of the old cicatrix. The obstruction was easily reached, and was found to be caused by an old-standing stricture of the lower end of the ilium. For half an inch of the bowel there was not a trace of muscular fibre, but only peritoneum. The contraction admitted a No. 10 catheter.

Of the three unfinished operations, in the first, on drawing out the cyst, the adhesions were everywhere so old and intimate that nothing more was attempted. A free opening was left in the cyst. The patient got very well, married, and remained well for two years, when the fluid rapidly collected. The second had a very firmly adherent thin cyst; it was simply emptied. The patient recovered perfectly, and was afterwards treated by drainage. In the third case the uterus was drawn up to within an inch of the umbilicus. The tumour was so fused together with the uterus and bladder that nothing was done except emptying two large cysts. The patient recovered. Mr. Keith briefly sketches sixteen cases in which no operation was performed.

Of the fatal cases death occurred from pulmonary embolism fifteen days after operation. Two died from pyæmia; in one of these part of a very adherent tumour was left attached to the sacrum ; in the other the tumour was cancerous and adherent to the rectum. One fair average case, in which both ovaries were removed, died from large fibrinous clot in the right auricle. One case of malignant tumour seemed doing fairly, when rapid pulmonary congestion carried her off on the sixth day. Another of the malignant cases got over the immediate effect of the operation, and lingered for twenty-three days, worn out apparently by the general cancerous disease.

In Case 52 the excessive chloroform vomiting during the operation, and for some time after it, so prostrated the patient that her chance of recovery was lost. Keith has now abandoned chloroform, and uses anhydrous sulphuric ether made from methylated alcohol, ad

ministered through Richardson's apparatus. The oftener it has been given the more he likes it. Chloroform, he says, certainly saves the surgeon five or ten minutes of time and a little trouble. Had it never been heard of, he doubts if humanity would have suffered from the want of it.

When practicable, the extra-peritoneal method of treating the pedicle has been adhered to. No case has been operated upon in an hospital.—*Lancet*, 1870.

10. In a very important clinical memoir on cancer of the uterus Mr. Henry Arnott gives the conclusions drawn from the observation of fifty-eight autopsies made in the Middlesex Hospital. The most common form affecting the uterus is true cancer, the structure varying from one almost purely cellular to a tissue exactly resembling the firmest portions of a scirrhous breast. Epithelioma is also very frequently met with, in the proportion of nearly three to four. Well-marked sarcoma is to be found affecting the uterus as well as other parts of the body, although it does not seem to have been hitherto looked for in that locality. Outbreaks of the disease in the neighbouring lymphatic glands or in remote viscera are comparatively frequently met with, and furnish a strong argument against rash operative interference.

These secondary foci being greatly more common with true cancer and sarcoma than with epithelioma, the microscopic examination of the morbid structure becomes of much importance in determining upon a line of treatment.—*Pathological Transactions*, 1870.

11. Dr. Gusserow discusses the nature of sarcoma of the uterus and its diagnosis from cancer. There are two forms: 1, hard sarcoma; 2, soft or diffuse sarcoma. Both may present spindle-cells and round cells. They are very rare. He relates a case of each. In the first the patient suffered intense pain, there was no remarkable hæmorrhage, but an intermitting discharge of flesh-water like fluid; the vaginal portion was quite intact; the body of uterus was enlarged, and in connection with it a tumour the size of an apple. This tumour very rapidly increased to the size of a child's head; peritonitic symptoms and quick prostration set in. The tumour pointed a little below the navel, where fluctuation was felt. Thinking it was a suppurating fibroid, it was determined to puncture, but in the meanwhile spontaneous perforation occurred. Fluid fæces came from the opening with pus. The patient died next day. The uterine cavity was filled with pus and fæces. The intestines adhered to the tumour, and a communication had been established. Uterus enlarged. The tumour consisted of very uniform structure; sarcoma with spindle- and round cells, the first predominating.—*Arch. f. Gynäkologie*, 1870.

12. Dr. Barnes sketches the history and diagnosis of retro-uterine hæmatocele, showing that the diagnosis depends greatly upon the use of the uterine sound. He then, in order to define more clearly the source and significance of the symptoms of pelvic hæmatocele, divides his clinical observations into five groups; the first contains four cases

of rupture of the gravid uterus. In describing these cases he points out that death of the fœtus is an efficient cause of rupture, and that the degeneration of uterine tissue is not a necessary factor. The second group contains eight cases, some doubtful, of rupture of tubal gestation - cysts. The third group contains four cases of bursting of a diseased ovary. In all post - mortem examination was made. In one, that of a young woman, there was malignant disease of the right ovary ; one was a case of axial twisting of an ovarian tumour under the pressure of the pregnant uterus, resulting in strangulation of the tumour, extravasation of blood, and peritonitis. One was a case of axial twisting of an ovarian tumour without pregnancy. One was a bursting of a diseased ovarian tumour, the blood becoming encapsulated. Group 4 contains two cases of effusion from external violence. Group 5 contains eight cases of effusion consequent on abortion ; some of these possibly being cases of rupture of tubal cysts. Group 6 includes eighteen cases connected with menstruation, and others where the antecedent conditions were doubtful. In one case the hæmorrhagic disposition was increased by variola. In two, effusions arose at the onset of menstruation, the author thinks from the difficulty of the menstrual blood, in its first rush, in finding free outlet by the uterus and vagina.

He then compares the symptoms of the several groups ; shows that effusions from rupture of uterus, of tubal gestation-cysts, and diseased ovaries form a cataclysmic order in which the shock is often at once crushing and the blood rarely becomes encysted, whilst in the abortion and menstrual cases, the injury being less severe, the effusion less in quantity and more gradual, the symptoms are less marked and the blood coagulating is usually encysted by peritoneal inflammation. He shows that one cause of menstrual hæmatocele is obstruction from narrowing of os externum uteri or from flexion. His experience is adverse to opening the hæmatocele.—*St. Thomas's Hospital Reports*, 1870.

13. Dr. Byford relates a case of inversion of the uterus treated by elastic pressure. The placenta was expelled, and, hæmorrhage occurring, the uterus was grasped through the abdominal wall. Bleeding returned, and the uterus enlarged. Grasping it caused contraction again. She was much prostrated, but in twenty days rallied and then got about. About five weeks after labour, when vomiting, she had tenesmus, and felt something come down, which she replaced, and a physician coming found an inverted uterus. Two months after this Dr. B. applied a water-bag in the vagina. On the fifth day the uterus had returned. The patient quite recovered.— *New York Med. Journ.*, 1870. (The mode of occurrence of the inversion is even more remarkable than the cure. Cases of inversion occurring many days after labour are so rare as to have raised doubts whether there was not error in the observation.—R. B.)

14. Professor Halbertsma relates a very instructive case of retention of menses from atresia vaginæ. The uterus had been enlarging

for ten years from the blood accumulated within its cavity, so that the fundus reached a hand's breadth above the umbilicus. He formed the opinion that rupture of one of the distended Fallopian tubes was impending. He punctured the uterus with an exploring trocar; the tension was thus relieved, and it is believed that the rupture of the tubes, which so often attends rapid emptying of the uterus, was prevented.—*Centralbl. f. d. Med. Wissensch*, 1870.

15. Dr. M'Clintock describes a form of contraction of the vagina which takes place after the menstrual epoch. There takes place a progressive diminution of the calibre of the vagina—not throughout its entire extent, but commencing at its summit, and slowly advancing downwards. When the contraction has reached the level of the os tincæ, the introduction of the finger into the vaginal cul-de-sac around the cervix becomes quite impossible, this part being so closely embraced by the ribbon-like structure. With the persistent increase of the contriction the os and cervix become quite encapsulated, and beyond the reach of touch or sight. The condition is quite distinct from malignant disease or cicatricial process. It occurs in old women.—*Dubl. Quart. Journ. of Med.*, Aug. 1870.

16. Dr. Duncan relates a case of a pluripara who had severe perimetritis after an abortion, ending in perimetric abscess, leaving the uterus fixed and drawn closely to the left sacro-iliac synchondrosis. Another abortion occurred whilst this state of things remained, when in the second month of a subsequent pregnancy the fixing of the uterus was still felt. As the uterus developed itself the uterus became retroverted, gradually filled the pelvis, and the cervix was driven close against the symphysis; the uterus was absolutely immovable. About the end of the fourth month the retroverted and adherent uterus became gradually and spontaneously replaced. The fœtal heart was heard until the middle of the sixth month, when the child died. Full a month after this the membranes burst and the delivery was completed; the os uteri remained widely open, unnaturally adjacent to the symphysis, and its mobility restricted. Involution was impeded, and two months after labour the uterus had regained some mobility. Two things are especially noteworthy—the uterus bound down by adhesions, overcame them, and became developed as far as the seventh month; the adhesions caused retroversion of the gravid womb.—*Edin. Med. Journ.*, Oct. 1870.

17. Dr. Lente passes under review the various topical modes or treating disease of the cavity of the uterus. Iodine in solution he has known cause intense pain and alarming collapse, which, however, passed away, and no further bad effect ensued. He, however, contends that it is one of the best and safest medicines we possess. He speaks highly of a method long used by the reporter (R. B.), viz., coating a probe-pointed sound with a film of fused nitrate of silver, as a means of carrying the remedy into the cavity of the uterus. He properly says that lightly used it is not a caustic, but a powerful astringent. Applied to the interior of the uterus it sometimes

causes acute pain, and a dose of morphia should be at hand to allay it. In some cases contraction of the os externum uteri has followed the too free use of nitrate of silver. As to fluid applications, Dr. Lente uses an instrument provided with a small pledget of cotton, which is carried into the uterus; by a piston a known quantity of the fluid, say solution of iodine, is forced into the cotton to saturate it, and this being in contact with the uterine wall avoids all force in the application.

Dr. Lente speaks highly of an instrument for carrying medicinal agents into the uterus in the form of ointment. For the arrest of hæmorrhage he uses iodine injection; but in certain cases he says scraping the mucous membrane with Récamier's curette is the only effectual remedy. In certain cases of rebellious chronic metritis, he recommends trial of a seton consisting of six silk threads carried through one lip of the os uteri. The free discharge set up leads to healthy action and diminution of bulk of the diseased cervix.— *New York Journ. of Med.*, 1870.

The leading gynæcologists of New York have discussed the value of intra-uterine injection. Dr. Nott said a portion or the whole of the substance injected becomes neutralised in contact with the uterine discharges; even chromic acid may be injected into the uterus full of blood, and pass out without irritating the vagina, which part is very sensitive to the direct action of chromic acid. For efficient action the uterus should first be cleared of discharges by syringe. A source of danger is obstruction to the return current by coagula. To obviate this a double current canula is necessary.

Dr. Barker preferred the sulphate of zinc in the metrorrhagia of the climacteric period. He employs a paste made of one ounce of sulphate with two drachms of glycerine, three to five grains of which is introduced through a canula. Dr. Peaslee thought intra-uterine injections should be very rarely used; he found iodine, persulphate of iron, and saturated solution of tannin or alum safe and effectual. Dr. Emmet spoke highly of chromic acid, saying that diluted with an equal weight of water it was no stronger than nitrate of silver, and did not, like this, harden the tissues. Dr. Kammerer found that flexions of the uterus often caused the retention of fluids in the cavity, and that the proper course was to keep the os internum freely open. Dr. Byrne had abandoned the use of caustic substances, and now employed mild substances, as sulphate of soda, sulphurous acid, tannin, &c.; he had become convinced that in all cases of troublesome intra-uterine affection there was some constitutional dyscrasia which must be treated. Dr. Thomas stated impressively that "intra-uterine injections do not constitute an advance in the treatment of uterine disease; that they had done and are going to do a great deal of harm."

18. Dr. Hoening relates the case of a woman who thrice after short intervals was delivered of twins, and twice aborted. On examining by sound, the instrument entered ten and a half centimeters. the knobbed extremity being felt nearly on a level with the umbilicus.

Dr. Hoening is confident the sound did not traverse a Fallopian tube, but that it actually perforated the uterine wall, the tissues being softened from puerpery.—*Centralbl. f. d. Med. Wissensch.*, 1870.

19. Dr. L. Aitken contributes a useful paper on some of the accidents attending the use of tangle-tents. Several times he has known pelvic peritonitis follow. In one case a tolerably thick tent was passed into the cervix without difficulty, and removed at night. Next day she complained of pain; pulse 120. Swelling found on both sides of the uterus, filling up the pelvis. Recovery. He relates a case in which a tent was applied on account of profuse hæmorrhage probably from abortion, and retro-uterine hæmatocele followed, but the patient was saved. In another case some ulceration of the cervix was caused, but this appeared to have been produced by awkwardness in introducing the tent. He urges that the tents should never be used if there is any inflammatory action, and that they should be avoided at or near menstrual periods. As to the mode of introducing the tents he recommends Simpson's stilet or a pair of forceps. (He appears not to be aware of Dr. Barnes's instrument, which makes the passage of a tent as easy as the passing a sound.—*Edinb. Med. Journ.*, 1870.

20. Dr. Tessier relates a case in which gangrene of the vagina followed the application of perchloride of iron. The patient, æt. 40, was suffering from slight metrorrhagia, when a profuse flooding suddenly supervened inducing collapse. Dr. Tessier introduced into the vagina a plug of charpie dipped in pure perchloride of iron; and in addition, other masses of the same kind of tampon soaked in an aqueous solution of the perchloride in the proportion of one part to four. The plugs were taken out in forty-eight hours. Five days afterwards, there was a feeling of burning in the vagina. On the seventeenth day a piece of mucous membrane was discharged. The patient had a slow convalescence. It resulted in great contraction of the vagina.—*Gazette des Hôpitaux*, 1869. (The case is very important as showing the action of *concentrated perchloride of iron*, and furnishing data for a standard formula sufficient for a styptic. The effect was scarcely "gangrene;" it was rather a powerful caustic, determining sloughing of the mucous membrane. The action was superficial; and it is hardly conceivable that it can penetrate deeply. We may conclude that in this case we have an example of the extreme local injury that concentrated perchloride of iron can produce. It is, however, clear that it need not be used in the concentrated form. One part in eight of water is sufficiently strong for styptic purposes. This is a powerful corrugant of tissue but is not caustic. —R. B.)

II.—PREGNANCY.

1. *On the Duration of Pregnancy.* Dr. WALLICHS.
2. *On the Value of certain Signs recognised as Characteristic of Pregnancy.* Dr. E. STROHL.
3. *On Auscultation in the Differential Diagnosis of the Presentation of the Fœtus.* Prof. C. MASSARENTI.

1. Dr. Wallichs contributes the following observations to our
knowledge of the duration of pregnancy. A woman, æt. 37, who
had borne five children, menstruated for the last time on the 30th
or 31st July, fruitful intercourse took place on the 4th August, deli-
very on the 30th April, that is 269 days after conception. In the
succeeding pregnancy the period of gestation was also 269 days.
The children were healthy and mature, and the dates were precise.
A third pregnancy also for 269 days presumably, but the dates were
not so rigorously fixed.—*Arch. f. Gynäk.*, 1870.

2. **Dr. E. Strohl**, of Strasbourg, has examined the value of certain
admitted signs of anterior pregnancy, basing his conclusions on the
observation of nearly 350 women. 1. The *transverse fissure of
the os uteri.* It presents great differences. In ten cases where there
had been no pregnancy he found it quite as great as in cases where
pregnancy had existed. 2. The *lateral fissures.* They are of great
value when they exist, but their absence does not exclude an ante-
rior pregnancy. 3. The *cracks in the skin of the abdomen* are of high
value. When they exist, the probability that pregnancy has existed
is very great; but Strohl says they are not always easy to find; they
are in some women so small and so few that they must be sought for
with great care. The skin must be stretched across the direction of
the cracks, for when at rest the skin recovers itself and conceals
them.

In one case of premature labour at six months, in one at seven
months, in four cases of labour at term of one child, and in two of
three labours there was no trace of cracks upon the abdomen or
thighs. On the other hand, cracks on the thighs only, without ante-
rior pregnancy or disease, were met with four times.

Strohl concludes that there are but two signs possessing an *almost*
absolute value when they exist and are well marked, whilst their
absence does not exclude an anterior delivery. These are, the lacera-
tions of the os uteri, and the cracks on the *abdomen.*—*Annales
d'Hygiène Publique*, July, 1870.

Dr. Horton relates a case of labour at term in which the hymen
was found entire, and obstructing the passage of the head. It was
incised.—*New York Med. Journ.*, 1870.

3. Professor Massarenti has subjected to fresh clinical and critical
examination the question how far the auscultation of the fœtal heart
can give evidence of the presentation of the fœtus at the end of
gestation. Referring to the generally received fact that in head-
presentations the fœtal heart is heard at a level below the umbilicus,
and in breech presentations above that level he examines the objec-

tion urged by Belluzzi against relying upon this evidence. Belluzzi's case was that of a woman examined after the waters had long escaped, and when the uterus had been contracting spasmodically. Belluzzi found the fœtal sound to the left of the median line, and for several centimeters below the umbilicus, and says, if he had relied upon this sign he must have concluded that the head presented, but the breech presented. Massarenti replies that the contracting uterus had driven the breach down, and that hence the lair was not invalidated. Belluzzi declares, contrary to most observers, that the fœtal heart is heard loudest nearer to the breech than to the head, and hence a new mode of interpreting evidence of auscultation. He recommends to measure the height of the uterus from its lower segment to fundus, and then, having found the area of the fœtal heart-sounds, to conclude that most probably the extremity nearest to this area is the breech. He affirms that this is actually the case in a great number of observations made before labour, and in new-born children. Massarenti, on the other hand, examining the fœtus as it is packed in uteri *with the head flexed,* affirms that the cardiac sound is nearer to the vertex.—*Med. Gazette of Bolognez,* 1870.

4. Dr. Ahlfeld demonstrated to the Leipzig Obstetrical Society the possibility of measuring the fœtus in utero. The length was estimated by taking the length of the ovum-axis by Bandelocque's pelvimeter, one knob of the instrument being introduced by the vagina, the other carried externally to the highest point of the fœtus.—*Arch. f. Gynäkol.,* 1870.

5. Dr. Langhans describes the relation of the chorion-villi to the maternal placenta. He says the villi of the fœtal placenta penetrate the maternal placenta in stems one millimetre thick, as well as in finer ramifications; that they are there free from epithelium, and so intimately fused with the maternal tissue that even strong traction never separates them, but results in rending the maternal tissue. The insertion of the thick stems is macroscopic, of the finer branches microscopic. This observation is opposed to the general description and Kolliker's, which says that "the final terminations of the branches are always and without exception free, and in no connection with the maternal placenta." On fatty degeneration of the maternal placenta Langhans agrees with Dohrn in opposition to Hegar in regarding the degree of change found at the end of gestation as inconsiderable, and not as preparatory to the casting of the placenta. (This view was originally explained by the reporter, Dr. Barnes.—*Med.-Chir. Trans.,* 1851 and 1853.)

On calcification of the placenta, Langhans concludes that it affects principally those parts which are least necessary to the nutrition of the fœtus. (This also is an old observation.—R. B.)—*Arch. f. Gynäkol.,* 1870.

6. Dr. Winkler describes a case of cyst-formation in the amnion. A mature placenta showed exactly at the point where the amnion merges into the funis a translucent cyst of gelatinous consistence.

It had no relation to the omphalo-mesenteric duct, which ran on the opposite side. The real seat of the cyst was in the connective-tissue stratum of the amnion. Above the funis end of the cyst were a row of cavities recognised by microscope, in constitution exactly like the large cyst; all were filled with a gelatinous fluid.

7. Dr. Hennigsen relates an interesting case of abdominal gestation complicating uterine gestation. The patient, æt. 37, had borne five children. Her second pregnancy resulted in the birth of a mature child having a large spina bifida, followed by metroperitonitis of the right side. After the fifth labour signs of pregnancy appeared, attended with frequent rigors and sudden acute peritonitic pains and syncopes, and tenesmus of bladder. Later a sanguineous discharge took place from the vagina. Later still fœtal parts could be felt through the abdominal walls, and fœtal movements became manifest, and after a time ceased. When labour was expected, expulsive-like pains set in, and a deciduum was discharged of the size of a goose's egg. A month after this menstruation appeared, and at subsequent periods rigors and abdominal pains occurred; these signs recurred during the succeeding two years. The abdominal tumour greatly diminished in size, through the absorption of the fluid contents of the sac. Signs of pregnancy again came. As the uterus grew the abdominal gestation tumour was lifted up into the right half of the abdomen, eventually as high as the liver. The fundus uteri was then felt in the left hypogastric region. Subjective symptoms then became severe; distress in breathing was so great that it was determined to induce labour. This was done by means of the uterine douche; a fœtus of seven or eight months was expelled, and the placenta without difficulty. For ten days the patient did well; the abdominal gestation tumour descended nearly to its former position. Pains and fever set in; the tumour became tender, and during the next month symptoms of subacute inflammation in the tumour, with irritative fever became marked. Pointing took place in the hypogastrium; perforation ensued below the navel; an odourless neutral fluid escaped, showing numerous cells in fatty degeneration, free fat-molecules, and many large nucleated cells. Pulse 120; temp. 39° C. The opening was enlarged by laminaria. After two months a portion of umbilical cord was evacuated, but no hard portions of the fœtus. Inflammation of the right knee-joint appeared.. Further symptoms of chronic pyæmia set in, and signs of diffuse perforative peritonitis having suddenly come on, the woman died.

Autopsy.—The sac was adherent for a small distance to the abdominal wall round the external opening; extensively adherent below to bladder, small intestines, and colon. It contained a chalky incrusted fœtus. There was a perforation which had been made by the pressure of the sharp edges of the macerated fœtal skull through the sac in the region of the valvula coli; this had caused the fatal diffuse peritonitis. The uterus was normal, pushed into retroversion; the left ovary and tube were normal; the broad and round ligaments on the right had been worked into the structure of the sac.—*Arch. f. Gynäkol.,* 1870.

REPORT ON TOXICOLOGY, FORENSIC MEDICINE, AND HYGIÈNE.

By Benjamin W. Richardson, M.D., F.R.S.

I.—Toxicology.

Toxicological effects of opium and its derivative alkaloids.—Dr. Weir Mitchell continues his admirable experiments on the influence of opium on birds. It will be remembered that Dr. Mitchell made the discovery in 1869, that pigeons could take very large doses of opium without suffering from the toxic action of the agent. We repeated his experiments, and were enabled to confirm them entirely, and we suggested some new lines of inquiry that have, with others, been now carried out. The conclusions at which Dr. Mitchell has arrived from his new researches are as follows.—1. Birds, namely ducks, chickens and pigeons, are never poisoned by crude opium, its aqueous extract, or acetum opii (black drop given internally; while the salts of morphia must be given in enormous doses to produce fatal effects when administered in the same manner. 2. Morphia salts, used hypodermically in excessive amounts, never cause sleep or stupor, but act as excitants (convulsants) upon the motor centres. In some instances the spasms are tetanoid in character; but in the duck they approach nearest to the typical strychnic spasm. 3. Thebaia is a tetanizing agent, only inferior in energy to strychnia and brucia. 4. Narcotina, almost inert in man, destroys birds when employed hypodermically, in doses of from two to seven grains. 5. Codeia is a fatal convulsing agent in birds (pigeons). 6. Meconin causes emesis when given internally, and is harmless when placed under the skin. 7. Narceia has no perceptible influence, except to disturb slightly the respiratory function. 8. Cryptopia in doses of one-fifth to half grain has no effect. None of these agents cause sleep in the pigeon, duck, or chicken.

Respecting the causes of the inaction of ingested opium, Dr. Mitchell considers them to be two in number. First. He considers that the slowness with which opium, as well as morphia, is absorbed, is a cause of the inaction. This, he thinks, is shown by the fact that twenty-four hours after a full dose has been given, the pigeon may vomit it in large quantities. In a few cases, the greater bulk of what he had given was thus rejected : but in many other cases all was retained. Secondly, he thinks the inaction is due to the great difficulty with which pigeons, especially old birds, are poisoned by opiates. Probably elimination is sufficiently rapid to protect the system against a dangerous accumulation of the drug. He infers that pigeons and other birds possess the same peculiarity which causes certain men to exhibit, under opiates, excitement only of the motor ganglia, emesis and restlessness, which symptoms under a larger dose might possibly eventuate in convulsions. The normal sleep of the birds is not nearly so profound as that of man,

and on the other hand their motor nerve system enjoys the faculty of evolving an enormous amount of force, and as compared to their cerebral manifestations is far more prominent. It is possible, therefore, we may discover that equivalent doses may affect more profoundly in the direction of stupor, the creature taking them in the proportion as its cerebral development is greater, and its brain more active. Dr. Mitchell found that the inhalation of oxygen by the birds did not increase the protection from the effects of opium; while the inhalation of a small per-centage of carbonic acid gave only a negative result.—*American Journal of the Medical Sciences*, January, 1870.

Toxicological Action of Viridia, Veratroidia, and Veratria of Commerce.—Mr. Charles Bullock, of Philadelphia, has worked out the chemistry of the veratrum viride. He finds in veratria two alkaloids, one soluble the other insoluble in ether. The first of these it is proposed to name viridia, the second veratroidia; together with these a resin is associated in the commercial specimens.

Dr. H. C. Wood, jun., has now made a careful examination of the two alkaloids and of the resin in respect to their physiological and toxic action. The preparations of the alkaloid worked with were always sulphates made by dissolving the alkaloid in very dilute sulphuric acid until the solution was nearly neutral to test paper. The result of the research has been to establish a distinctive action between viridia and veratroida. Viridia in a poisonous dose, administered subcutaneously to a warm blooded animal, causes a desire to be quiet, and an unnatural sluggishness. The expression shows this to be not of cerebral origin, for the eye is bright and the consciousness is perfect. The condition is evidently dependent upon a condition of weakness, which makes movement a painful effort. The next new symptom is, in most cases, an accession of tremblings, which at last ends a muscular thrill. The next stage is marked by the supervention of convulsions, which with increasing debility increases until death. Consciousness remains until the last; sensibility appears to be unchanged for a time, and then is benumbed. These are the toxic symptoms in mammals and birds; in reptiles the convulsions are less marked, and in some instances are wanting, but in them there is profuse salivation. The cause of death, from viridia, is asphyxia from simple failure of muscular respiratory power.

The *post-mortem* appearances yield no evidence of irritation. The action of veratroida (the alkaloid which is insoluble in ether) is very different from that of viridia, and resembles more closely that of veratria; there are fewer convulsions, and the peculiar muscular thrill is absent. Vomiting is always produced by the veratroida, and there is generally purging. Death occurs from loss of power of the respiratory muscles. It is less active than veratria in toxic power.

Dr. Wood sums up as follows:—

Viridia.—1. Viridia appears to be very slightly, if at all, locally irritant.

2. It has no action whatever upon the alimentary canal; never producing either vomiting or purging.

3. It exerts no direct influence upon the brain, and the pupil is not affected by it, except it be an indirect dilatation just before death.

4. It is a spinal motor depressant (probably directly so) producing death by paralysis of the respiratory nerve-centres, and is without action on the muscles or nerves.

5. It is a direct depressant to the circulation, lowering the force and the rapidity, slowing the action of the heart, and, finally, affecting the force of the single beat, independent of any spinal action it may exert.

Veratroidia.—Veratroidia appears to be, physiologically as well as chemically, in many respects midway between viridia and veratria; locally it is more irritant than the former, less so than the latter. It possesses somewhat similar powers to the former on the heart, although to a less extent, and seems midway between the two alkaloids in its action on the nervous system and muscles, acting chiefly on the spinal centres, but appearing at the same time to impair the conducting power of the nerves and the irritability of the muscles. Its influence on the animal may be summed up as follows:—

1. Locally it is somewhat irritant.

2. It is an irritant emetic, and sometimes cathartic.

3. It exerts no direct influence upon the brain or upon the pupil..

4. It is a direct spinal motor depressant, producing death by asphyxia, and acting at the same time, to some extent, upon the conducting nerves and the muscles.

5. It depresses the heart's action both in force and frequency, but the period of depression is followed by one of reaction, its primary cardiac action being independent of its spinal influence.

Resin of Veratrum Viride.—The resin of veratrum viride has no effect upon the circulation; it is inert so far as the medical virtues of the plant are concerned. It has some local action upon the stomach, which is indicated by the violent vomiting it induces in the pigeon, and the gastric disturbances it causes in the human subjects. It is more than doubtful that it is the resin which produces the depressing vomiting often seen when the fluid extract or tincture of veratrum viride has been taken in. Its action is probably not powerful enough in the small quantities given to do more than aid and abet its more active compeer, veratroidia.—*Ibid.*

On Chronic Arsenical Poisoning.—M. Delpech points out various details of facts bearing on the subject of chronic arsenical poisoning by inhalation of particles of arsenical preparations. He finds that dead animals which have been preserved (embalmed) with Becoeur's arsenical soap, and have been collected in large numbers in one room (a museum) charge the dirt of the room with arsenic in such proportions, that it can be removed from the air and proved by analysis. In other rooms in which the walls are covered with paper coloured with Scheele's green, arsenical gases are developed by the reaction of the arsenious acid upon the organic compounds with which it comes in contact; and these gases, mingling with the air, infest it and make it a source of danger. He adds, in relation to the practical bearing of the subject, that many facts have demonstrated to him that people who

live habitually in rooms, in which large numbers of dead birds are pre-
served, or in which there are embalmed or straw-stuffed mammiferi,
whose skins have been prepared with Becoeur's soap, are subject to
accidents from poisoning, analogous to those, described by many
observers, as occurring to individuals who inhabit carpeted rooms the
walls of which are papered in papers coloured with Scheele's green.—
Annales d' Hygiène Publique, April, 1870.

II. FORENSIC MEDICINE.

A New Method of Distinguishing Apparent from Real Death.—M.
Laborde states that when a sharp steel needle (not cased only with
steel) is driven into the tissues of a man or of a live animal, in a vari-
able, but generally very short time, this needle undergoes, suddenly, on
its superfices, the following modification :—It has lost its metallic lustre
to a greater or less extent ; it becomes dim, or in more precise terms,
it is oxydised.   In the year 1857, in the hospital of Bicêtre, where he
was house-surgeon, he had an opportunity of observing this curious
modification for the first time, after inserting a steel needle into living
tissues ; but Professor Cloquet had made known the fact twenty years
before, at the time of his researches upon needle-puncturing.   The
subject was a man who had been found in what seemed to be a dying
state, and who had in fact all the appearances of death.   In order to
test the deep sensibility of the presumed dead body, for the man was not
dead, Laborde successively inserted several bright steel needles into the
muscular mass of the calf of the leg, and of the upper part of the thigh ;
and as there was no reaction in answer to this energetic appeal, he
withdrew the needles soon after he had thrust them into the tissues.
But one of those needles having been left in the leg for more than an
hour, he was not a little surprised, on withdrawing it, to find all the
surface of it covered with one continuous stain looking like rust.   He
was the more induced to repeat the phenomenon, as it had been pro-
duced on tissues absolutely insensible.   A fresh needle was inserted
into the corresponding spot in the right leg.   Twenty minutes after-
wards its surface was covered with the same stain as the preceding,
but with less intensity, arising certainly, from the difference in
the time of the insertion.   Would this same phenomenon occur in a
subject when really dead ?   The experiment was easily made, similar
needles were inserted into the muscular mass of the legs of a subject
who had died, and were left there for twenty minutes, half an hour,
and an hour ; but when withdrawn the needles were in their pure state,
and clear of every spot or stain on their surface.   This fact became the
starting point for more work, and furnished the author with a basis for
practically resolving the question of apparent death, and consequently
of actual death. The results of his ulterior researches have confirmed his
first observation.   The oxidation of a needle under the condition above
stated, and the thermo-electrical phenomena which are ultimately con-
nected with it, and which are not less appreciable than the oxidation

itself, constitute for us a certain sign of apparent death. The complete absence of oxidation, and of the concomitant phenomena, is a sure sign of actual death. The oxidation itself, or non-oxidation of the needle, establishes a proof which enables us to say whether the death is only in appearance or whether it is actual.—*Mouvement Médical*, Juillet, 1870, and *Annali di Chimica*, No. 3, Settembre, 1870.

Colour Tests as an Aid to Diagnosis. Guaiacum Test for Blood.— Dr. Day, of Geelong, has brought to much accuracy the guaiacum colour test for blood. As this process advanced by Dr. Day has met with the approval of one of our most eminent English medical jurists, as it is a very simple process, and as it has recently been applied in an important investigation, we shall let Dr. Day give at some length his description of his method. He says :—

" The guaiacum process for the detection of blood is an application of a discovery made the late Professor Schönbein, who found that peroxide of hydrogen, which, according to his views, is an antozonide and composed of water and antozone, is rapidly decomposed in the presence of blood, its antozone being converted into ozone by mere contact with the corpuscles. In order to prove the correctness of these views, he made use of tincture of guaiacum, the precipitated resin of which is chemically indifferent to antozone and undergoes no change of colour in its presence, but is possessed of a strong affinity for ozone, with which it combines and becomes changed from its normal colour to a bright blue.

" About three years since, I attempted to repeat the experiments by which Schönbein arrived at the discovery just alluded to, but found it impossible to procure the peroxide of hydrogen. It is a substance, as described by writers on chemistry, not only very difficult to make, but when made is so prone to decomposition that it cannot be preserved without the aid of hydrochloric acid, and this renders it comparatively valueless as a test for blood in cases where great delicacy is required, oxidation and blueing of guaiacum resin by the action of ozone being checked in the presence of free acids.

" It was not long, however, before I was so fortunate as to find that antozonides of a very stable character, and strictly resembling peroxide of hydrogen in all their reactions, were the easiest possible compounds to make, and, moreover, that they exist in abundance, ready made, in every chemist's establishment. There are certain drugs which have a special tendency to absorb oxygen in this form and to become antozonised. Among them I may mention ether, oil of turpentine, oil of lavender, oil of juniper, oil of lemon, oil of eucalyptus, and oil of amber. This process takes place more rapidly in essential oils when they are combined with alcohol." When the antozonides are added to guaiacum alone no change is produced, but when blood also is present, a beautiful blue tint is developed. The result, according to Schönbein, is due to the fact that oxygen in the form of antozone cannot exist in the presence of blood, but is instantly transformed into ozone, which, having a greater affinity for the guaiacum resin than it has for the constituents of the blood, combines with it and produces its characteristic blue reaction.

"Having, continues the author, now at my command an abundant supply of peroxide of hydrogen or antozone, I began to experiment with it pretty freely, and soon found one sample of compound spirit of sulphuric ether which had become so highly antozonised that it immediately gave a bright blue reaction with guaiacum in the presence of blood, even when the quantity of blood was so minute as to be quite imperceptible to the naked eye. There were, however, certain difficulties to be overcome, before this process for the detection of blood could be made available in medico-legal inquiries, the greatest, perhaps, consisting in the large number of substances, both organic and inorganic, which act on guaiacum and turn it blue. This difficulty is removed by the fact that, with one or two known exceptions, which may be easily recognised, they all act on the guaiacum alone ; whilst blood produces no change in the colour of guaiacum, except in the presence of antozone. It is clear, therefore, that in testing for blood by this process we must always apply the guaiacum first, and if it be turned blue by the substance under examination, we may infer, either that it is not blood, or, if blood, that there is also some substance present which can blue guaiacum without the intervention of antozone.

"The difficulty of recognising the blue reaction on dark cloth at one time threatened to mar the value of this process, but it has been overcome by the simple expedient of placing a piece of white blotting paper over the cloth immediately after the tests have been applied, and gently pressing it. By this means perfect impressions of every minute spot of blue may be readily obtained.

"The principles on which the blood-test is based have already been explained. It is so easy of application that I need not occupy much time in showing how it should be used. There is, however, one step in the process which must never be forgotten, and that is, invariably to apply the guaiacum first, and if this be followed by a negative result, then to add a few drops of antozonised ether, when, if blood be present, oxidation and blueing of the guaiacum will speedily follow.

"Although, as I have already stated, a large number of substances are capable of becoming antozonised and, as a consequence, of turning guaiacum resin blue in the presence of blood, I would much prefer, for medico-legal investigations, the use of Robbins's Ozonic Ether. It is a very carefully prepared etherial solution of peroxide of hydrogen of an uniform strength, which is an obvious advantage in cases where great delicacy is required. The tincture of guaiacum used in this test need not be strong. It should be freshly prepared and in a perfectly unoxidized condition. I make it for my own use by putting a few pieces of pure and unoxidized guaiacum resin into a small bottle and filling it up with alcohol ; after shaking it for a minute or two it is fit for use. It should be kept in the dark.

"A piece of paper I now have contains traces of blood upwards of twenty years old ; on applying tincture of guaiacum to it no change of colour will occur, but on adding a drop or two of ozonic ether the guaiacum will be rapidly oxidized and acquire a bright blue colour.

"A test for pus is made by exposing a saturated alcoholic solution of guaiacum to the air until it has absorbed a sufficient quantity of

oxygen to give it the property of turning green when placed in contact with iodide of potassium. Perfectly sound tincture of guaiacum, such as should be used for the blood-test, undergoes no change of colour in the presence of iodide of potassium.

" On a piece of paper there is a small quantity of pus. It is more than nine weeks old, and yet on moistening it with water and pouring a drop or two of the oxidized tincture of guaiacum over it a clear blue colour is produced. In operating on pus which has become dry, it is always necessary to moisten it with water before applying the test.

" Although, for convenience sake, I have spoken of the tincture of guaiacum, used in this test, as oxidized, I am more disposed to think that in reality the oxygen is held in a state of solution, much as it exists in the blood.

" I can offer no very satisfactory explanation of the reactions which give rise to the blueing of oxidized guaiacum by pus. It may be that pus possesses the property of chemically polarising the neutral oxygen contained in the tincture of guaiacum and splitting it up into ozone and antozone, and that the ozone thus generated oxidizes and blues the guaiacum. I may here remark, that prolonged exposure to air and light causes tincture of guaiacum to absorb antozone. It will then turn blue in the presence of blood alone, and is unfit for use in any of the colour tests.

" A test for mucus consists in the application, first, of oxidized tincture of guaiacum, which by itself undergoes no change in the presence of mucus, and then in the application of carbolic acid or creosote, which quickly changes the colour of guaiacum to a bright blue, although neither carbolic acid nor creosote will blue guaiacum alone. In testing for mucus on cloths, or when it is mixed with blood, it is necessary to use the carbolic acid pure, but when the mucus is in a liquid state, it is better to use carbolic acid diluted with alcohol.

" A cloth has been nearly saturated with menstrual discharge, and as there is always mucus mixed with this fluid it affords a good opportunity for enabling one to judge of the value of this test. On pouring over the cloth a small quantity of oxidized tincture of guaiacum no change of colour will occur, but on adding a little pure carbolic acid or creosote, a bright blue will be quickly produced.

" A test for saliva is similar to that for mucus, with the exception that the blue reaction produced by the oxidised tincture of guaiacum and alcoholic solution of carbolic acid is highly intensified by the addition of ozonic ether, or any other antozonised fluid. That this is not due to the presence of blood may be easily proved by placing a small quantity of saliva in a test tube and allowing it to stand for a few days ; by carefully taking one drop from the surface and applying the test for saliva, the above named indications may be obtained : but on taking a second drop and applying the blood-test, a negative result will ensue. I may state that saliva reacts on oxidized guaiacum when combined with carbolic acid, just as readily after the ptyaline has been removed as before.

" I have on a piece of white blotting-paper some saliva fourteen

days old. On applying the tests to it it still retains the power of giving its characteristic reaction.

"To those engaged in medico-legal investigations the blood-test is of acknowledged value. The tests for pus and mucus add greatly to its usefulness; as they may enable a medical expert to at once decide on the source from whence blood has been derived."—*Australian Medical Journal*, November, 1869.

III. Insanity.

Difference between Heat of Passion and Temporary Insanity.—The case of Daniel McFarland, who was recently tried and acquitted of the crime of murdering Albert D. Richardson, of New York, has created more medico-legal interest than any other case for several years past. There could be no doubt that McFarland murdered the man Richardson in a fit of jealousy, by shooting him about 5 o'clock in the afternoon of November 25th, 1869, in the office of the 'Tribune.' The question raised, therefore, in the defence was, that McFarland was at the time suffering from emotional insanity, and upon the evidence of the experts for the defence the acquittal was chiefly based. It was proved that the prisoner had cause for extreme jealousy; it was proved that one of his relations, whom he much resembled, had been insane; and it is held by one of his defenders, Dr. Hammond, that he, McFarland, is liable still, upon comparatively slight cause, to another explosion of mania. In treating at length upon this case Dr. Hammond gives the definitions of the difference between "heat of passion" and temporary insanity.

Premising that there is no doubt that emotion may give rise to attacks of temporary insanity, he proceeds to indicate the marked differences which exist between "heat of passion" and temporary insanity. To do this effectually clear ideas must first be formed of the meaning of certain terms.

"An emotion is that pleasurable or painful sensation which arises in us in consequence of sensorial impressions or intellectual action." According to Bain, the word emotion is used to comprehend all that is understood by feelings, states of feelings, pleasure, pain, passion, sentiments, affection, &c.

Passion is emotional activity. It designates that state of mind in which certain impressions or emotions are felt, and which is accompanied by a tendency or impulse, often irresistible, to act in accordance with these impressions or emotions, irrespective of the intellect. An act performed in the "heat of passion" is one prompted by an emotion which, for the moment, controls the will, the intellect not being called into action. It is an act, therefore, performed without reflection. The passions are, to a certain extent, under the control of the will, and this power of checking their manifestations is capable of being greatly increased by self-discipline. Some persons hold their passions in entire subjugation, others are led away by very slight emotional disturbances. The law recognises the natural weakness of man in this respect, and wisely discriminates between an act done after due reflection and one committed in the midst of passional excitement.

The acts performed during temporary insanity, in their more obvious aspects, and when isolated, resemble those done in the heat of passion. But they are so only as regards the acts themselves. Thus, a person entering a room at the very moment when one man was in the act of shooting another, would be unable to tell whether the homicide was done in the " heat of passion " or under the influence of temporary insanity. He would be equally unable to say whether it was committed with malice aforethought or in self-defence. The act, therefore, can teach us nothing. We must look to the circumstances and to the antecedents of the perpetrator for the facts which are to enlighten us as to the state of mind of the actor. Now, the conditions of temporary insanity are so well marked that there can be no difficulty on this score, and those which precede the act of culmination have already been dwelt upon at sufficient length ; suffice it, therefore, to repeat, that the act which marks the height of the paroxysm is always preceded by symptoms of mental aberration, while acts done in the heat of passion are not thus foreshadowed. And, as regards the subsequent state of the individual, the distinction is equally apparent. The one who has committed a criminal act in the heat of passion soon subsides to his ordinary equanimity, and begins to think of his safety. The other, who has perpetrated a similar act during an attack of temporary insanity never thinks of escape, nor even avoids publicity. He may even boast of his conduct, or deliver himself into the hands of the law. What is, however, of great importance is the fact that, though he may subside into a condition of comparative sanity, the evidences of disease are still present, and remain in him for days, weeks, or even months and years. These symptoms are, in general, those of cerebral congestion, to which attention has already been directed.

In heat of passion the act follows immediately on the excitation of which it is the logical sequence. In temporary insanity the act is a culmination of a series of disordered physical and mental manifestations, and may or may not be in relation with the emotional cause.

Bellart, quoted by Devergie, has said that by assimilating the passions to mental alienation immorality is justified ; it is placed upon the same level as calamity. The man who acts under the empire of passion has commenced by suffering his will to become depraved. The man who acts under the influence of calamity obeys, as a machine, a force the power of which he cannot contend with. How far the accused in the present case was acting from passion, and how far he was under the influence of a calamity the force of which he could not resist, will be apparent from a consideration of the facts developed during the trial, and those facts have been ascertained by personal examination.

After giving evidences of the physical derangements of McFarland, and that one of his relations, whom he much resembled, was insane, Dr. Hammond adds that there can be no doubt with regard to the mental condition of the criminal during a long period previous to the homicide, and that for about two weeks prior thereto, his state was such as to render him entirely irresponsible for his acts. If he had been taken away to a distance he might and probably would have recovered

his mental balance, and the homicidal act might never have been perpetrated ; but, surrounded as he was with all the associations and circumstances that had so unsettled him, and constantly receiving fresh accessions to his troubles, recovery was impossible. While at the very height of his mental aberration he accidentally met the man most nearly connected with the origin of all his difficulties—the one to whom he attributed the wreck of his hopes—the one who, he believed, had injured him more than all the rest of the world combined. Without an instant's reflection, indeed without the possibility of reflection in his condition, he perpetrated the act for which he has just been tried for his life. The sight acted upon him just as does the sight of dangerous weapons upon other insane persons.

A case related by Dr. McIntosh, in a memoir on morbid impulse, well illustrates this point. A religious monomaniac had for many years an antipathy to a fellow-patient, who assisted in his gallery, imagining that he practised animal magnetism and various other tortures of the soul upon him. He avoided him as much as possible, and he never evinced any homicidal tendency, at least, so as to attract attention. So far from being suspected of such a tendency, he was, indeed, trusted with many weapons, such as cricket bats, bows and arrows, etc., which might have been used with deadly effect on his victim, had he chosen, for he was often within easy access. One rainy winter evening, however, he startled the gallery by a sudden and desperate onslaught on his victim, resulting in the death of the latter. Seeing the object of his antipathy reclining easily on a sofa and sleeping, and espying a ready and rare weapon at hand, he advanced stealthily upon him, so as to approach the sleeping person from behind, then, wielding the weapon on the devoted man's head so conveniently situated, he caused a compound comminuted fracture of a fatal nature. He subsequently confessed that it was the sight of the weapon and the tempting posture of his neighbour that overcame him.—*The Journal of Psychological Medicine*, July, 1870.

On Fractured Ribs in Insane Patients.—Drs. Rogers and Brown have published a short, but excellent report on the subject of fracture of ribs in the insane. The reports of the cases are by Dr. Rogers ; of the analysis of bones by Dr. Brown. On the subject of analysis, the latter gentleman writes an account, which we transcribe at length, for the reason that it is a first step towards a correct conclusion on the cause of frequency of fracture in insane patients :

" Several specimens of ribs of general paralytics have been sent to this laboratory ; and the general appearance of all of them is so unlike that of the ribs of healthy adults, that I have been induced to make careful analyses of some average samples.

" In the accompanying table, the first four columns of figures show the composition of these samples.

" I. Consisted of six ribs, which had all been fractured, and had completely united, and showed a slight callosity ; some of them had been again fractured more recently, and had only imperfectly united ; they contained an unusual amount of fat. Portions of the ribs were

removed, and freed from fat, before they were submitted to analysis, and the remaining portions were handed to the Curator of the Museum of the School of Medicine.

"II. These ribs were not fractured; nor did they contain much fat; they were, however, thinner than usual.

"III. Consisted of one rib only; it was slender, and rough and jagged on the edges, but had not been fractured.

"IV. Shows the average proportions of organic and earthy matter in several samples, which were remarkable only for being less perfectly developed than the ribs of healthy adults; some of these had been fractured and perfectly united; others were entire.

"For comparison with these, I give the composition of the femur and tibia of a nine-months fœtus in column V, and of the bones from a case of osteo-malacia in column VI.

"VII. Is calculated from the analysis of a healthy adult tibia by Valentin.

"VIII. Is calculated from analyses of ribs of a healthy man, aged 25, by Von Bibra."

TABLE OF ANALYSIS.

Constituents.	Ribs of General Paralytics.				Nine-Months Fœtus.	Osteo-malacia.	Adult Tibia. (Valentin.)	Adult Ribs (Von Bibra.)
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Phosphoric Acid	23·52	22·85	19·09	...	23·31	16·89	24·24	25·95
Lime	29·57	28·54	25·25	...	28·98	22·2	32·98	34·43
Magnesia and Alkalies	·41	·43	·37	...	·36	1·05	1·37	1·67
Carbonic Acid	1·55	1·29	2·09	...	1·1	1·71	3·37	2·9
Total Inorganic Constituents	55·05	53·11	47·8	49·46	53·75	41·85	61·96	64·95
Organic Constituents	44·84	47·02	47·8	50·54	47·15	58·16	38·02	33·97
	55·05	100·13	53·5	100·00	100·90	100·01	99·98	*98·92
Ratio of Lime to Phosphoric Acid	$\frac{8\cdot9}{7\cdot1}$	$\frac{8\cdot8}{7\cdot1}$	$\frac{9\cdot3}{7\cdot1}$	...	$\frac{8\cdot8}{7\cdot1}$	$\frac{9\cdot2}{7\cdot1}$	$\frac{9\cdot7}{7\cdot1}$	$\frac{9\cdot4}{7\cdot1}$

* This specimen also contained fat which had not been removed before analysis.

"It will be observed that the ratio of organic constituents to earthy matter is much greater, while the ratio of lime to phosphoric acid is distinctly less, in the ribs of paralytics than in those of healthy adults. There are the same differences between the composition of healthy ribs and those of paralytics as between the composition of the adult large bones and those of the fœtus. And, generally, the composition in cases of paralysis approaches that observed in cases of osteo-malacia. Whether the defects in the ribs of paralytics are due to arrested development, or to degeneration of the fully developed bone, it will require further experiments upon carefully selected cases to

prove ; but from the evidence already obtained, I am led to conjecture that both causes will be found to operate.

"*Laboratory, School of Medicine ; 6th August,* 1870."

This analysis, as far as it goes, shows that in general paralysis the composition of the bones is changed by the proportionate increase of the organic constituents over the earthy.

This will partly account for the frequency of fractures among insane patients, and also for the position and form of the fractures, which in every case but one herein mentioned occurred in the anterior portion of the ribs, a few inches from the cartilages, and not at the angles, as is generally found to be the case in general hospitals.

The fractures, too, were generally simply an even division of the bone without any jagged edge, and not generally projecting through the periosteum.

The result of the analysis is suggestive rather than conclusive, as to the condition of the bones in patients the subjects of general paralysis, and it would be unsafe to generalise from a few examples.   The analysis is, however, a first instalment towards determining by scientific inquiry whether the statements that have been made, as to the peculiar liability to fracture of the bones in certain forms of insanity, holds good as a general rule.

The bones submitted to analysis were limited to those taken from the bodies of patients who had died of general paralysis, but by a more extended examination it might, perhaps, be demonstrated that other forms of insanity are accompanied by great degeneration of osseous tissue, more or less closely allied to the disease known as osteomalacia, and generally associated with tubercular disease of the lungs.—*Liverpool Medical and Surgical Reports,* 1870.

IV.—HYGIENE.

On the Production of General Diseases by Organic Entities.—In the matter of public health no question has created so much interest since our last Report as the germ theory of disease.   We have ourselves had occasion to combat this theory, and we quote, with much satisfaction, the following arguments by Dr. C. Wood, the Professor of Botany in the University of Pennsylvania. After stating the various positions of different writers, the author says :

"It is certain that under ordinary circumstances vibrios, &c., are always the accompaniments of putrefaction, and may frequently be found in a fluid before it has undergone more manifest changes.   In the *milzbrand* of domestic animals, and its probable derivative in man, malignant pustule, these bodies have frequently been found in the blood, but are said not to be present in all cases, and when present to be of fatal significance.   *A priori* reasoning suggests that their spores are of very necessity at all times present in the blood, and the experiments of Frau Lüders seem to establish this.   That lady took a small glass tube with the ends hermetically closed, which had been exposed for half an hour to a temperature of 290° C., and thrust it into the heart of a recently killed guinea-pig, and then

broke off the ends. After the blood had been sucked into the tube from the other end, which was melted off, to remove any fluid that might adhere from the lips, the ends of the tube were sealed, and it was kept at the temperature of from 13° to 15° C. After two days fungous granules, chains, and rods were abundant. If, then, the spores of vibrionidæ be always present in the blood, they must of very necessity develop themselves whenever that fluid is strongly predisposed to putrefactive changes, as it is in malignant pustule. Their development is a consequence, not a cause, of the disease; for if a cause, they would be present in all the cases. So far, then, from these observations lending support to the cryptogamic theory of disease, do they not give great significance to the negative arguments against it? There is no difficulty in finding the fungi in putrefying liquids in or out of the body; why, then, if they be present in the blood of exanthematous patients, can they not be demonstrated? In the vaccine scab there is an exanthematous poison in its most concentrated form. If such poison be fungoid, this virus can certainly be little else than a mass of spores. The scab, however, has been most carefully studied by some of the best microscopists that have ever lived, with powers sufficient to demonstrate the structure of a spore the twenty thousandth of an inch in diameter, without finding any such body. The only possible way of explaining this and maintaining the integrity of the cryptogamic theory is by *supposing* the existence in the virus of infinitely minute spores, which is making a *supposition* to establish a *supposition*, a fair example of the whole tissue of argument on which the theory rests.

"It is proverbially difficult to establish a negation. Still, there may be such an accumulation of negative evidence as to create a probability so strong as to be worthy to be received as a demonstrated fact, just as circumstantial evidence will frequently convict the criminal. Probabilities thus founded become almost certainties when strongly corroborated by positive facts. Such facts seem to exist in this case. It is apparently impossible that any of the algæ can cause a general disease, from reasons heretofore adduced. Our present knowledge of the natural history of the fungi, especially of their known relations to disease, tends very strongly in the same direction.

"It is very certain that numerous *local* affections are produced by the growth of fungi in tissues. These plants are in some cases so placed that they could readily enter the blood and produce systemic diseases if such were their habit. Thus, the fungoid growth *Aspergillus pulmonum hominis* has been found by Drs. Von Dusch and Pagenstecker ('Archiv. Générale de Méd.,' 5e sér., tome xl, p. 738) in the tissue of tubercular lungs, and even in some of the pulmonic capillaries. As another example may be mentioned the curious foot disease of India, in which a mucedinous fungus (*Chionyphe Carteri*) eats its way into the tarsal and metatarsal bones, and even, in time, into the lower ends of the tibia and tarsus. This fungus frequently kills its victim, never, however, by producing a general systemic disorder. The affection preserves throughout its strictly local character, the patient dying eventually of the exhaustion in-

duced by it.   If in fungi is to be found the origin of blood diseases, surely in both of these cases everything is most favorable for the production of the symptoms known as those of blood-poisoning, and yet in neither are such symptoms manifested.

" In what manner do fungi act in producing the various local diseases to which they give rise ?

" They seem to exert an influence not merely as irritants or passive foreign matters, but by inducing chemical changes mostly in tissues already weakened by disease, changes which are somewhat similar to those of putrefaction and are the result of the life force of the plant seizing on certain elements or compounds for its nutriment. In other words, the fungus feeds on the tissue, and *continues* to grow and feed so long as material is afforded it, unless destroyed by some outside influence, or unless, indeed, the vital powers of the part are so strengthened as to be enabled successfully to resist its encroachments.

" The exanthemata are self-limited diseases, *i.e.* affections which have a fixed, definite course, and which terminate spontaneously if the patient live long enough.   The fungal diseases march steadily onwards, have no fixed course, are in no sense self-limited.   As proof and example of this take the Indian foot disease already alluded to.

" The nearest known approach to the production of systemic disease by fungi is seen in the affections of certain of the lower animals. Their spores have been found in the blood in some of these cases. Do they act in such instances as poisons, producing limited diseases, as typhus, smallpox, &c. ?   No.   On the contrary, they appear to act on the blood as they do upon other tissues, producing a local disease of it, so to speak, giving origin to a steadily progressive train of symptoms.   They feed upon the nutritive fluid, form filaments in it which pierce the walls of the vessels, and ramify through all the tissues.

" The most carefully studied of these affections is that which attacks the ordinary house-fly.   The first appearance of this disease is the presence of very minute oval cells in the circulating fluid, which cells increase in number, enlarge, grow into filaments, pierce the blood-vessels, and ramify through all the tissues, gradually destroying them.   Whilst this is going on the fly evidently becomes weaker and weaker.   By and by the hind legs swell up, stiffen, and all power over them is lost.   Then the other limbs undergo similar changes, and finally the little invalid breathes its life out.   In eight or ten hours after death, the filaments, continuing to grow, pierce through the surface of the body, especially between the wings, and interlace over it to form a whitish winding-sheet.   By the latter and by their stiffened projecting legs, flies, dead from this affection, may be readily recognised.   Does this course correspond with that of our systemic affections ?   No !   It seems somewhat doubtful, even in these cases, whether the fungus is the original cause of the disease, for, thus far, all attempts at inoculating healthy flies have failed.   Fungi are the scavengers of the vegetable world; and it is very possible that the

plant merely preys upon an already mortally stricken fly, just as the hyena will feed upon living animals if they are sufficiently prostrated by disease.

"The asserted power of the sulphites in arresting zymotic and malarial diseases is relied on by some as affording a substantial argument in favour of the cryptogamic theory. The answer to such reflex arguments is very simple. In the first place, it is by no means proven that the sulphites have the despotic power over these diseases which is claimed for them. Allowing, however, all their most ardent friends claim, there is no proof whatever that their remedial properties are dependent on their poisonous influence upon protophytes or protozoa. The whole set of deductions are purely suppositions and in a circle. Substances possessing such wonderful power over the germinal, living matter of all the lower plants and animals, are to be expected to exert a more or less powerful influence upon the living germinal matter of the higher animals, and at present there is nothing known which disproves the theory that these sulphites act remedially simply by modifying the life actions in some unknown way, or, in other words, by altering nutrition; indeed, there is at present no proof of the truth of almost any theory. So far from our present knowledge of the therapeutics of the sulphites lending aid and comfort to the cryptogamists, it seems to me to afford very conclusive proof that the truth is not with those gentlemen. If a fungus causes a zymosis and the sulphite kills the fungus, the disease must be arrested. The cure should invariably follow immediately upon the exhibition of the remedy. The medicine is a specific removing the cause, and, if given sufficiently early, should never fail."—*Reprint by Dr. H. C. Wood from 'American Journal of the Medical Sciences.'*

V. SUMMARY.

Some Points on the Physiological and Medical Aspect of Sewage Irrigation, with a Paper on the Influence of Sewer Gas on the Public Health. Separate Essay. By Alfred Carpenter, M.D. Lond.— The first paper is a second edition of an essay we have noticed in a previous number. A map is supplied, showing the plan of the irrigation fields at Beddington, Surrey, with their relationship to the town of Croydon. We need not say the whole is well conceived, scholarly, and practical.

Felo-de-se. By J. G. Davey, M.D. *Separate Essay.*—Dr. Davey concludes that the act of suicide is at all times and under every variety of circumstance the effect of pre-existing cerebro-mental disease; and he claims the repeal of the present law in regard to felo-de-se.

Insanity in Wiltshire. By John Thurnam, M.D. 'Supplement to the Nineteenth Report of the Medical Superintendent of the Wilts County Asylum.'—The author insists that the county of Wiltshire will compare favorably with other counties in respect to insanity, and that the supposed increased liability to insanity in England, at this time, may be imaginary.

On the Influence of Mental Activity on the Excretion of Phosphoric

Acid by the Kidneys. By Luther Hodges Wood, M.D. *From the* ' Proceedings of the Connecticut Medical Society.'—The author shows that, under conditions of hard study and under conditions of mental repose, the amount of physical exercise of the body and of sleep being the same, increase of work, in both instances, diminishes the excretion of the earthy phosphates. The alkaline phosphates are increased in the first period of study, and are not altered in the second. The total amount of phosphoric acid excreted is the same, whether the mind be active or not.

Researches into the Constitution of the Opium Bases. Part III. On the Action of Hydrochloric Acid on Codeia. By Augustus Matthiessen. ' Proceedings of the Royal Society,' No. 115.—The author, in this paper, names a new base "chlorocodide." The physiological action of chlorocodide appears, he says, to be much less marked than that of apomorphia. Doses of a quarter of a grain taken internally, or one tenth of a grain injected subcutaneously, produce no appreciable effect.

A Handbook of Microscopy. By Joseph G. Richardson, M.D. Philadelphia, 1871. — This new work by Dr. Joseph G. Richardson, on medical microscopy, contains a most useful chapter on medico-legal investigations, in regard to stains of blood, spermatic fluid, &c. A chapter on the microscopical examination of vomited matters will also repay perusal, as well as another chapter on anal, vaginal, and uterine discharges.

Case of Poisoning by Chloroform administered by the Stomach. By E. Fitzau, M.D. ' Deutsche Klinik,' No. 21, 1869.—In this case a medical man took rather more than two ounces and six drachms (by measure) of chloroform. After vomiting he sank into anæsthetic stupor, from which he recovered in about fourteen hours. He was then attacked with acute inflammatory symptoms, referable, locally to the stomach, and died fifteen hours later from rapid collapse.

The Active Principle of Gelseminum sempervirens, with a Case of fatal Poisoning by three Drachms of the Fluid Extract of the Plant. By Professor Theodore G. Wormley. ' American Journal of the Medical Sciences,' April, 1870.—The fluid extract of the *Gelseminum sempervirens* contains a new organic acid, which Professor Wormley proposes to call " gelseminic acid," and a strongly basic or alkaloid principle, which, being the active principle of the drug, he names " gelseminine," " gelseminia," or " gelsemia." A sixth of a grain of the alkaloid seems to be a fatal dose.

Death by Hanging—a Medico-Legal Study. By Professor A. Tardieu. 'Annales d'Hygiene Publique,' January, 1870.—This is a very important paper, and the conclusions at which the author arrives are based on evidence as singular as it is careful and accurate. Death, he thinks, occurs in hanging in less than ten minutes in man, and insensibility and unconsciousness occur much sooner, in fact, almost immediately. Sometimes consciousness is lost from the very first moment, owing to the occurrence of syncope. The author finds no evidence whatever for the common opinion that a voluptuous sensation is felt in the first moments of hanging.

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A Manual of Medical Diagnosis; being an Analysis of the Signs and Symptoms of Disease. By A. W. Barclay, M.D., &c. Third Edition. London, Churchill. 1870. pp. 669.

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NOTICE TO READERS.

The Editor is particularly desirous of having all Reports of Hospitals, Asylums, Sanitary Boards, Scientific Societies, &c., forwarded to him, as also Inaugural Lectures, Dissertations, or Theses, Medical and Scientific Addresses, &c.

Analytical and Critical Reviews.

I.—Pathology of the Microscopic Arteries.[1]

" PATHOLOGY "—yes, but where does pathology begin and physiology end? The reader must be left to decide; and if to him the first pages of this article appear to smack too much of the teacher's chair, let him dream himself a pupil again, and thank us for an agreeable sensation.

The walls of arteries may be considered practically to consist entirely of two anatomical elements, yellow elastic tissue and the unstriped muscular fibres employed in organic life. The functions of these elementary tissues are in a manner antagonistic to one another, wherever they appear, and the blood-vessels are no exception to the rule; for while the contraction of the contractile fibres must tend to alter their calibre, the elasticity of the elastic tissue keeps and restores the area to a constant form. It opposes an excessive dilatation when the muscles are not acting, and an excessive contraction when they act vigorously. In the act of dying the arteries are emptied, presumably because their muscles continue to energise longer than the heart has sufficient strength to drive the blood at that distance; but if in an animal recently slaughtered the blood-conduits are injected with a syringe, they remain in a state of distension, even after the injected substance is cleared out of them. The reason is, that their muscles have ceased to act. Again, when the nerves leading to the arterial walls are destroyed, the vessels dilate,

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[1] *Recherches Experimentales sur la Circulation, &c.* By MM. LE GROS et ONIMUS. ' Journal de l'Anatomie et de la Physiologie,' 1868, 1869, 1870.

On Cholera and Choleraic Diarrhœa: their Nature, Cause, and Treatment. Two Lectures delivered to the Church Missionary College, Islington, 1870. By GEORGE JOHNSON, M.D.

Hypertrophy of the Minute Arteries in Cases of Chronic Bright's Disease. By GEORGE JOHNSON, M.D. 'Brit. Med. Journal,' April 16th, 1870.

for the elasticity of their yellow tissue is still intact while the muscular coat is paralysed.

These powers of contraction, and of again resuming the middle state jointly regulate the distribution of the vital fluid. By their means there is served out to the capillaries in an even stream that which has been supplied by an intermittent force. They are to the heart as the fly-wheel is to the piston.

The arteries are regulators of the circulation. But they are something more also; for, as well observed by John Hunter, in lower animals devoid of a heart, the blood nevertheless circulates; and even in the higher mammalia, Brodie's case of a heartless fœtus, which lived several days after birth,[1] shows that they are not dependent for propulsive force on the central organ alone. A fly-wheel, indeed, continues to revolve after the piston is detached, having accumulated force previously; and the resilient elasticity of the arteries may act likewise, by storing up the heart's force. But the flywheel has no autonomy, and it would not have moved at all had there been no prevenient piston; while the example of the heartless fœtus shows that the arteries have a propulsive force originating in themselves, over and above that which is stored up by their elasticity.

The elastic and muscular tissues are very unequally distributed through the arterial system; the larger tubes are composed almost entirely of the former substance, while those next the capillaries have their middle coat made up of muscular fibres and nuclei encircling the canal; and the medium-sized have a mixed character. The microscopic contractile arteries would, therefore, seem to be an independent motive power in the economy, and worthy of a separate consideration, such as we are now allotting to them, apart from the organs to which they are distributed, and of which the special functions are affected by general arterial derangements. In more than one instance a diseased state, universal over the whole arterial system, has attracted attention, solely or mainly by its affection of one part; and it has received a title therefrom, tempting thus to faulty pathology and injurious therapeutics those who have the natural weakness of being led by a name. The danger would have been shunned had the general, rather than the local, ailment been looked at. The natural classification, or the art of seeing likenesses in disease, conduces much more to the relief of pain than diagnosis, or the art of seeing differences.

The contractility, under the influence of suitable irritation, of the coats of the arterioles, contended for by John Hunter, was afterwards experimentally demonstrated, from their behaviour

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[1] 'Phil. Trans.,' 1809, p. 161.

under galvanism, by Wilson Philip, Kaltenbrunner, and Wiedermeyer.   And it was universally allowed that they regulated the supply of blood to the organs.   Hunter thought they regulated it by somehow promoting the cardiac force.   But he was apparently puzzled by the direction of the fibres ; which, he says, he

"never could discover, but should suppose them oblique, because the degree of contraction appears greater than a straight vessel could produce, in which light a circular muscle is to be considered, as its effects are in the direction of its fibres; for either the diameter or the circumference of the artery will decrease in the same proportion, but not the area, which will decrease in proportion to the square of the diameter."

We know now how the desired result is secured by the double layer of circular and longitudinal fibres.   Yet what a striking example of prescience was it for naked mathematical reasoning to hit upon the requirement, and suggest a feasible means of accomplishing it so like the actual.   But still it was hard to imagine how contraction, simple and uniform, as it was supposed to be, should aid the flow of the blood.   And on this ground some ascribed to the muscular fibres a mere "stopcock" action, controlling by antagonism the heart's force, and in fact serving merely the same purpose as the elastic tissue.   But this antagonism of two parts of similar construction seemed unlike the usual machinery of nature.   It was strange if the involuntary muscles of the arteries should have nothing else to do beyond opposing the free action of the involuntary muscles of the heart.   Such an arrangement would remind one rather of the checks and counterchecks in bungling human statecraft than of the choicest work of the Divine Architect.   And it was remarked that if the fibrous layer of the pipes served only to moderate the rush of the stream, they would surely be found most prominently displayed at those points where the current is most immediately under the influence of the ventricle.   But the reverse is the fact; it has been pointedly demonstrated by Hunter that the quantity of muscular fibre in the arteries is in inverse proportion to their exposure to the influence of the heart; and his most glaring example of its abundance is in the umbilical cord, where the cardiac influence is absolutely null.

In this condition the question remained during the first half of this century, till the acute observation of Dr. Waller, followed up by the brilliant experiments of M. Claude Bernard, led to the generally diffused knowledge of the influence of the great sympathetic nerve on the circulation.

When the fibres of the sympathetic nerve leading to any separate part of an animal's body are divided, the arteries of the part become fuller, and the temperature is raised by the increased quantity of hot blood which runs through. When the same fibres are submitted to electric influence, the arteries become empty and the flesh chill and pale for lack of blood.

These experiments, so neatly crucial, seemed to prove clearly that a special department of the nervous system contracts and enlarges the vessels and modifies the capillary circulation.

"They teach that it is the great sympathetic which plays the part of constrictor to the small arteries and slackens the capillary circulation. In fact, cutting the nerve paralyses in a manner the small arteries, which become proportionally relaxed; whilst, on the other hand, exciting the nerve action by galvanism causes such a constriction of the small arteries that their area is obliterated." (*Rapport sur les progrés et la marche de la Physiologie génerale, &c., par M. Claude Bernard,* 1867.)

So, in spite of its apparent incongruity, physiologists were driven to admit the theory that the heart is a force-pump, which drives the blood indiscriminately through the larger arterial canals, while the small arteries, entirely destitute of propelling power, check the supply in accordance with the requisitions of each part.

A further system of countercheck was suggested by M. Bernard in 1858, when he found that, on stimulating the corda tympani nerve which goes to the submaxillary gland, there was provoked an excess of activity in the capillary circulation, and such a dilatation of the small arteries that the blood issued from the vein of the gland with all the characters of arterial blood, that is to say, ruddy in colour and in a powerful jerking stream. This phenomenon he attributed to such a "*paralysing* action of the corda tympani on the sympathetic," that the corda tympani becomes practically a dilator. But there are between the two neat crucial experiments on the great sympathetic a number of examples of intermediate phenomena, where redness of skin and increased vascularity follow what we can hardly allow to be a paralysing influence. Not to cite any but commonplaces, do not the action of light and of moderate warmth increase the circulation? Yet it is hard to assign to these agents such a part to play as that of paralysing life.

At this stage of the solution of the enigma, therefore, great interest attaches itself to the researches carried on during the last few years in the laboratory of the Academy of Medicine at Paris by Messrs. Legros and Onimus. Their attention was aroused by the fact that in the normal condition the contraction of unstriped muscular fibre is rarely spasmodic or in mass, but

continuously alternate, wavy, vermicular. Why (argued they) should not the blood in the arterioles be passed on by such a movement as propels the contents of the digestive canal? On investigation they found what they sought, a peristaltic movement, not only in the circulating tubes of the frog's web, but also in the more perfect organs of the mammal. In a man's retina, where the *arteria centralis* was obliterated by a clot, they saw through an ophthalmoscope distinct peristaltic waves in the conduits which carried on the collateral circulation. And when once the eye has become accustomed to the phenomenon, it may be detected, say these gentlemen, without a lens, in the ear of the rabbit and other translucent parts.

The objection has been raised that the force of the blood-stream, coming on different sections of the arteriole's wave at the same time, will counteract it and aid it variously, by not being in perfect time. True—but on the whole they will mutually produce a regular movement, just as the tide, the ocean swell, and the stream, though not harmonious in time or force, will join in urging forward a flood of water. It appears that as a matter of fact the pulse and the peristalsis tend strongly to be reduced to harmony, and that this constitutes the main difficulty of making the observations, the latter movement being overlooked in consequence of the concentration of the mind upon the former.

There seems no opening for a question of the correctness of these observations. The observers are competent, shrewd, and by no means imaginative; the experiments were made in a public laboratory, and are so simple that they are the common property of all; and the thing observed is quite in accord with our knowledge of the physiology of other parts; it was not found only because it was not looked for. Neither are they at all in discord with the previously received researches of one so respected by contemporaries as Claude Bernard. Far from being in opposition to facts which demonstrate the influence of the contraction that occurs in the peripheral vessels, they magnify that influence. If they destroy some of the inferences, and, perhaps, some of the exaggerations of the vaso-motor theory, they will in another point of view be its true complement.

It seems most in accordance with what we know of the general behaviour of unstriped muscle to suppose the movements of the microscopic arteries consecutive on reflex action. It is in harmony with other vital phenomena to describe the blood-stream as dilating the arteriole, the sensitive fibres of the sympathetic transmitting the impression to the ganglia, and the motor fibres acting on the contractile coat of the vessel, pressing the blood onwards just as the digestive canal behaves to the alimentary mass.

If in an animal dying, or so recently killed that the muscular vibrations have not ceased, the aorta be separated from the heart and injected, the injection penetrates easily to the capillaries; whereas, if life has been extinct for longer, considerable force is required to attain the same end. Now in a dead and in a living artery the elasticity must be equal, and if its mucularity opposed the course of the current, a reverse result would attend the experiment.

In a decapitated criminal the blood does not spout back scarlet from the emptied arteries, as one sees represented in badly drawn martyrdoms, but pursues its path with force enough to carry in with it bubbles of air. (*Ch. Robin, ' Observations anatomiques et physiologiques sur des suppliciés par decollation.*')

Equally striking are the experiments of Messsrs. Legros and Onimus on living animals, where the cardiac action has been annulled by tying the large vessels. Their circulation is continued for a certain short period even in mammalia, and for a much longer time in cold-blooded creatures.

In animals where the sympathetic has been divided on one side and the action of the heart paralysed by poisons, such as chloroform or alcohol, the temperature is found highest on the side where the sympathetic has remained untouched. This shows that its action is to enable the small arteries to propel the blood.

These observers were at one time disposed to lay great stress upon a series of experiments in which galvanic currents were employed to replace nervous influence. But here a riddle presents itself for the solution of the physiologist, for while interrupted currents bind up spasmodically the circulation through the small arteries, continuous currents sometimes act in the same way and sometimes increase its vivacity. From experiments on the organic muscles of the intestinal canal they have inferred that this variation in the action of the continuous current depends in the direction in which it is conventionally said to " flow" from positive to negative pole. In a certain number of experiments, when a moderate stream was down the path of the normal peristaltic movements it increased them, when upwards it diminished them. We must, however, take leave here to remark that since the course of galvanism is straight, it must cross the majority of the fibres of circular tubes at more or less of an angle, and that the degree of this angle, and whether the course was up or down the fibre, must in most of their experiments have been as much a matter of chance as which end of a ship is struck by lightning. More pregnant of suggestion is their notice that strong continuous currents, and all induced or interrupted currents, in whatever direction they go, arrest the motions of

organic tubes. It looks at first sight as if there were an essential opposition between the phenomena arising out of powerful and slight action. But that is only a superficial view. Lister[1] has for some time made British physiologists familiar with the idea that what is called "irritation" or "stimulus," is, in fact, a diminution of vitality; and on further consideration Messrs. Legros and Onimus are inclined to think that the effect of electricity is never to increase true peristalsis, and that the motions it produces are a mere superficial imitation, bearing to the normal act the same relation that cramps and convulsions bear to healthy exercise. Physiological (vital) processes are arrested, and morbid (deadly) processes mockingly take their place. The authors call the first "*contractions*," the latter "*contractures*"—we cannot translate the alteration, but have endeavoured to express the points they would make.[2]

It can scarcely be questioned that these experiments, and the rival progeny of which they are likely to be fruitful, are destined to exert great influence over both our pathology and our therapeutics. In the first place, it appears that the blood-vessels which supply each separate organ are regulated by a distinct department of the nervous system (Bernard); and consequently that external forces acting through the nervous system, may be led to act specially on these organs. Secondly, these forces, so far as we are thoroughly acquainted with them, act readily and invariably, and are in a great measure under our control. They are the most powerful, and at the same time, if used in graduated quantity, the most manageable of our remedial measures. Thirdly, we have access to the nerves of the blood-vessels, not

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[1] 'Phil. Trans.,' 1858.

[2] Inasmuch as the action of organic muscles normally consists of alternate rest and contraction, we might formulate the effects of electricity by saying that weak currents diminish the completeness of the first part, strong currents annihilate both parts of the act. This would avoid the anomaly of representing the effect of large doses as opposite to that of small, and would explain many cases where it appears to be so. We should be glad to turn to this point the attention of those who are testing the truth in Hahnemann's formulæ. And we would also use it to explain the curiosity of slight mental emotion producing hyperæmia, while the intenseness of the same is notified by pallor. A girl will blush at a compromising thought, but she will grow white and faint at a gross indecency. A baby will first flush, and then blanch, with fear. "Red wrath" and "white with anger" are proverbial measures of degree. When—

> "Parting is such sweet sorrow,
> That I would say good-night until to-morrow,"

the lips are full and the eyes sparkle; but—

> "When we two parted in silence and tears . . .
> Pale grew thy cheek and cold, colder thy kiss."

The physical effects on the skin of slight and severe cold are similarly contrasted to the popular eye.

only immediately, but also through the blood itself. A series of observers, beginning with Hales, have told us that certain substances (contemptuously termed " mild," " mawkish," " insipid," from affecting but slightly the sensory nerves) when mixed with the blood enable it to pass readily on its course, while others in various degrees arrest it by constricting the muscular arteries. And it is probable that their action is different on the vessels of different parts, so that the chemical quality of the blood affects much the ease and quickness with which it circulates. Fourthly, if this tissue is so readily acted on by agents which we can withhold or supply at pleasure, is it not also exposed to injuries over which we have only preventive control ? Is it not likely to be among the first attacked by disease ?

The last consideration has the most direct bearing on the subject of the present article. From the time that Stahl first insisted on the importance of the nervous system as a factor in the phenomena of disease, the tonic peripheric spasm of the microscopic arteries, which ushers in fevers, had attracted attention. It was attributed by Hoffman to the nerve-force acting on the *vis insita* of irritable (or muscular) fibre. Dr. Cullen added the far-sighted observation that this nerve-force is normally intermittent, that the motions which are the results of it are alternate contractions and relaxations, and that, consequently, spasms are essentially *motus abnormes*. Long as these pathological observations, and the inferences grounded upon them, have been before the world, physiologists have added no facts or theories of importance to their prosecution, elucidation, or refutation, till we come to these recent researches of Messrs. Legros and Onimus. By their light we see the current of the blood urged continuously forward by a peristaltic motion similar to that which moves on the digesting mass in the alimentary canal, a wave of alternate relaxation and contraction. And we can readily understand that if the controlling nerve-force is weakened or suspended, a suspension of the normal circulation must ensue. Just as in the intestines when the circular muscles are paralysed, say by the poison of lead, the ilia may be contracted or dilated, or contracted in one part and dilated in another, but in both cases equally inefficient in transmitting their contents ; so the microscopic arteries may, under the influence of not very dissimilar causes, or from different degrees of the same cause, be the seats of hyperæmia or of anæmia, or of the one in one part and of the other elsewhere. The congested tissue and the pale chilly tissue are contrasted in colour, but in respect of their services to the economy stand on an equal footing of insufficiency, and are traceable to slight modifications of a common cause. The important point in their pathology is,

that the peristaltic movement, by which the contents of the muscular tubes should be propelled, is defective.

The case of the circulating tubes differs from that of the alimentary canal in having as an additional moving power the powerful *vis à tergo* of the heart. When partial dilatation of the vessels has occurred from a slight degree of arrest of their peristalsis (corresponding in degree, say, to the distension of the bowels in atonic dyspepsia), then the action of the heart drives the blood further than it naturally should do, and we have the active hyperæmia which is indicated by excessive secretion in glands, the gush of arterial blood into the veins, the throbbing of mental emotion and incipient inflammation. This corresponds to M. Claude Bernard's experiment on " irritation " of the corda tympani nerve (see p. 288). This active hyperæmia is probably possible over the whole body ; it is not such a terrible blow to the circle of life as to be irremediable even when universal ; and, when partial, is often scarcely to reckoned a pathological process. Yet it is impossible to draw a definition between it and congestion or stasis, leading to complete arrest and rupture of the capillaries, on the one hand, and a diminution of supply from spasmodically contracted vessels, on the other. It is possible, for example, to imagine (and in fact there must often occur) a degree of spasm which would leave the tubes exactly in their medium state, but motionless ; the effect on the circulation would be the same as if they were either distended or contracted abnormally, and, in short, it would be but a different degree of the same partial death. The effect of such a complete paralysis is exemplified in the overfilling of the tissue with hot blood, and the consequent rise in temperature, in parts whose sympathetic nerves have been divided (C. Bernard) ; and in the stasis and interstitial hæmorrhage, which follow other injuries to the nervous centres (Dr. Brown-Sequard[1]). The dimunition of temperature and bloodlessness, consequent on affecting the nerve by the passage of electricity, would seem to illustrate the rigor which ushers in the action of a morbid poison on the animal body.

Ordinary rigor is apparently that degree of sudden spasm in the microscopic arteries which leaves a restricted, but by no means obliterated, area for the passage of fluid, flowing slowly by reason of the deficiency of the peristaltic wave. Thus the surface is cold and pale, while the detained blood is accumulated in internal parts and larger vessels, keeping up (if not raising) their temperature. The spasm is sufficient to resist the force of

[1] Dr. Brown-Sequard has found that injuries to the corpora restiformia cause hæmorrhages in the skin of the external ear in guinea-pigs. ' Archives Gen.,' Avril, 1869, p. 90.

the heart, as well as to stop peristaltic action. As it goes off, the walls of the vessels give way, and till their normal wave-movement is quite restored, admits too much blood, constituting the hot stage. This gush of arterial blood sets in action an excess of secretion, especially of the watery sort, and especially in parts where it has been most prominent, and so we have the phenomenon of the sweating stage on the cutaneous surface, and of diuresis in its colleague, the kidney.

The explanation sketched out above does away with the necessity of invoking the aid of " action and reaction," a vulgar " *Deus ex machiná*," which shows weakness of conception in the physiologist.

An extraordinary rigor presents the same essential phenomena, intensified and wider spread, so as to be very dangerous to life. The circulating tubes of the continuously necessary viscera are attacked with spasm to such a degree as to stay their functions, and in proportion to the importance of these, so is the risk. In malignant ague, the blood-vessels of the brain are paralysed, and death takes place by coma in the cold stage. In sun-stroke the same thing happens; indeed, these two diseases are so similar in many respects as to suggest an interlacement of some parts of their etiology. Other modifications of tropical marsh miasmata affect mainly the liver and stomach; and since these viscera are not in such immediate demand for the sustentation of life, time is generally allowed for " congestion " to have supervened in fatal cases. But it may be remarked that even in this instance autopsies are recorded where anæmia, rather than congestion, of the viscera has been found, that is to say, where the paralysis of the arterioles has been fatal without having lasted so long as usual.

We rejoice here to have the opportunity of testifying to the value of the labours, scarcely sufficiently appreciated, of Dr. George Johnson in this field.

This physician has for the last fifteen years been unremitting in his endeavours to draw the attention of our profession to the state of the arteries in cholera. And we must with shame confess that an outcry was raised against him, as a dangerous heretic to be put down with a vigorous hand. The heretic, however, received better treatment from the public than from the profession; for in 1866 one of his works, ' Notes on Cholera,' received a favorable notice in the ' Saturday Review [1];' and in 1870 he has been enabled to put the latest revision of his views before us, in the two lectures given at the Church Missionary College, which we have selected for review. We have preferred

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[1] June 2nd, 1866.

this to his other publications on the same subject, partly because being delivered to a semi-medical audience it is more elementary and explicit, as well as more free-spoken, but also because it may be conceived to have the benefit of the various criticisms which have been made, without being strictly controversial.

Dr. Johnson's view is simply this, that the pressing danger of death in the collapse of cholera arises from a spasm of the minute pulmonary arteries. Hence, while the large branches of this arterial department are found stuffed up with black blood, the pulmonary tissue itself is dry and bloodless, and the left side of the heart is unnaturally empty, not having been fed with its usual supply of aërated blood. The right heart has not failed to contract upon its contents, as is shown by the tension of the walls when examined immediately after death, yet the contents have not moved on beyond the larger branches which lead from it. The arrest has evidently originated in the microscopic muscular ramifications. The same thing doubtless takes place in the external surface, sometimes in a greater, sometimes in a less degree than in the pulmonary arterioles; the skin is cold and pale as in the algide stage of ague; indeed it is colder and paler than in ague, for not only is the peristaltic propulsion of the blood-current deficient, but the aorta forwards it in extremely deficient quantity. Hence the smallness of the pulse.

Viewed in the light shed by the physiology of MM. Legros and Onimus, Dr. Johnson's views receive support rather than confutation from those critics, who have retorted upon him cases of death during collapse, in which the lungs were found congested. We have seen reason to suspect that spasm and dilatation are so far from being contrasted as to appear different stages of one departure from health. It is quite natural that spasm should merge in dilatation, either in the act of dying, or in a progress towards recovery which has failed from exhaustion of vital force. Moreover the majority of the critics do not seem much in earnest, and the controversy with the most formidable of these antagonists, Dr. Owen Rees, ended in a mutual fencing with personalities and witticisms (see ' Lancet,' 1868-69).

By the degree of spasm in the pulmonary arterioles Dr. Johnson measures the danger in cholera, rather than by the coldness of the surface or the severity of the diarrhœa, vomiting, or other parts of the disease; many patients die where these latter are much less marked than in instances of recovery, nay, some even where they are entirely absent. Again, the suddenness with which some apparently moribund will rise up in perfect health, shows that their collapse is not the consequence of

excessive secretion; for that, as we know, entails a long convalescence and gradual renutrition.

Now, what is there in this view that it should have been repugnant to the general feeling of pathologists? Surely, rightly apprehended, it removes cholera from the category of a thing unique, *sui generis* (of which so few examples are found in nature), and associates it with other morbid poisons which act in a corresponding manner, either universally or on other parts. The algide stage of cholera is a rigor, of great severity universally, but especially dangerous from its affecting such a vital organ as the lungs. Such is the upshot of Dr. Johnson's pathology of collapse, and we are bound to say that it receives important support from the observations of the French physiologists we have quoted, and from general anology. Cholera-poison, like other poisons, acts by destroying a vital energy, it kills by substituting a motionless spasm for the peristaltic wave of the pulmonary artery.

This theory of the cause of death, and etiology of the most ominous phenomena, does not at all explain the diarrhœa and vomiting, which are equally conspicuous, though not equally dangerous, elements of the disease. There is no connection at present traceable between impeded action of the arteries and an abnormal exudation of fluid into the alimentary canal. One can only say of the cholera poison, as pharmacologists say of a drug, that it is a powerful emetic and hydrogogue cathartic; but whether it acts in this way after it has been absorbed into the blood, or directly kills the epithelium, or smites first the solar plexus, we have no evidence. Some of it certainly gets into the blood, as is shown by its getting to the lungs; but whether it is this portion which produces the abdominal symptoms is not evident. Perhaps it is Dr. Johnson's bold assumption that they are caused by the pouring out into the alimentary canal of spoiled blood materials, fermented into a poisonous form, that has prejudiced many against the more carefully argued part of his scheme. This would make the diarrhœa and vomiting curative " efforts of nature," a mode of looking at the phenomena of disease always suspiciously cross-examined in the present day. But we do not intend a critique here of this part of the subject, and allude to it only as probably explaining the tardy reception of Dr. Johnson's pathology of collapse.

To get back to the microscopic arteries,—the most reasonable explanation of their behaviour is to assume that some of the cholera poison is carried by the blood to the ramified local centres of the great sympathetic which line their coats; and by this means their muscular fibres are reduced to the inert condition of spasm which has been described as cholera collapse.

What therapeutic inference should be drawn? Dr. Johnson says, "facilitate the escape of the morbid secretions by eliminants," so that the poisoned blood which is endangering life may be rid of its peccant material. The antipathic physician says, "oppose the morbid processes" by astringent opiates. We confess it appears to us that if drugs answering either of these descriptions got into the blood of a collapsed patient, they would increase the danger, one by weakening the powers of resistance to disease, and the other by further poisoning the nervous system. The probability is that both pass through the body unabsorbed.

Dr. Johnson very properly does not confine his attention to the drugs to be swallowed during collapse. With great reason he urges the importance of husbanding the waning sparks of life by absolute rest; for example, by not allowing the patient to be raised even to go to stool. The oxygenation of the blood, as far as possible, by fresh air he also insists on as a reasonable deduction from his pathology. The use of warmth as a relaxor of spasm also chimes in with his theory; but there is a difficulty here, for blankets and hot baths, the usual media of application, are inconsistent with access of air to the skin, which, in the suspension of the pulmonary functions, is the chief port of entry for oxygen. We agree with him in confining ourselves to hot bottles, bags of sand, and the like. The drinking of hot water, if the patient can be persuaded, is reasonable; nor is it at all inconsistent with swallowing ice, which is so strongly craved for as a relief to vomiting; alternation of heat and cold is a powerful renewer of life, but excess of either, or both, destroys their value. The marvellous temporary relief which follows the injection of warm saline fluids into the veins receives from Dr. Johnson's pathology a ready explanation: "The liquid mingling with the poisoned blood in the pulmonary artery dilutes it, and so renders it less irritating to the vessels, while by its warmth it relaxes the spasm, and thus allows the blood to flow on." The inference from this, that hot baths would be also useful, requires to be guarded by the consideration alluded to a few sentences back. Saline injections into the veins are in still better harmony with the theory, and, as our author says, "have unquestionably saved life in some apparently desperate cases." The main impediments to their use are the skill and care requisite to the operation. But if Dr. Halford succeeds by a pamphlet in teaching rough backwoodsmen to inject ammonia into the veins of their snake-bitten shepherds, we need not despair of having a trained corps of injectors, in the event of a cholera epidemic among our centres of civilisation. Persons in the position of cuppers, *salassatori*, and the like, would probably do it

neater than physicians or surgeons, when directed to suitable cases.

So far for collapse. But what has happened to the pulmonary arteries of a patient who has had choleraic diarrhœa and no collapse? Dr. Johnson would say that the mass of blood has purged itself of its poison before it has had time to affect them; and he would, therefore, in cholera seasons assist nature by sweeping out the alimentary canal with a purgative, and afterwards soothing its excited state with an opiate, if necessary. There is, however, another view of these cases possible, and that is, that the virus has not entered the blood at all, but has acted immediately on the tissues of the digestive tube. And this view receives support from that effect upon the arteries, which we are led by Dr. Johnson's pathology to suppose is the characteristic of its presence in the circulation, not having occurred. As he himself allows, we know nothing of any morbid poison beyond what we learn from observation of its influence; and where that influence is absent, ought we to suppose the presence of its material cause?

This is a very important question; for if the strong cathartic virus is in the digestive tube, one can hardly imagine a milder cathartic drug aiding its expulsion. We say " milder" because we do not suppose any one proposes to give violent hydragogues. But, besides this, it is very doubtful how far cathartics hasten the expulsion of foreign contents from the intestinal canal. It is well known to the police that purgatives delay the passage of foreign bodies (such as coins) which have been swallowed by thieves, and most mothers of large families have experience of the same fact in the management of their nurseries. So with regard to the morbid poison in the bowels, there is just a risk lest a purgative should pass it over, and, by cleansing the mucous membrane, give a greater chance of its being absorbed into the blood, out of which we are so anxious to keep it. In the majority of instances of choleraic diarrhœa the medicine probably is carried away harmless.

Opiates in choleraic diarrhœa would seem to stand a better chance of retention; and we may explain the utility, which experience seems to assign to them, by supposing that they have guarded the blood and pulmonary artery from the infection, by arresting absorption. It is by no means impossible that the oleaginous fluid which has been made the usual vehicle for purgation, may have also acted in the same way, and shielded the absorbing vessels; and thus that the opiate treatment and the castor-oil treatment, which have been considered as contrasted, may not be irreconcileable, and may both be better than doing nothing to prevent complete cholera. We should prefer, how-

ever, some more purely oleaginous liquid, say olive or cod-liver oil, to that used by Dr. Johnson.

It is not only during their invasion by cholera that the microscopic arteries have favoured Dr. Johnson by revealing to him their secrets. Twenty years ago he described and figured in the thirty-third volume of the ' Medico-Chirurgical Transactions' hypertrophy of their walls as occurring almost constantly in kidneys affected by chronic Bright's disease. The thickness of both the circular and longitudinal layers of fibres he found in all cases examined to be so obviously increased as to be sometimes threefold their ordinary measure; while at the same time the exaggerated tortuosity of the vessels shows that they are longer as well as bulkier than natural. It was for many years looked upon as a local anatomical change associated with a local disease.

Let us remark in passing how often the kidneys, from the facilities which they offer to the dissector, have led the way to anatomical and pathological knowledge. The beginning of what we know about fatty and amyloid degenerations, about epithelium, pus, and blood-poisoning, is traceable to them, not to mention much of the physiology of secretion and nutrition. One is reminded of the advice given by Lord Chesterfield to his son, to study politics in the small independent states which then bordered the Rhine, as being compact representations of larger communities. The kidneys, however, have had their day, like the exclusively post-mortal anatomy which has so profitably studied them. They have the disadvantage of showing themselves by their secretions only, till after death. It is probable that the eyeball, an equally compact and separate organ, will in future run the kidneys hard in the race for imparting knowledge, on account of its transparency and openness to observation during life.

The enlargement of the renal arteries Dr. Johnson is strongly of opinion is a true hypertrophy, a primary augmentation of the muscular fibres in size and strength; while the waxy (amyloid) degeneration which is often found in them, he considers decidedly secondary. In this he differs from Professor Virchow, who looks upon this morbid formation as the original deviation from health.

About three years ago, in a paper printed in the fifty-first volume of the ' Medico-Chirurgical Transactions,' Dr. Johnson published a further extension of his observations to the other arteries of the body, and associated their condition also with that of the central organ of circulation. He found in short " in every fatal case of chronic Bright's disease with hypertrophy of the left ventricle there has been decided hypertrophy of the

arterial walls in most of the tissues examined, not only in the kidneys, but also in the skin, the intestines, the muscles, and the pia mater."

The microscopic preparations on which these facts rest, he has constantly exhibited to a large circle of acquaintance, and in particular to a meeting of the Metropolitan Counties Branch of the British Medical Association, where the paper was read which heads this article. It is cited in preference to his other publications for the same reasons which actuate the selection of the lectures on cholera.

The profession is deeply indebted to Dr. Johnson for perseveringly carrying out an important investigation. And the duty is entailed of criticising strictly by the light of physiology the interpretations which may be put upon it. The author traces the historical sequence of events as follows:— ¡

1. By the destruction of the renal gland-cells (epithelium) the separation of the urinary excreta from the blood is impeded.

2. The blood, thus poisoned by urea and deficient in normal constituents, is noxious to the tissues, while at the same time there is less demand for blood in the kidney from secretion being deficient.

3. The minute muscular pipes, therefore, contract upon their contents, and resist the passage of this abnormal blood, and the result of their continued action is what he concisely calls in the ' Medico-Chirurgical Transactions,' " a protective hypertrophy," and again, " a beneficent compensatory action."

4. The left ventricle makes an effort, increased by the resistance, to drive on the blood, and becomes equally and simultaneously hypertrophied.

Thus the enlargement found after death would be the register and measure of the over-action during life.

This explanation rests mainly on two assumptions, to which we must demur till much more evidence than at present can be brought forward in their favour. It is taken for granted that increase in permanent bulk of contractile muscle is induced by increased action, and also that abnormal increase in bulk implies an increased power of action. Now, if increased action brought on increased bulk, the voluntary efforts of trainers to put muscle on the athletes submitted to their care would be successful, and after the superfluous fat had been worked off the rower or runner would grow daily heavier. Instead of which he remains steady or grows lighter. What a grand object of ambition it would be to a trainer to treble the muscles in a prize-fighter, as the muscles of hypertrophied arteries are trebled! He knows it to be impossible, and is quite contented when he sees education strengthen the power of the nerves over them, so that they

contract quicker and closer under the influence of the will; he is satisfied if the biceps is corky and prominent when " put up," though it be no larger when at rest. The powerful frames of those who live by the use of them are sometimes quoted in evidence from the time of Galen downwards. It is true that blacksmiths have often stout arms, but their legs will usually be seen to correspond, and in fact they have taken to the trade because they were fitted for it by their build. Had they been tailors, they would equally have been robust. In *danseuses* there is no extraordinary development of the lower extremities as compared with the upper; nor do the vocal cords of singers increase in size. Hospital physicians know well enough that over-exertion in any special handicrafts is much more likely to induce atrophy than hypertrophy. That muscles enlarged beyond the normal are, on that account, stronger, is another not uncommon fallacy. Yet a bladder enlarged in consequence of stricture or diseased prostate, though its muscular coat be decidedly hypertrophied, does not eject the urine through the catheter with added vigour. Neither do thickened parietes enable the stomach to push on through the pylorus its contents, nor the rectum to shoot out the fæces with augmented force. Why, then, should we attribute to an hypertrophied heart a strength in propelling the blood, for which we have no evidence either in the extension of the pulse to smaller arteries, or in its firmer stroke? What both the sphygmograph and the naked senses show is a visible bounding wave, dependent apparently on loss of elasticity in the larger tubes. It is difficult to imagine how an enlarged heart, cribbed in as it is by the ribs and lungs, should be a more efficient organ than when its size is fitted to the room it occupies.

The root of the fallacy seems to lie in attempting to assign a protective agency to morbid processes, and then attributing to this protective agency a causative power.

" There is less *demand* for blood to be acted upon by the gland; the small arteries *consequently* contract." " The minute arteries *resist* the passage of this abnormal blood. The left ventricle, *therefore, makes an increased effort.*" (Johnson.)

And so on. Were these checks and counterchecks designed to benefit the patient, they certainly must be pronounced signal failures; for thickening of the heart, instead of overcoming obstacles, induces death by dropsy sooner than dilatation; and the more the contracted area of the arteries cuts off the supply of blood, the quicker does the gland degenerate. The only evidence of beneficent design we can find is the design of improving the race by the destruction of the weakest, which is traceable in

almost all disease, and is truly a design worthy of Omniscience, but certainly not a blessing to the individual.

Is it not more reasonable to suppose the change in the same muscular tissue in the heart and in the microscopic arteries to be the primary lesion, induced sometimes more or earlier in one place than the other, according to external circumstances? There is no department of the body which physical agents touch so readily as the circulating machinery; and no part of that machinery so readily as the microscopic arteries. The tissues, cognizable to the naked eye teach this; the urethra is red, with visible blood-vessels, and painful from a gonorrhœal poison, before its epithelium becomes purulent; in a catarrhal sore-throat congestion precedes secretion; the skin is scarlet from heat before its epidermis is killed, and separates; while a vast number of agencies affect the minute arteries, which are harmless to the neighbouring organisms altogether, mental emotion and moderate doses of alcohol, for instance. Since the most usual causes of Bright's disease—cold, scarlet fever, sorrow, and alcohol—when they act acutely and temporarily, exhibit their first effects on the small arteries, why should they not do so when they act chronically and permanently? It seems much more likely that arterial lesions should lead the way to glandular degeneration, than that glandular degeneration should lead the way to them.

The most dangerous foe to muscular fibre is the substitution of continuous for alternate contraction. The most rapidly degenerative cardiac lesions are those which infringe on the period of rest. Could the physician secure for a heart lately injured by rheumatic inflammation that immobility which a surgeon demands for a sprained ankle, the one disease would not be more deadly than the other. It is by protracted strain that the contractile fibres of the bladder, or bowels, or stomach, become paralysed and lose their strength. The walls of these viscera quickly grow thicker, without growing stronger, as they degenerate. In fact, it seems to be the rule that nutrition under disadvantageous circumstances should build up bulkier products than those which are more perfect. The higher works of creative power seem the most economical of material; they are as polished epigrams contrasted with the twaddle of an un-prepared speech. It is true that in the earlier stages of this degeneration the fibres do not, microscopically viewed, differ from the normal; but is not their tendency to undergo fatty and amyloid changes, which all acknowledge, itself an evidence of the imperfect vitality of "hypertrophied" muscular fibre?

This is a matter which has a most serious bearing upon the administration of the healing art. For if, as seems likely, the

sphygmograph can detect the earliest indication of such alterations in the minute arteries as render them less pervious to the circulating blood, we should be able to prognosticate, in time to try and prevent, the degenerative changes which follow. And if, as seems also likely, physical agents act more readily on the microscopic blood-vessels than on other tissues, there is here pointed out the path through which we may hope to prolong life by rational therapeutics, and the time at which we should enter upon it.

The researches of Messrs. Legros and Onimus appear to teach what is the main point to observe, namely, not so much the degree of contraction or dilatation, as the degree in which the peristaltic wave is controlled by various reagents. Upon the extent of temporary interference with it depends the danger of permanent lesion to the circulation, and upon the power of controlling this interference depends the value of means of medication. Is not this the glimmering of a new dawn for therapeutics?

When the materia medica is reviewed with the object of bringing to bear upon it an increasing knowledge of the important department of physiology now under consideration, care must be taken to distinguish between the general and specific actions upon specific parts of the articles experimented upon. The former are doubtless the most important, but they are not always the easiest or first discovered. And now that we have the means of applying instruments of precision to our researches, we may afford to throw overboard all those observations of the action of drugs which depend on subjective phenomena, and which have largely contributed to make our pharmacology ludicrous.

The idea that dilatation and spasmodic contraction of the muscular tubes, that abnormal flush and abnormal pallor of parts, are essentially contrasted, has such strong doubts thrown upon it, and the probability is so great of their being degrees of one departure from health, that a complete revision of our bases for pharmaceutical study may be expected.

II.—Sanitary Organization and Work in New York.[1]

When we direct attention to the bulk of the report we are

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[1] *Third Annual Report of the Metropolitan Board of Health of the State of New York.* 1868. Albany. Pp. 626.

Report of the Council of Hygiene and Public Health of the Citizen's Association of New York upon the Sanitary Condition of the City. New York. 1865. Pp. 360.

about to notice, and add that it is closely printed, it must be evident to any one that no very satisfactory account can be given of it in a review which only can occupy a few pages. Nevertheless, it would be unpardonable to pass it over, for two reasons: one of these is its very high intrinsic value, and the other is that it exhibits in a bright light what may be done in a few years when people set themselves earnestly to work with a determination to succeed against all obstacles. We suppose the necessary proceedings of a sanitary board never yet were popular with all classes. They are usually of a nature to clash unpleasantly with old-established customs, with vested interests, and with private convenience, and to make demands upon the purse, which, above all things, are repugnant to popular sentiment. It does not require a very enlightened mind to perceive that money expended on making passable roads and lighting them effectually at night, or in securing property by a good system of police, is well laid out—that the money's worth is gotten. But to take a single example: a landlord is apt to think himself very hardly dealt with who has not only to spend large sums in sanitary improvements which do not seem to benefit anybody except perhaps his tenant, but who has to pay in addition for the organization and officers whose business it is to rout him out and to compel him to do that which he would rather not do. The prejudices arising out of conservativism are serious obstacles enough to sanitary progress, but the grumbler becomes indignantly violent when his breeches pocket is invaded. This is the vulnerable spot in the Achilles, whatever he may say to the contrary, and he protects it by every manœuvre in his power. It is for the protection of this weak place that he tries to persuade himself, that he may be the better able to convince others, of the uselessness of those measures which sanitarians proclaim to be essential for the maintenance of public salubrity. We have experienced all this here, and can consequently estimate very fairly the difficulties with which the New York Board of Health have had to contend. That they have contended successfully with them, and are still fighting a righteous battle against filth and disease with manful persistence, command our admiration and good wishes.

The metropolitan district of New York, embracing Brooklyn and some rural towns, is estimated to contain a population of about a million and a half. The city of New York itself in the cold season gives residence to nearly a million, of which about half a million of persons are crowded into a space of about two square miles. In 1865 it was prominently put forward that the death-rate ranged between 25,500 and 35,000 per million of inhabitants, that one third of these deaths were avoidable, that all

the evils of a populous and neglected city prevailed in their worst forms—overcrowding of tenant-houses, bad drainage, the occupation of cellars in damp and filthy domiciles, surrounded by nuisances and poisonous effluvia, while no efforts were made by the authorities to afford protection against smallpox by vaccinating the people until an epidemic of that disease created a panic. All this and a great deal more of a similar kind came out as the result of an elaborate investigation made by medical inquirers at that time, and was made public in a most instructive report put forth by a Council of Hygiene and Public Health of the Citizens' Association. This report had the effect of rousing the authorities from their apathy, and a Board of Health was organized, which set to work at once to bring the metropolitan district under a well-ordered system of sanitary supervision, to cleanse, purify, and improve it.

The staff of the board consists of a sanitary superintendent, Dr. E. B. Dalton, with an assistant sanitary superintendent, fifteen medical inspectors, that is, one for every 150,000 of population, who are assisted by a picked body of police inspectors, a registrar of vital statistics, Dr. Elisha Harris, with an assistant registrar, an engineer, and an analytical chemist, together with legal officers. The total disbursements of the board in salaries and general expenses in 1868 amounted to 164,401 dollars, equivalent to about £32,880 sterling. What we desire particularly to call attention to here is the close connection established between the executive sanitary board and the Bureau of Vital Statistics, an arrangement by which our New York friends have vastly improved upon that operative in this country ; and further, to the manifest advantage gained by placing the sanitary government of the whole metropolis under one responsible board. In this way they have preserved the principle of self-government, while they have avoided our mistake in London of frittering away its advantages by an absurd subdivision of authority, which only serves to make authority itself contemptible, while introducing an insuperable element of contradiction, discord, and inefficiency.

To commence with the necessary basis of all sanitary administration. The Bureau of Vital Statistics in New York, from the fact of its association with the Board of Health, not only concerns itself with a bare registration, for civil and political purposes, of the births, marriages, and deaths among the people, with the variations introduced by the resident or transient character of the population, but takes cognizance of the relation which special local conditions bear to mortality, as well as the influence exerted by various measures of public hygiène. We may give an illustration of this by referring to that portion of

Dr. Elisha Harris's report which relates to the "tenement" houses in New York, that is to say, houses where the poor are lodged as with us in London, several families in a dwelling, each family occupying its separate room. The excessive mortality year by year in the tenement-house quarters of the city indicated the duty of instituting a system of special registration for sanitary purposes of all deaths occurring in such dwellings. The execution of this duty was confided to a gentleman specially detailed for the service, who has furnished a table showing for nine months the number of deaths in tenement houses, and the number of tenement houses in which deaths occurred by streets and avenues. The following extract from Mr. Norton's report furnishes grave matter for thought, especially as local inquiries in our own metropolis made by individual health officers have served to show that similar causes are operating in the midst of our own population in a very similar manner :

"According to the census of 1865, New York city contained 49,844 dwellings of all classes. We know that the city now contains 18,582 tenement houses, leaving 31,262 dwellings of a class which may be termed private, although the number includes the hotels, boarding houses, private residences, and shanties of the city. Upon this basis is formed the following somewhat remarkable statement, which is merely putting the lines of totals in the preceding tables in new phraseology, namely, while 31,262 houses gave a mortality of 4803 in the nine months under consideration, 18,582 other dwellings sent no less than 11,570 persons to the grave in the same period. A very large majority of the deaths in the public institutions is composed of persons taken from the tenement houses to die at the hospitals. It is, therefore, entirely within the bounds of probability, if not of absolute truth, to charge 14,500 deaths out of 19,813, the total mortality of the period covered by the above tables, to the tenement-house population of New York. It is estimated that these buildings contain one half of the total population of the city. We now learn that they yield over 73 per centum of the whole mortality. In the present state of sanitary knowledge it is impossible to doubt that much of this waste of life and health is altogether needless and preventable ; and it is quite certain, theoretically as well as practically, that whatever is needless depends upon certain local conditions which may be easily found and thoroughly understood, and whose control is entirely within the scope of the sanitary authorities."

Again, after presenting some plans of blocks of tenement houses, Mr. Norton then sums up :

"In looking back over the statistics of tenement-house mortality presented in this report, we invariably find the highest death-rates in those places where surface crowding and domestic discomfort are most prevalent. A few examples, taken from the first tabulated statement of the record of deaths, will suffice. In Avenue A seventy-

seven dwellings gave 129 deaths.   In Avenue B sixty-nine dwellings
are charged with 106 deaths.   In Avenue C seventy-three dwellings
yielded 107 deaths.   In Baxter Street fifty-eight dwellings gave a
mortality of 100.   In Cherry Street 114 tenement houses gave 205
deaths. . . . . ."

And so on.   Thus it is that the Bureau of Vital Statistics,
condescending to particular statistical investigations, brings its
special method to bear upon the grand object of preventing
mortality and disease.

Another illustration may be drawn from observations made
in the office, of the results upon mortality during the summer
months.   Of the use of antiseptics Dr. Harris writes :

" During the period of greatest mortality, last July and August,
the Board adopted some unusual and important measures for pro-
moting the general purity of the atmosphere, and of foul spots in the
city, by the application of crude carbolic acid in streets, gutters, and
wherever putrescent matters were found.   This effort was attended
with results which warranted the conclusion that those districts of
the city which were so treated by antiseptic sprinkling were decidedly
improved in regard to those unhygienic conditions that were asso-
ciated with the excessive diarrhœal mortality in children.   The fol-
lowing abstract of records of mortality in the wards that chiefly
received this application of the disinfectant will show that there is
reason to mention this subject with satisfaction, especially as it was
in the five wards here given that the death-rate by diarrhœal mala-
dies was rising most rapidly.   The local and surface sources of
putrescence were most abundant in these wards, and there was every
reason to fear that the fatality of diarrhœal diseases would con-
tinue to increase until the onset of cold weather. [We need not repro-
duce the table.]   The statistical statement herein given shows that
this special class of fatal disorders in these most sickly wards not
only did not increase, but that it continued to decrease, and that it
decreased even more rapidly than the general death-rate from all
causes in the same wards or in the whole city.   Omitting these five
wards and the two others that were partially treated by the same
antiseptic sprinkling, the ratio of the diarrhœal deaths did not de-
crease during the period here given" (p. 428).

We mentioned in a former article that our own Registrar-
General had found a difficulty in adopting a suggestion he had
received for the registration of infants born dead.   In the
report of his evidence, recently given before the Royal Sanitary
Commission we find him again dwelling upon this difficulty.
He was asked by the chairman to state his objections to the
registration of still-births.   His reply was :

" I think it a very indelicate investigation, and I have never yet
heard of any real good practical purpose to which it may be turned.
I have got a specimen of how they do it in Paris, which I have

brought with me, where they make inquiries as to the very earliest miscarriages, one month after conception. That is a thing which I hope that my office will not be condemned to commence. . . . . I also think that people would differ very much as to absolutely living children. I think that the registrar would be scouted, and people would be horrified at his approach when he was coming and making inquiries of young women as to what had happened to them with regard to miscarriages."

Although we are not yet discussing this mass of evidence, we must be permitted to suggest that Major Graham is here evidently confounding two things, and that for a registration of still-births it is by no means essential that miscarriages at a month from conception should be included. Everybody knows that there is a popular as well as a professional distinction drawn between the discharge of an ovum at a period earlier than can allow of viability and the birth of a dead infant at or near the full period of gestation. Such registration is actually effected in the city of New York, through the medium of the very strict regulations established concerning the burial of the dead. Scarcely any of the still-born infants that have reached a viable period of utero-gestation escape registration in the bureau. The opinion of Dr. Harris, who has adopted the practice, is, at any rate, worthy of being placed in opposition to that of our own Registrar-General, who has not. He says:

"It seems proper to mention the fact that the records in this almost unnecessarily neglected branch of vital statistics are full of importance and of medical and hygienic significance. We would respectfully urge upon all sanitary authorities and vital statists the duty of establishing such registration in every city and nation" (p. 466).

We can scarcely imagine him thus expressing himself if the process of registration had been found incompatible with delicacy, or of a nature to rouse feelings of indignation and horror.

We shall only add, with regard to this part of the volume, that the report of Dr. Harris is illustrated by several graphic representations of the course of mortality week by week, from certain special diseases, as well as of the general and infant mortality.

Passing on to the actual sanitary work performed by direction of the Board, we may first notice their mode of operation in dealing with nuisances :

"The orders of the Board for the abatement of nuisances are based upon the reports of its sanitary inspectors and of the members of the sanitary company of metropolitan police. Such of these reports as require the action of the Board are forwarded by the sanitary superintendent to the Attorney for an endorsement of the proper order in

legal form, or to the engineer if any construction or drainage is necessary to abate the nuisance. The complaint and proof in each case having been presented to the Board, the orders are entered usually in the form recommended by the attorney and engineer" (p. 20).

Three days are allowed to the party served in which to demand a " hearing" by the Board, at which he may show cause why the order should be revoked or modified. In urgent cases a peremptory order is at once issued, requiring the abatement of the nuisance within five days. Any neglect of this or of a final order, after hearing, is followed by the enforcement of the order by legal prosecution or suits for penalties. The Board, having power to make general sanitary rules and regulations, a very summary mode of obtaining the abatement of a nuisance is thus provided—one which is vastly superior to the summary (?) proceedings which we can adopt under our Nuisance Removal Act. It does not appear that after the medical inspectors have made their report and given their recommendations they have anything further to do with a case. The execution of the order in a proper and satisfactory manner is seen to by the disinfecting department of the Board, in respect of orders for cleansing, disinfecting, white-washing, and the removal of filth and garbage, and by the engineer in respect of structural alterations and repairs. This is, again, an improvement upon our practice in London, where health officers and inspectors are diverted from their proper work to superintend the execution of former orders.

In New York there are responsible persons employed by the Board to execute sanitary repairs at established rates, so reasonable that few parties have been found to complain. When the charges are not paid by the party liable they remain as a lien upon the property upon which the work was done. This, again, is an arrangement which the health officers of London have desired to see adopted here, in consequence of the delays which are observed to occur from frequent changes of ownership. We recommend its adoption by the Sanitary Commission in any suggestions that may be forthcoming for the amendment and consolidation of our sanitary and nuisance laws.

It is unnecessary to enumerate the works carried out by the Board, so far as they relate to ordinary nuisances—paving, drainage, scouring, and so forth; but their action as respects trade nuisances, which we treat so very delicately in this country, must be specially mentioned as worthy of imitation. A system of " permits" has been established to parties engaged or desirous of engaging in various business pursuits which, if improperly or carelessly conducted, are liable to become detrimental to the public health.

"In all cases applications for permits are referred to sanitary officers, and the Board bases its action upon their reports of personal inspections and their written statements as to the condition of the premises, the manner of conducting the business, and the character of the machinery and appliances used therein, and such other facts as are necessary to a proper understanding of the subject. As all permits are liable at any time to be revoked, this sanitary supervision secures the due attention to cleanliness and to the rules and regulations of the Board" (p. 28).

One result of these proceedings is that the slaughter-houses are in process of being entirely removed from the densely populated portions of the city, and largely reduced in number, that the keeping of swine has been generally discontinued in the built-up portion of the city, and that the nuisances arising from the practice of keeping milch cows in dark, crowded, and unventilated stables, and feeding them upon distillers' wash, so loudly complained of in the report of the Council of Hygiene, have entirely disappeared. The trades of bone, offal, and fat boiling are only tolerated when conducted with all the modern precautionary appliances, and it is confidently predicted that at no distant day will only be carried on in connection with the large slaughtering establishments.

Among other things the Board employs its medical inspector in examining the arms of the children in the public schools, with a view to secure a thorough system of vaccination, and in the regulation of quarantine.

Texas Cattle Disease.[1]

A considerable part of the report before us is occupied with an account of a disease of cattle which broke out in the month of August, affecting the meat supply of the city, and of the investigations which the Board of Health undertook in relation thereto. It is highly to their credit that they undertook a scientific inquiry which must have taxed all their force, at a time, too, when they were comparatively new to their work; while the manner in which their investigations were conducted is worthy of all the commendation it is possible for us to bestow upon it. They have accomplished a self-imposed task, so as to have earned the thankful acknowledgments both of pathologists and sanitarians. We propose devoting the remainder of our article to this portion of the report.

The *origin* of the inquiry was in this wise:—On August 8th, 1868, information was received of a herd of 140 diseased and dying

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[1] *Third Annual Report of the Metropolitan Board of Health of the State of New York.* 1866. Pp. 626.

bullocks having arrived at Communipaw, one of the great herd yards near Jersey city. Certain unusual events, in the progress of sudden and fatal diarrhœal disorders in various parts of New York, during the previous ten days, induced the Board to inquire into the report. Fifteen were found to be sick; and it came out that the herd had been shipped only eight days previously from central Illinois, had been attacked on the second day from departure, and that 159 had died on the route. Prompt steps were taken by the Board to obtain information, and to restrain the movement of all sick and infected herds.

The result of this was that they speedily learned of other herds in progress towards the city being diseased, as well as of cases within the metropolitan district itself. A plan was set on foot for an organized inquiry of a scientific nature. Dr. Moreau Morris was placed at the head of the organisation as assistant-commissioner for the state, Dr. R. Cresson Stiles was appointed pathologist and microscopist in the inquiry, while any chemical investigations were committed to Professor C. F. Chandler, the chemist to the Board. In our remarks upon the labours of these gentlemen we shall follow an order similar to that which we adopted when the report of our own Cattle Plague Commission was before us, as more convenient than any other for our purpose.

1. The following is the summary given by Dr. Morris of the *symptoms* by which the disease is characterised :

" Generally standing apart from their fellows, listless, indifferent to surrounding objects, restless ; evidently desiring to lay down, but fearing to do so, until compelled to yield by rapidly waning strength; the head hanging low down, frequently within an inch of the ground, or occasionally pressed firmly against some unyielding object; the base of the horns hot, the ears drooping, the eyes dull and staring, the spine or back peculiarly arched, the hinder feet being drawn under the body and placed in a bracing attitude ; a tremulous creeping over the flank muscles, with frequent efforts at voiding fæces, which are generally small, hard, and rounded, and covered with bloody mucus, though there is sometimes considerable looseness of the bowels during some stages of the disease ; frequently passing urine of a dark, bloody appearance. The pulse is rapid, very soft and feeble ; respirations frequent, and during hot weather panting without exertion. The temperature, both externally and internally, increased. Flies are also observed to adhere to the animals, who seem either unconscious of their presence or too feeble to drive them off" (p. 233).

The temperature taken in the rectum has been observed to reach $107\frac{1}{2}°$ F., but usually it was not so high, but varied from 103° to 105°. The mortality of the native cattle thus attacked

was observed to be about 80 per cent. ; others recovered after a prolonged convalescence. In the convalescent animals observed, the eyes, and sometimes the skin also, was seen to remain for several days deeply jaundiced ; the legs were œdematous, and there was a very flabby condition of the surface.   Even as long as twelve or sixteen days after the most obvious acute symptoms had ceased, such as hæmaturia, the temperature was still observed to reach $103°$ or $103\frac{1}{2}°$.

2. It appears that so rapid is the decomposition after death, that even in three or four hours the special pathognomonic signs have become entirely obliterated.   Hence it became a practice with Dr. Stiles to make his pathological and microscopical investigations immediately on the slaughter of an animal. Dr. Morris thus summarises the results of examination at slaughter :

" 1. A greatly increased temperature of the body and the blood is an indubitable and most trustworthy symptom of this disease, for it is the first symptom discoverable ; it is excessive and extraordinary in degree, and it marks this disease as a pestilential fever.   2. Upon opening the animal the muscular tissue is seen of a dark red colour ; the fat is of a deep brown-yellow, having, in intense cases, a green-bronzed tinge.   3. The spleen is found enlarged, more or less engorged with dark-coloured blood, softened frequently to a pulpy mass.   4. The abomasum, or fourth stomach, upon its inner tubular pyloric portion, invariably presents sloughs, erosions, and deep excavated ulcers of various forms and extent.   There is usually accompanying these more or less inflammatory appearances of the larger and more vascular portions of the stomach (gastritis).   The ulceration, or rather the peculiarities that were found in the tubular portion of the rennet or fourth stomach, at the base of the longitudinal folds in that stomach, finally appeared to be a surer guide to the recognition of the disease than was the mere appearance and size of the spleen or the liver ; the absolute tests by the minute examination of the liver, bile, and spleen-pulp by the microscopist, and the historical and symptomatic history (*sic*) of the animal before death, being, of course, preferred to all other kinds of evidence.   Yet to the practised eye these ulcerations, sloughs, and erosions served as trustworthy guides in deciding the nature of any case in which for the moment the other kinds of evidence were not accessible.   5. Kidneys generally enlarged, darker in colour than normal, congested with blood, and the cortical substance usually softened.   6. The liver enlarged, increased in weight, generally fatty or waxy, its bile-ducts and radicles fully injected with bile, its colour changed to a yellowish brown.   7. The gall-bladder filled with a thick tarry or flaky bile. 8. The bladder distended with dark bloody urine.   9. The intestinal canal in its various portions—the ileum, cæcum, and rectum—frequently presenting congested vessels under its mucous coat, its epithelium softened and easily scraped off with the finger.   10. The heart:

muscular tissue sometimes found softened. 11. The lungs generally in a healthy condition; in some intense cases interlobular emphysema. 12. The brain in some cases congested and softened. In pronouncing the diagnosis of the disease beyond all dispute, the revelations of the microscope place the final seal upon all the group of symptoms and pathological changes. The blood, bile, and liver under this (microscopic) test give us a view of that factor which is the poison, which has produced these changes and death " (p. 234).

To this summary we may add the following particulars from the special report of Dr. Stiles :—The average augmentation in the weight of the liver was about 30 per cent. above what is normal, and the waxy change occurred in animals that had suffered long from the disease. Invariably the organ was enlarged and congested, and its surface marked by yellow patches or uniformly discoloured. The surface of the section presented yellow spots on a ground of deep congestion. Under a power of five hundred diameters, the yellow colour of the centre of each lobule was seen to be due to the repletion of the ultimate biliary radicles, forming a regular network between the liver-cells, with bright yellow secretion. About this, and shading into it, was a zone of fatty degeneration which affected the superficial or portal portion of each lobule. The *bile* was in all cases very abundant, not only distending the gall-bladder and ducts, but constituting the principal part of the contents of the small intestines. It contained granular flakes and masses of a brilliant yellow or orange tint to transmitted light, often so abundant as to give the bile a semi-solid consistence. The source of these yellow flocculi was an admixture of blood, the corpuscles of which had been dissolved, and the coagulating fibrin having imbibed the bright yellow dye of the mingled colouring matter of the bile and red blood-corpuscles. The *blood* of the aorta, on the animal being slaughtered, had commonly a temperature of 105° or 106°. It coagulated firmly without a buffy coat, the quality of the fibrin not seeming to be impaired. The red corpuscles, however, had undergone a change; when examined immediately after removal from the body they were shrivelled or crenated; in one case many of the discs appeared to have lost a portion of their substance, as if a circular piece had been punched out. The liquor sanguinis was invariably of a yellower colour than natural, and contained minute yellow flocculi of granular matter of irregular size and shape; the source of this yellow colouration was indicated by the occasional presence in the serum, after standing for several hours, of rhomboidal notched plates, probably of cholesterine. In several instances defibrinated blood or serum, poured from a clot which originally abounded in corpuscles, was found after a

few hours to be absolutely devoid of the latter, complete disso-
lution of them having taken place long before putrefaction.
The dark opaque *urine* formed a solid coagulum on boiling;
blood-discs were rarely found in it, but fibrinous coagula enclos-
ing débris of blood-corpuscles, and dark crimson granules, and
moulded into casts of tubuli uriniferi, were frequently met with.
The appearance of the organs affected after death is shown in a
series of admirably executed chromolithographs.

3. We may give the *pathological* conclusions of Dr. Stiles in
his own words :

" The Texas cattle disease is an acute, infectious, febrile disorder,
attended by morbid action of the liver, its most destructive pheno-
mena being explicable as the results of the hepatic affection. The
dissolution of the colouring matter of the blood-corpuscles in
the liquor sanguinis and the hæmaturia are consequent upon the
entrance of bile into the blood-vessels, in whatever manner effected.
In the experiments of Kuhne and Frerichs the injection of bile or of
its salts into the blood was followed, in the great majority of their
experiments upon the lower animals, by the appearance of blood in
the urine. The solvent action of the bile upon the blood-corpuscles,
and the consequent liberation of their colouring matter, can be
readily witnessed under the microscope, each disc disappearing sud-
denly, like a light blown out, and the liquid assuming an orange tint.
The blood thus altered in character becomes liable to extravasation,
other hæmorrhages than hæmaturia being frequent attendants upon
attacks of jaundice.

" That bile is mingled with the blood is proved by the yellow colour
of the serum, its yellow flocculi, its crystals of cholesterine, by the
yellow drops in the epithelium of the tubuli uriniferi, by the yellow
granules in the spleen, and by the hæmaturia. These results cannot
follow the mere accumulation in the blood of the constituent elements
of bile ; the proximate principles of the bile itself are there found.
The liver is incited to excessive secretion, the product of which dis-
tends to excess the channels and reservoirs of the bile, and fills the
intestines. It is not unusual to find cases of icterus in man thus
accompanied by excessive biliary secretion.

" That the greatest facility exists for admixture of bile with the
blood is shown by the repletion of the reticulum of bile-ducts in im-
mediate contact with the capillaries of the liver, as well as by the
abundance of bile exposed to absorption by the mucous membrane of
the intestines. In the experiments of Dr. Randall, under your
direction, in which rabbits were fed upon bread soaked in the bile of
the Texas disease, death ensued in from one to four weeks, according
to the amount of bile consumed. In these experiments the poison
was absorbed by the mucous membrane of the alimentary canal.
The stomach was found ulcerated, and containing extravasated blood ;
the liver was softened and fatty ; the bile was of a bright claret
colour, and contained coagula ; the kidneys were deeply congested.

Thus death was caused by the absorption of bile, with many of the phenomena of the Texas disease in a chronic form" (p. 306).

4. Thé history and *etiology* of the disease may be considered together. The earliest published definite account of it is embodied in a report by Dr. Albert Badger, Vernon county, Missouri. He states that it was first recognised as having been propagated among native herds by cattle driven from Texas in 1852 or 1853. From the first it was found to be confined to the great roads running through the country from the south, and in 1853 it was confined to one highway, over which Texas cattle passed that year. On this road the disease was fatal, killing about 50 per cent. of all the cattle along that road, and persons living near the watercourses over which the road crossed lost as many as 90 per cent.

The disease entirely ceased during the four years of the war of rebellion, the first case of its reintroduction occurring in the autumn of 1865, when two pairs of oxen were bought in the south by a Mr. Box, and immediately infected the herds of three of his neighbours. In June, 1866, a drove of Texas cattle passed through Vernon county, and about eight miles into the adjoining county of Bates, when the citizens resisted their further progress northward, and compelled them to return into the Indian territory by the same road they had entered Vernon county.

The disease did not appear for some six weeks, and it extended directly up to the very point on the road sides at which the Texas cattle had been turned back, and not a farm beyond that point. In 1856-58 it was observed that the course of the disease seemed totally arrested at the banks of any deep stream of water, excepting at the points where the Texas cattle found fording places which they crossed. It has been established beyond a doubt that the disease arises in native cattle from feeding or watering with or after Texas cattle. One Missouri farmer, who had seen a good deal of the disease, states that he had never known a case that could not be directly traced to this cause. It would appear that all evidence is wanting that the contagion can be communicated in any other way than by the pasture or water. This gentleman states that he has had cattle of his own separated from large herds of Texas cattle by a fence without evil results, and of the immense numbers that have died on the road, none died on pastures from which Texas cattle were excluded, neither was it found to spread to cattle confined to stables or to their own pastures. It has been stated that native cattle do not communicate the disease to other native cattle, but there is sufficient evidence of the fallacy of this opinion, in itself somewhat improbable. It has even been communicated by

allowing oxen to pasture where cows dead of the disease had been buried. Cows seem to suffer more severely than steers, and calves mostly escape. The contact necessary to contract the disease is so trivial, that it is asserted that cattle have died of it that had only been driven across a road along which Texas cattle had passed. Neither does it appear that the Texas beasts need be manifestly ill to produce these results on native cattle. An instance of this is recorded where some Texas cattle showed no disease for several months, while hundreds of native cattle infected by them were dying all around them. Nevertheless, Dr. Howard, who made post-mortem examinations of slaughtered Texas cattle, affirms that they exhibited lesions similar to those observed in the native herds, and that some of their lesions were as extensive and exhibited as much or more evidence of past inflammatory and destructive action than other cattle did of present disease when killed for scientific observation. The disease does not appear immediately on placing cattle on infected pastures. It has an incubation of from fourteen to thirty or forty days, but usually the disease is developed in about twenty days. Its development is hastened by a high temperature, and the hunger, thirst, and excitement of railway transportation aggravate it.

We have purposely deferred speaking of certain microscopical observations of Dr. Stiles until we had given some account of the more obvious etiology of the disease, for the reason that those observations have a bearing upon this subject that is more important than any other. They led, very early in the investigation, to the discovery in the *fresh* blood and bile, but with difficulty, of minute vegetable germs, which multiplied abundantly in the various specimens of bile preserved for analysis. Within a few hours of removal from the body numerous cryptococcus (or torula) cells, resulting from the development of the former, were found, often containing crimson granules. Specimens of blood and bile from healthy animals in no instance exhibited these forms. Their development was studied by Dr. Stiles and by Professor Hallier, by planting in solutions of sugar, gum, and saliva. The resulting anærophytic forms were planted on slices of apple, &c., and, after a period of two weeks the planted area was found covered with penicillium.

The inference Dr. Stiles draws is that it is possible that these germs, developing luxuriantly in the bile and voided with the fæces, may be the source of the contagion which proves so fatal in the western pastures, where Texas cattle have occupied them in advance of native herds. Dr. Stiles appends to his statement some reports from Professor Hallier, in which he says that the fungus of which the micrococci and cryptococcus-like cells take

their origin is a species of the genus Coniothecium, which he terms *C. Stilesianum.* It has great similarity to the *C. syphiliticum,* although they are entirely different. " At all events," he writes, " it is a parasitic fungus, growing on plants, and to be looked for in the food of the wild bullocks." These microscopical observations are illustrated by some well-engraved plates. Another inference drawn is that it is probable that, regarding this fungus in one or other of its stages as the contagium, a process of ground-incubation or development of it upon the soil takes place after its expulsion from the bowels of an infected beast.

" As in regard to the infection cause of cholera, so in regard to the Texas cattle disease, the bowels of the living, and, in some instances, apparently healthy individual *carrier* of the pestilential germs, may evacuate with excrement those germs so completely developed that they may at once begin the fatal and incubation work of infecting other individuals; or, on the other hand, the germ development in such excrement may be so incomplete and immature ('unripe,' as Professor Hallier says of the anærophytic spores), that the surface of the soil, or the herbage on which the excrement is dropped, must serve as the nursery and 'hotbed' for nourishing them into the advanced or infectious and poisonous stage of development (the 'ripe' state—Professor Hallier), before the blood and tissues of the exposed and healthy individuals can become infected. . . . . Upon this subject we need only refer to the abstract of correspondence and of authenticated evidence in preceding sections of the report.

" In the states of Illinois and Indiana the proofs upon this point concerning the incubation or maturing of the excrement contagium during an interval of greater or less duration after it was dropped upon the ground, are so abundant and convincing, that many of the farmers seized upon the logical interpretation of their own practice and experience, and emphatically, though somewhat rudely, gave expression to this wonderful yet now easily understood doctrine that Pettenkofer demonstrated when analysing the history of cholera in Bavaria, in the autumn of 1848 " (p. 325).

At the time of closing the report the investigations on the subject were not completed, so that we may anticipate some further observations.

5. The alliances of the Texas disease need occupy us no further than this, that Dr. Stiles finds in it such analogy to yellow fever in the human subject that he thinks himself warranted in designating it the yellow fever of cattle. We will transfer his remarks upon this subject.

" In the hottest period of the summer, when the liver is excited to unusual activity, cases presenting many of the features of the Texas disease in cattle are not infrequent in man. They present the same fatty degeneration and boxwood discoloration of the liver, the

hæmorrhages into the stomach and intestines, albuminuria and fatty degeneration of the kidneys, intense jaundice, yellow grumous but usually scanty biliary secretion, high fever, softening of the spleen; all these characteristics without the suspicion of yellow fever infection. In some of these cases disorder of the liver is the only recognisable cause of a train of symptoms ending in black vomit and death; in others Bright's disease of the kidneys is the basis upon which these symptoms are engrafted. In these cases, and in yellow fever, an acute cholemia, or admixture of bile with the blood, is the most decided of all the pathological phenomena. The group of symptoms and lesions in the Texas disease is, therefore, well established, and corresponds to the action of a not unusual combination of causes, as well as to that of the yellow fever miasm. The application of the term *yellow fever* to the Texas disease of cattle is warranted both by its pathological characteristics and by the source of the contagion. From examination of the liver of yellow fever, I am confident that the same injection of the biliary radicles would be found as in the Texas disease, could the liver of the former be obtained under the same conditions that revealed that structure in the latter. The pathological alteration in the liver of yellow fever is not a fatty degeneration merely, as is often asserted. The boxwood colour can be derived from the biliary secretion only, and the liver of the Texas disease, and that of yellow fever, present precisely the same appearances when examined a number of hours after death. The yellow coloration in the Texas disease is undoubtedly due to an admixture of blood with the bile at its source, or to a superabundance of hæmatoidine from broken-down blood-corpuscles in that secretion, and such may be considered the cause of the peculiar yellow coloration, in whatever disease it may be found " (p. 309).

The analogy, so far as it has been pursued, is suggestive, and will no doubt be followed out; it promises to be worth the bestowal of time and labour upon it.

6. There is very little to be learnt of the efficacy of *treatment* from this report. Out of a herd of thirty (mostly cows) found on one farm in Dietcher's county, eighteen were diseased; nine of these died before any treatment was instituted, the other nine all recovered under treatment.

" The medical and hygienic treatment was as follows:—The sick animals were placed in a small enclosure by themselves. Pure carbolic acid was placed in a large open-mouthed bottle, dissolved in water; this was held to the nostrils and given by inhalation, at short and repeated intervals. The heavy oil of coal tar, containing 70 per cent. of carbolic acid, was liberally sprinkled upon the yard where they were kept, thus presenting the fumes of the carbolic acid constantly. The feeding was low diet, plenty of water, salt, and outdoor air " (p. 207).

In another instance there were five cattle reserved for treatment at Communipaw. They were placed, on August 14th, in

a lot where they had access to salt, meadow-grass, and were compelled to drink of the following mixture, which Dr. Harris had prescribed as an experimental remedy :

"Carbolic acid 12 oz. in crystals, glycerine 4 oz., bicarbonate of soda 12 oz.; mix. *Directions.*—Dissolve or mix one ounce in three or four gallons of water."

This was readily drunk by the steers. The surface of the ground was liberally sprinkled with heavy oil of coal tar mixed with sawdust. On the 16th one of the five was slaughtered for scientific investigation ; the others appeared to be convalescent.

In concluding our review of this report we must again express the satisfaction which its perusal has given us, and the interest with which we anticipate the further communications which are promised with regard to the Texas disease, and our congratulations on the success which has attended the scientific as well as the hygienic labours of the New York Board of Health.

III.—Deroubaix on Urogenital Fistulæ.[1]

THERE are few, if any, of the ills to which flesh is heir to which can compare with vesico-vaginal fistula in the distress which they cause. The subject of it is not only compelled to bear an ever-present bodily torture from the disease itself, but she has to endure the further, and perhaps greater, misery of being cut off from society and family ties, without even having, as Dieffenbach remarks, the melancholy consolation of being able to hope that a speedy death will deliver her from so much suffering; and it is painful to think how long this malady was the " opprobium chirurgicale," and how numerous must have been the women who went unrelieved to their graves, whose cases were perfectly amenable to treatment.

An account of the many futile methods which have been proposed and practised for its cure forms a curious chapter in the history of medicine—all the more remarkable from the sequel to the story, which shows how completely the disease, with rare exceptions, is now under control.

The work before us is a most elaborate monograph on the subject, so lengthy and diffuse, that it is unlikely that many of our readers will find time and opportunity to make themselves acquainted with its contents. Its chief fault, indeed, lies in its

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[1] *Traité des Fistules Uro-Génitales de la Femme.* Par L. DEROUBAIX, Chirurgien des Hôpitaux Civiles de Bruxelles, &c. Bruxelles, 1870.

excessive length ; and it requires no ordinary amount of literary padding to fill upwards of 800 large and closely-printed pages with a discussion of this one disease.

There is, however, a vast amount of labour and research expended in its composition ; and it may not be uninteresting to our readers if we extract some of the chief facts in connection with the history of vesico-vaginal fistula, and the many endeavours which have been made at discovering a method of cure.

It is somewhat remarkable that in the works of the fathers of medicine, whether Greek, Roman, or Arabian, no mention is made of vesico-vaginal fistula. Many of the ancient writers were such accurate observers, that this omission seems difficult to account for. It may partly be explained, doubtless, by the fact that the practice of midwifery was almost exclusively in the hands of women, and that men rarely occupied themselves with it at all. However this may be, it is beyond question that no clear description of the affection is met with until the year 1597, when Felix Plater gives a distinct account of it, and the same was subsequently done by Louis Mercatus, an eminent Spanish physician, and numerous other writers. These authors, however, contented themselves with a description of the malady, its mode of production, and its lamentable results; and none of them seem even to have considered the possibility of attempting a cure. To Van Roonhuysen, a Dutch practitioner, belongs incontestably the credit of suggesting an operation for the closure of the fistula, which has the merit of containing the germs of the method now in use. He proposed that the patient should be laid on her back in the lithotomy position, that the vagina should be largely dilated with a suitable instrument, that the edges of the fistula should be pared with a bistoury or scissors, and that the raw surfaces should be brought into apposition by pins of swan-quill, and dressed with various balsams. It will be observed that this procedure is in many respects curiously like the one at present employed.

It seems doubtful whether Roonhuysen ever practised this operation, or whether it was merely a theoretical proposal. Whether he actually performed it or not is of secondary importance, since to him belongs the undoubted merit of first recommending it. Roonhuysen's name is best known in this country in connection with the invention of the vectis, to which he can only lay a doubtful claim, as it is thought by many that he borrowed the idea from the Chamberlens. The originality, however, of his suggestion, with regard to vesico-vaginal fistula, is beyond any question, and is well worthy of remembrance, since he was the first to point out the direction in which it was

necessary to work, in order to arrive at a reliable method of curing one of the most disgusting of human infirmities.

It is a strange fact in the history of surgery that nearly two centuries elapsed before the hint given by him was practically worked out.   Whether it was that his writings were not widely known, or that surgeons deemed his proposal too difficult to carry into practice, it is certain that the seed thus sown took no root.   So little, indeed, was thought of Roonhuysen's writings, that Velthem, who wrote an elaborate thesis on the subject in 1724, which professes to contain a complete history of all that had been written with regard to it, does not even mention his name, although he proves his familiarity with Dutch literature by quoting the writings of Ruysch, the anatomist.

During the whole of the eighteenth century few or no attempts at cure were made, and the affection was generally considered beyond the power of treatment.   It was not until nearly the end of last century that a new era in the history of the complaint arose, and, owing chiefly to the writings of Desault, numerous attempts at cure were made.   His efforts indeed, were based on an evidently fallacious analogy between the urinary fistulæ of the male and the female ; but still they had the effect of reviving an interest in the subject.   The chief features in his method were—1st. To prevent the passage of the urine into the vagina by keeping a catheter in the urethra.   2ndly. To maintain the edges of the aperture in apposition by suitable plugs in the vagina.   Neither of these ideas were new.   They had been tried by Velthem, Mauriceau, Levret, and others ; but Desault devoted so much care and attention to their application as almost to justify us in considering him as the parent of the practice.   His catheter was of large size, and attached to a kind of framework fixed above the pubes, and his plugs were cylindrical and covered with some waterproof material, and were intended, not only to press together the lips of the fistula, but to occlude the vagina, so as completely to prevent the passage of the urine.   By these means he affirmed that he had cured several cases of long standing.   The value of Desault's method was at first pretty generally admitted, not only in France, but in our own country, where such men as Clarke, Guthrie, and Blundell adopted it.   It is very doubtful, however, if there were many reliable cases of cure resulting from its use.   Soon a reaction against it arose, and many were found not only to deny its efficacy, but violently to oppose it, and among these the most prominent were Vidal de Cassis, Jeanselme, and Jobert de Lamballe.   Jeanselme stoutly contested the supposed fact that a plug would keep together the edges of the aperture, and, to prove this, adopted the ingenious device of using plugs of soft wax.

A cylinder made of this material was passed into the vagina, and on it an impress of the opening was taken. The edges, he said, were always found to be apart.

The frequent failure of Desault's plan caused Naegelé, and after him many German surgeons, to resort to Roonhuysen's original proposal, and attempt the reunion of the edges of the fistula. Numerous plans were proposed, some of which showed considerable ingenuity, but, as might be expected in the absence of a proper speculum, by which the seat of the disease could be exposed, they were all more or less failures. It was, in very deed, working in the dark, and that under circumstances in which extreme accuracy was of essential importance. The cures —if cures there were—must have unquestionably been more the result of good luck than of good management.

Many attempts at cure were made about this time by means of cauterization of the edges of the fistula, and several eminent surgeons, notably Dupuytren, Lallemand, and Delpech, worked assiduously in this direction. Their hope was that the edges of the fistula, swollen by inflammatory action, might permanently adhere, or failing that, that cauterization might produce a narrowing of the aperture, which being increased by subsequent operations, might finally result in complete closure. The agents chiefly employed were nitrate of silver and the actual cautery, the latter being applied with the aid of a properly constructed speculum. Lallemand invented an ingenious method of treatment combining cauterisation with mechanical opposition of the edges of the fistula, which was at one time in considerable vogue. He applied the cautery, nitrate of silver being the one preferred, freely to the edges of the fistula, and after the eschar had separated, and the edges were raw, he introduced an instrument into the bladder, which was intended to seize them and keep them in apposition until adhesion took place. Although these methods had many followers, the reliable cases of cure have been very few indeed, and even those which have been published have been doubted by the opponents of the plan.

It would be useless and unprofitable to refer to all the suggestions and methods of treatment subsequently proposed by various surgeons, and it is the less necessary as they are all now happily more interesting from an historical than a practical point of view. Reference need only be made to one or two authors, and prominent among them is Le Roy D'Etoilles, who wrote an elaborate paper on the subject in 1842. D'Etoilles had no favourite method of his own, but endeavoured to gather together all the best points from the plans previously proposed. Being a man of great mechanical skill, he invented a number of instruments, some of them extremely ingenious, and to which we now

refer, because it is not impossible that operators consulting his descriptions might yet obtain useful hints. We have no evidence, however, that all this ingenuity had much effect in curing the disease.

Dieffenbach, and Wützer of Bonn, should be mentioned among the surgeons who worked assiduously at the subject, and attempted the cure of vesico-vaginal fistula by means of the suture. The latter, indeed, was so persevering that he is reported to have operated as often as thirty-three times on the same patient, but with a success that could scarcely be called encouraging. A precaution taken by him is worthy of notice. With the view of preventing the urine from passing over and irritating the wound, he performed supra-pubic puncture of the bladder, placing a sound in the opening, and keeping the patient lying on her face.

About this time our own surgeons were strangely indifferent to the operation, and little or nothing was done in this country with regard to it. This is the more remarkable, as of late years so much has been done by us in improving the methods of treating the affection. Indeed, even so late as 1852 in ' Miller's Surgery,' then a standard work, the cure of vesico-vaginal fistula is stated to be a hopeless task, and the advice given is to trust chiefly to palliatives.

About this time Vidal de Cassis proposed an operation for the cure of the complaint. His plan was to effect complete occlusion of the vagina, the cavity of which should form a sort of supplementary bladder, the urine and menstrual fluid being evacuated per urethram. The merits and demerits of this proposal gave rise to great discussion. On the one hand it was said that the menstrual fluid being retained might give rise to accidents, that calculi might readily be formed in the occluded vagina, that the urine might pass backwards through the uterus and Fallopian tubes into the cavity of the peritoneum, giving rise to very dangerous symptoms, and lastly, that by this method the important functions of reproduction were prevented. On the other hand, these objections were made light of, and the discussion was carried on with much vigour both in the Academy of France and the medical journals.

Jobert de Lamballe, Velpeau, and other French surgeons made, about this time, numerous endeavours to cure the fistula by plastic operations of a somewhat elaborate character, flaps being taken from some part of the vagina and implanted over the aperture. These proceedings gave rise, at first, to great hopes, but they eventually shared the fate of the methods they had followed, and the affection remained as little amenable to treatment as before.

After his ineffectual efforts at a plastic operation, Jobert de Lamballe devised another plan of treatment, which gained great celebrity, and which had the happy effect of reviving the interest of surgeons in all countries in the subject, and of acting as the precursor of the modern method of operating.   His plan was based on the theory that the difficulty of cure depended on the state of tension of the vaginal wall in which the fistula was situated, and his operation endeavoured to remedy this by suitable incisions before the sutures were inserted.   His writings on this point attracted much attention, but unhappily the same success did not follow the efforts of others that seems to have attended his own.

Such, indeed, could be said of most of the methods recommended up to this time, and on an impartial review of all that had been done, a candid inquirer was bound to admit that science was still unprovided with any reliable means of treating this formidable and distressing infirmity.

The first experiments which seemed to foreshadow the present successful mode of operating were made in America as early as the year 1830, when J. Mettauer, of Virginia, operated on a large circular fistula, using leaden threads, and succeeded in effecting a complete cure.   Unfortunately for his own reputation, this case was not published until the year 1847.   A very similar operation was practised in London by Mr. Gosset, who used ligatures of silver gilt wire, and as his observation was published in the 'Lancet' of 1834, it is evident that he must be regarded as one of the very earliest employers of the metallic suture.   Deroubaix makes a mere passing allusion to the fact that its advantages have been distinctly recognised by our countryman long before the observations of Marion Sims were published.   A reference to Mr. Gosset's paper, however, renders it quite evident that he understood the reason why a suture of metal is preferable to one of organic matter, as he accounts for its superiority in terms much the same as those of American surgeons.   It is to be regretted that his successful cure did not attract more attention, and so lead our countrymen to the path afterwards so successfully trodden by our American brethren.   As in many similar instances of inventions and discoveries, it seems beyond doubt that this isolated case should not detract from the credit due to those who popularised and worked out the modern method of cure.

It is unquestionably to the untiring energy of Marion Sims that modern surgery owes its triumph over this affection, which had baffled all previous efforts; and, although we may scarcely be prepared to go the length of saying with him that the use of the metallic suture forms *the* discovery of the nineteenth cen-

tury, still his name will unquestionably be always honorably remembered in connection with the subject. The history of Sims' indefatigable labours is interesting in itself, and well teaches the old old lesson of how perseverance and zeal are so often rewarded by success.

The idea of devoting himself to the treatment of vesico-vaginal fistula first suggested itself to Sims in the year 1845, when he was attending a lady suffering from retroversion of the uterus. Having placed her on her hands and knees, he noticed the fact that the vagina dilated spontaneously, partly under the influence of atmospheric pressure, partly from the falling of the uterus into the abdominal cavity from its own weight. He was immediately struck with the possible adaptability of this observation to the treatment of vesico-vaginal fistula, knowing how difficult it was in that complaint to effect exposure of the vesico-vaginal septum. This it was that gave rise to the invention of the duck-billed speculum, the value of which in many diseases besides vesico-vaginal fistula is now fully recognised by the most eminent gynæcologists.

His first operation was performed in January, 1846. The fistula was diminished in size but not cured, and the same result followed in the next case. Nothing daunted he incessantly repeated his experiments during the next three years, with untiring patience, but with the same constant want of success. At the end of that time he first employed metallic sutures in the case of a young negress, who herself was a living witness to the failure of the ordinary methods of treatment, since she had already been subjected to operation thirty times in a variety of ways. To his own great surprise this time the fistula remained perfectly closed, and a permanent cure was effected.

Encouraged by this unexpected success, he immediately practised the new operation on all the women on whom he had ineffectually experimented during the past three years, and with the same happy result.

Sims was followed in his researches by Bozeman, whose name is also intimately connected with the treatment of the disease in America, and who considerably modified the operation. The fame of these experiments soon spread abroad, and very shortly Spencer Wells, Simpson, and others of our most eminent practitioners repeated them in this country, and surgeons in France and Germany soon followed their example.

Bozeman now visited Europe, and operated in all the principal cities with great success, converting many practitioners who were formerly sceptical as to the advantages to be derived from the American method.

Since that time this distressing affection may be said to have

been removed from the list of incurable diseases, and there are now few morbid states which may be so surely remedied by operative measures.

It is unnecessary to follow up the history of vesico-vaginal fistula beyond this point, and it is quite impossible, in the limits of a short article, even to refer to all the improvements and modifications which have been suggested. We will, therefore, content ourselves with mentioning one or two subjects in connection with the operation which are open to discussion.

One of these is the use of the metallic suture. When the American surgeons published an account of their successful operations, the happy results they were able to show were almost universally attributed to the use of sutures of either silver or some other metal. As the tendency of most is to run into extremes, the use of metallic sutures was lauded to the skies as the commencement of a new era in surgery. Suppuration, granulation, erysipelas, and many other evils dreaded by surgeons, were to be things of the past, and all our wounds, for the future, were to heal by the first intention only. Soon, however, surgeons came to see that this did not always take place, and many began to teach that the special advantages expected from the silver sutures were entirely imaginary; and that with regard to vesico-vaginal fistula especially, the more favorable results were in no way due to the material used in bringing together the edges of the opening, but to superior operative skill and the improved instruments employed. As in all such disputed points, there is a good deal to be said on both sides; but still it seems to us that the balance of evidence is incontestably on the side of the metallic suture, and it is worth pointing out in what respects it is preferable to one composed of silk, or other organic material. The former seems to owe its superiority chiefly to the fact that its surface is smooth and impermeable; organic ligatures, on the other hand, are apt to imbibe the secretions from the surrounding tissues, and to retain them in their structure, where they may undergo putrefaction, and so give rise to a sort of local septicæmia very unfavorable to immediate adhesion. Another advantage possessed by the metallic sutures is their fixity of form after application; whatever traction they may be subjected to, or whatever may be the condition of the tissues in the midst of which they are placed, they retain the same diameter and their precise shape. In this respect they contrast favorably with organic sutures, which swell by imbibition and change their form and shape in correspondence with alterations of the parts in which they are placed.

On the other hand, metal threads are distinctly inferior to

those of silk or other soft substance in their tendency to cut their way out of the surrounding structures, and this defect is most likely to be felt when there is much strain on the parts they are intended to keep in apposition, or when they are subjected to movement from muscular action; then the advantages derived from their mechanical properties are more than counterbalanced by their penetrating and cutting effect.

It will be seen, then, that while the metal sutures are likely to be of great service in certain situations, there are others in which sutures of more yielding material are preferable.

Among the former the vagina seems to be specially adapted for the metallic thread, since its walls are thick and membranous, and little subject to the influence of muscular action, and thus afford a good hold to the suture without any tendency to undue traction upon it. It is not improbable that, with due care in operating, and under favorable circumstances, an organic suture may successfully hold together the edges of a fistula until adhesion takes place; but it must not be forgotten that it was not until metallic threads were used that the improvement in the power of dealing with vesico-vaginal fistula commenced, and that previously a successful operation was a rare and exceptional occurrence. This undoubted fact would of itself be a reason for preferring the metal threads, especially as they are quite as easily manipulated as those of softer material.

With regard to the precise mode of operating, the instruments to be used, the position of the patient, and the kind of suture to be employed, there is much diversity of opinion, and these are questions which we cannot venture even to touch upon in the limits of one short article. Such of our readers as wish to acquaint themselves with all that has been done, cannot do better than consult M. Deroubaix's volume.

A certain number of cases will always remain which are not even amenable to the improved methods of operation now in vogue, either from the situation of the fistula, the existence of extensive adhesions to surrounding parts, or other cause. The question as to the best mode of dealing with cases of this sort is scarcely considered by any of our British writers; under such circumstances Deroubaix strongly recommends the indirect method of cure, which consists in inducing perfect occlusion of the vaginal canal below the seat of the fistula. This will, of course, always be regarded as a last resource, not to be lightly undertaken, but it has this advantage, when successful, of again directing the urine into its proper channel, and, so far as the involuntary dribbling of urine is concerned, the cure is as complete as after the ordinary operation. There must, however, always be serious drawbacks to its adoption, from the fact that

by obliterating the vagina not only must the sexual relations be interfered with, but the menstrual flow is permanently diverted into the bladder, the blood escaping mixed with urine. One would have expected serious inconvenience from this, but Deroubaix assures us that all such fears are groundless, and that the results of his operations have always been such as to surpass his highest expectations with regard to it.

"There is neither passage of the urine through the Fallopian tubes, nor stagnation in the vaginal cul-de-sac, nor retention of the menses in the same diverticulum, nor any deleterious influence of the urine on the uterus, nor incontinence arising from traction on the urethra when the ostium vaginæ is occluded, all of which have been announced as the inevitable consequences of the operation. On the contrary, micturition again becomes voluntary, as in the normal condition; the urine is completely expelled from the new reservoir; there is no catarrh from its mucous lining, nor, unless there is a lithic diathesis, does any calculous formation take place in it; the menses, often deranged, or even suppressed before the operation, generally reappear and become regular; the general health, if impaired, becomes improved; and these changes, which one would expect to take place very slowly, on the contrary frequently show themselves with astonishing rapidity."

This is so satisfactory a result that it should induce surgeons to try the operation whenever the ordinary method seems inapplicable, since all must admit that the interference with the genital functions is a very minor evil compared with that we seek to remedy. There can be no doubt that the central portion of the vaginal canal is the part where we should seek to produce obliteration, provided the fistula is sufficiently high, since the vaginal walls in that position lie naturally in close contact, and are easily kept in apposition; whereas near the ostium vaginæ the presence of the urethra and the fourchette seriously interfere with the success of the operation.

In conclusion, we need only refer to a point in connection with vesico-vaginal fistula, which, as prevention is confessedly better than cure, is of extreme importance. It is now pretty generally admitted by all writers on midwifery that the true cause of this unhappy accident is, in the vast majority of cases, sloughing resulting from long-continued impaction of the head in the second stage of labour, and that instrumental delivery has no connection with it beyond this, that had instruments been sooner used no slough would have formed. In spite of the almost unanimous testimony of all who have studied the subject, as to the evils of protraction in the second stage, both as regards the mother and child, our teachers of midwifery go on, year after year, preaching the stale, and, so far as scientific midwifery

is concerned, the untrue aphorism that " meddlesome midwifery is bad," and subjecting women to hours of fruitless waiting, and all the risks of continuous pressure, rather than resort to the simple expedient of an early use of the forceps.   He must be a bungler indeed who can produce a vesico-vaginal fistula by means of the forceps; and we presume that there is scarcely a case on record where the formation of the fistula can be unquestionably traced to mechanical injury from this source.

We are happy to find that of late years this fact has been more or less recognised, but it is to be feared that even yet the " laissez aller" system of midwifery and the unreasonable dread of interference are too often answerable for the causation of what may most truthfully be described as a preventible accident.

IV.—Airs and Waters.[1]

It may be accepted as a fact in modern physic that the treatment of disease by drugs, as pursued by our forefathers, has, in

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[1] *Die Heilquellen und Kurorte der Schweiz, und einiger der Schweiz zunächst angrenzenden Gegenden der Nachbarstaaten. Zweite umgearbeitete und sehr vermehrte Ausgabe.* Von Dr. Meyer-Ahrens, Zurich, 1867.

Le Climat de Pau sous le Rapport Hygiénique et Médical. Par le Dr. Ed. Carrière. Paris, 1870.

The Principal Baths of Rhenish Germany. By Edwin Lee, M.D. Fifth Edition. London, 1870.

The Climate of the South of France as suited to Invalids; with notices of Mediterranean and other Winter Stations. By Charles Theodore Williams, M.D., &c. Second Edition, with an Appendix. London, 1870.

The Baths and Wells of Europe: their Action and Uses, with Hints on Change of Air and Diet Cures. By John Macpherson, M.D., &c. With a Map. London, 1869.

The Climate and Resources of Madeira, as regarding chiefly the necessities of Consumption and the welfare of Invalids. By Michael C. Grabham, M.D., &c. London, 1870.

Winter and Spring on the Shores of the Mediterranean; or, the Riviera, Mentone, Italy, Corsica, Sicily, Algeria, Spain, and Biarritz, as Winter Climates. By J. Henry Bennet, M.D., &c. Fourth Edition. London, 1870.

Notes of a Season at St. Moritz in the Upper Engadine, and of a Visit to the Baths of Tarasp. By J. Burney Yeo, M.B., &c. London, 1870.

The Roman Climate: its Influence on Health and Disease, serving as an Hygienical Guide. By G. Taussig, M.D. Rome, 1870. Pp. 130.

Eaux Minérales. Articles in the 'Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques,' 1870, tome xii. By Henri Buignet, E. Verjon, and A. Tardieu.

Des Eaux Minérales de Contrexéville, et de leur emploi dans le traitement de la Gravelle, de la Goutte, du Catarrhe vésical, &c. Par le Dr. A. E. Debout. Paris, 1870. Pp. 96.

a very considerable degree, given place to that by hygienic measures and dietetic regulations. Among the former change of air occupies the first rank, and is a measure that gains daily in popularity, and in almost equal degree in the growing opportunities afforded to people of all classes to avail themselves of it.

Nothing could exhibit more plainly the popular estimate of the benefits of change of air than the number of books yearly produced for the purpose of instructing the sick and their advisers in the choice of fitting places of resort, or of vaunting the virtues of some locality that has made good its claims, or at least hopes to do so, as a place of recovery remarkable for the climate, or for the healing springs it is blessed with, or, as often happens, for the combination of the two endowments.

Nor are the migratory propensity of the sick in search of health, and the production of numerous works on change of air and health-giving spas, phenomena at all peculiar to our own well-abused island and its climate ; on the contrary, the fashion of betaking themselves, for health sake, to some distant place of repute for its climate, or for its waters, is even more rife among the people of the continent than among ourselves; and if our own press be deemed prolific in books on watering-places and health resorts, it makes but a feeble approach in that respect to that of Germany and France ; and not only must it yield to the foreign press in respect to the number of works published, but still more in that of their magnitude. Of this fact the treatise that stands first in the list appended to this review may be cited as an example. English doctors generally would not, we venture to say, have imagined Switzerland to be so rich in health-giving spas as to have afforded Dr. Meyer-Ahrens occasion to produce the large octavo, closely printed volume of 812 pages referred to, on the mineral waters and health-resorts of that small country Could an English author be found to write a like exhaustive treatise on the watering-places of his native land, a publisher adventurous enough to incur the cost of its publication could not be hoped for.

It is, indeed, an astonishing thing to note in foreign book circulars the numbers and the size of the class of works in question annually issued from the press ; but sufficient evidence may be gathered from the preceding remarks of the popular conviction prevailing in continental Europe of the value of change of air, and of the resorting to mineral springs and baths, as means of cure.

The question of the invalid, where to go with the best chance of recovery or of prolonged life, can be sufficiently answered, in reference to the principal places of resort, by one or more of the

books whose titles are attached to this article. These treatises differ much in scope. Dr. Macpherson's, although not the largest, is the most comprehensive in range of subjects, giving a sketch of the best known baths and wells of Europe, including those of Great Britain, besides instructive chapters on bath-life, on change of air, on the internal and external use of water, and on the so-called diet-cures, represented by the grape- and the milk-cure. Under two heads, " bathing " and " wells," he collects what he has to say of the situation, the chemical composition, and the reputed uses of the mineral waters of Europe best known to fame. As a consequence of the very large number of places to be noticed within the compass allotted for the purpose, the remarks on a considerable proportion are very superficial, and supply little besides an index to the chemical characters of their mineral waters. Did the value of these health resorts reside solely, or well nigh so, in their waters, this amount of information might, in many instances, almost suffice ; but the fact of the case is, that the mineral waters are in numerous instances of minor importance to the invalid than the site and climate ; and, moreover, the tendency of modern inquiry has been to abstract largely from the supposed virtues of mineral water baths.

Dr. Theodore Williams's book, although primarily devoted to an examination of the climate of the South of France, has become, especially in its " second edition with an appendix," an exponent of the climatology of the far wider region of the whole seaboard of the Mediterranean, including Italy, Algeria, Spain, and Corsica, whilst it also describes the Alpine sanatoria of Switzerland.

The fourth edition of Dr. Henry Bennet's work on ' The Shores of the Mediterranean ' has likewise so expanded as to embrace the climatology, not only of the Riviera, but also of Italy at large, of Sicily and Corsica, of Biarritz, and Arcachon in France ; of Algiers, and Algeria, and, lastly, of Spain. But it will be satisfactory to the admirers of Mentone to know that, as the result of all his search for a better climate, no preferable place has been found. It does not seem that he travelled so far as the distant island of Madeira to examine its merits as a home for the invalid. Had he done so he would have encountered Dr. Grabham, who possibly might have secured a verdict from him in favour of that sea-girt locality. However this might have been, Madeira will not suffer in popularity from the want of an advocate, or of a book to make known its merits.

Among the other works under notice, that by Dr. Burney Yeo will probably attract many readers, inasmuch as its subject, the hygienic value of mountain climates, has more novelty and

interest just now. And if it might be wished the author's opportunities of observation had been more extended than those derivable from an autumn vacation, yet we have the conviction, from the information conveyed, that he made the best use of his time and carefully considered the matter he took in hand to examine.

The climate of Pau finds an admiring writer in Dr. Carrière, who has made a very satisfactory collection of facts relative to that town as a health resort.

Dr. Lee's little treatise on the baths of Rhenish Germany has been so welcomed by readers that it has reached a fifth edition, and may, therefore, claim exemption from the hands of the critic as a well-established favourite with the public.

Lastly, the climate of Rome, in relation to health, has found a very modest exponent in Dr. Taussig, a German physician, who has taken up his abode in that city. Many years ago Rome had the benefit of the recommendation of Sir James Clark as a resort for chest invalids and others; but of late years the prevailing feeling has been against its fitness as such, and Dr. Taussig, we consider, fails to establish a character for the city such as is likely to induce many patients to adopt it as a residence in lieu of the admittedly superior climates to be found on the Riviera and in other Mediterranean stations.

Something of the general scope of the principal works under notice may be gathered from the preceding remarks. In the following digest of the more important facts relative to airs and waters as curative agents we shall have to borrow from them all, and in so doing further pourtray their features.

If to prescribe change of air be, in some instances, a proceeding dictated by genuine recognition of its value as a remedial agent, it is certainly, in others, one determined by only some general impression that good results may follow it; or, more simply still, by a desire to be quit of a troublesome patient, or of one whose perverse chronicity is a standing argument against the efficacy of the medical treatment he has been submitted to. But although a change of air, and of surrounding circumstances can never be prejudicial to health if a proper locality be selected, it ought, nevertheless, not to be indiscriminately recommended, with no sufficient regard had to the mental, social, and business relations of the patient. Nor, again, should it be prescribed without definite and intelligent views regarding the character of the place and climate required by the circumstances of the malady under which the patient labours.

These certainly are but truisms, yet withal they are often enough overlooked.

In forming an estimate of the value of change of air, and of

that of the several health-resorts to invalids, there are many circumstances to be borne in mind.

In the first place, the mental as well as the physical constitution of individuals has to be consulted. It is of great moment to pleasurably excite the mind, to call forth emotions of satisfaction and delight. This holds good in all cases, although necessarily with much greater force when there is an over-wrought mind or mental despondency. If we accepted the descriptions of the advocates of the many health-resorts in the world, the conclusion would follow that well-nigh all of them are detached fragments of the original Paradise, replete with all that can make life enjoyable, and walled round from the incursions of death, except with regard to those improperly located individuals to which the enemy had rightful claim before their entrance into the Eden.

Dr. Bennet, whose picture of Mentone emulates in warmth of colouring that given of any other refuge for the invalid, is fain to admit that—

"The descriptions of the winter climate of Nice, Cannes, Hyères, and Italy in general, contained in most books of travel, works on climate, and guide-books, are mere poetical delusions. The perpetual spring, the eternal summer, the warm southern balmy atmosphere, described to the reader in such glowing terms, only exist in the imagination of the writers."

Indeed, the imagination is called in requisition to depict in bright colours the virtues and charms of every locality that lays claim to the character of a health-resort, and that can find a scribe to record them. Yet, although this is the case, it is still easy to discover, in most instances, from one guide-book or another, those special features of any one locality which are deemed its excellencies, and also to arrive at an opinion of its suitableness to any given case, both mentally and bodily. To these ends, the contrasts, or the comparative estimates, most of the writers on health-resorts set before their readers are a great aid. Dr. Bennet has wisely instituted such estimates in the case of most of the places mentioned in his work, referring to Mentone as his standard. Dr. Carrière has kept the same object in view, but, to show the merits of the climate of Pau, curiously contrasts it chiefly with that of Venice, that is, with one which possesses small claim to the consideration of invalids.

That the mind may be pleasurably affected it is necessary not only to supply beauty of scenery, with sunshine to enjoy it, but also those circumstances of life and surroundings to be found in agreeable society, in comfortable lodgings and enjoyable diet, and in means for securing mental diversion and exercise, and

these with sufficient variety as to place and character.   In respect
to these conditions there are great differences in the different
localities recommended to invalids.

It is a common thing to hear patients condemn a place as dull
from want of society, or of agreeable and varied walks, or of
resources for amusement ; or again, as deficient in its accommoda-
tion for invalids, or as unsatisfactory in its dietary.   Defects of
such and similar character necessarily fret the mind, which when
unhinged is still more the prey to petty annoyances.   It is an
objection to many hill-stations that they are isolated and
secluded, and, though surrounded by grand scenery, present
nature in her harder, more sombre, and wilder aspect, unrelieved
by the variety of outline and softer perspective, with the more
varied vegetation and colouring, met with at lower elevations.

Again, with regard to many watering-places, especially such
as are away from larger towns, a monotony of existence and a
tedium of routine are apt to prevail, rather irritating than
soothing to many nervous patients.   Indeed, the same draw-
backs are not unfelt by those patients even in towns where
various objects extraneous to the valetudinarian arrangements
bid for attention and mental diversion.   The organization of
German bathing-places is painfully methodical, and calculated
to engender a *tædium vitæ*, except, indeed, in the case of Germans
themselves, the best drilled race on the globe, who find their
pabulum vitæ in the regulations and routine imposed upon
them.

Having duly weighed the requirements of a patient in
relation to his mental and emotional condition, and attended to
them in our recommendation of a health-resort, we certainly
have done much towards rendering the change of air sought for
beneficial.   Both Dr. Bennet and Dr. Williams picture the state
of happiness in which the voluntary exile from British fogs,
leaden sky, and changeful atmosphere, finds himself on the
shore of the Mediterranean, spending the greater part of the day
in the open air, scarcely knowing what confinement within doors
means, enjoying the full influence of the genial air—

"In a region in which earth, sea, sky, present to his observation
phenomena so varied in form, so brilliant in colour, and so wondrous
in beauty, that an inexhaustible feast unfolds itself to his astonished
gaze, in the enjoyment of which the attention is withdrawn from the
contemplation, and oft'times the exaggeration, of his own symptoms,
and directed to higher and nobler objects."

It is well when such an Elysium can be secured for our
patients.   In many instances it cannot be, and happily daily
experience teaches us that, in numerous cases of disease, mere
change of abode, unaided by the variety accruing from distance

from home, is sufficient in itself to effect improvement. It is, moreover, equally a matter of experience that change of locality, even when it might be considered a change for the worse in respect of hygienic conditions, as from an open and healthy country house to one in a town, is often attended with benefit. In such cases the good derived must be attributed to mental and moral influences chiefly, to altered surroundings, to change of society, and other readily supposable circumstances of kindred influence.

Those patients are certainly more enviably placed who can obtain something more than the limited exchange of abode just alluded to. The remarkable effects of even short sea voyages on the physical and mental constitution of invalids need no enforcement or illustration; nor, indeed, do those derivable from a transfer of residence from one part of a country (even within our own small island, where climate change is comparatively small) to another, and particularly when from an inland place to the sea-side. The vast benefits derivable from such removals are universally recognised and sought for; among the wealthy by sea-side residences and country houses, and among the poor by convalescent institutions in the open country and at the sea-side.

In most cases additional advantages follow on foreign travel. Differences in the character of scenery and in that of the inhabitants, the excitement consequent on enforced changes in habits and diet, and the daily novelties encountered by the sojourner in a foreign country, are influences—some or all of them—operating for good in most instances, and rendering foreign travel a more potent hygienic remedy than home-travelling. At the same time it is to be observed that a large proportion of the influences brought to bear by it upon invalids are of the nature of mental impressions, and it must be admitted that now and then, in certain states of mind and in some dispositions, the circumstances of a residence abroad are not salutary, but irritating, and ever and anon a true John Bull gladly escapes to his native shores from the homes and society of the ill-appreciated foreigner.

Climatology is much more than meteorology. Our preceding remarks on change of air show how many conditions operate on the human organism over and above those noted by the meteorologist, and ample evidence is adducible that like benefits follow, in the self-same morbid conditions, on the transfer of invalids to stations differing widely in atmospheric conditions, in temperature and in altitude.

Writers on particular health-resorts do, as a rule, lose sight of these lessons of experience. They busy themselves in demon-

strating the mildness of the atmosphere, the much bepraised mean temperature, the absence of variations of temperature, of humidity, and of frost, and always arrive at the welcome conclusion that the place favoured by their advocacy presents the climate the best suited for invalids. In our opinion Dr. H. Bennet errs in assigning too much importance to temperature only. That cold and frost are not the dread foes even to chest-invalids—the class of sufferers kept prominently in view throughout his work—is sufficiently shown by our knowledge of the diseases prevalent in Canada, and by the reports on mountain stations, such as those of the Engadine in Switzerland. Moreover, the proposition might be reversed, and the experience of Australia be cited to show that a warm climate is no safeguard against pulmonary consumption.

The valueless character of observations on mean temperatures, considered as a guide to the selection of a fitting climate, is insisted upon both by Dr. Bennet and Dr. Grabham, but more fully by the latter. Dr. Bennet quotes the fact of the similarity obtaining in the annual medium temperature between Marseilles and Mentone, and then points to the actual wide divergence of the two places considered as residences for invalids; and Dr. Grabham instructs the reader that mean temperatures " are merely averages founded upon columns and pages of individual observations," wherein the extremes and variabilities of temperature are concealed, the excess of summer heat being made to compensate for deficient winter warmth.

Variations in temperature are dealt with by most writers on climates as absolutely and always nocuous to the sick. Stations on the highest elevations are most exposed to them, both as regards frequency and intensity. Very sudden and great diurnal variations of temperature are, says Dr. Yeo, among the chief characteristics of the climate of the Upper Engadine; yet, if the experience of the advocates of mountain resorts is to be credited, these offer no bar to the residence of patients suffering from most of the ills flesh is heir to, not excluding pulmonary affections and consumption. Judging from the example, and the history of mountain stations generally, and from facts to be gathered from a host of observers on the effects of changes in temperature on the human frame, the conclusion forces itself upon us that such variations have too great an importance assigned to them by most writers on health-resorts. There are conditions qualifying the effects of these variations. Dr. Grabham judiciously observes—

" That the effect of a change of temperature has no distinct relation to the particular height at which the mercury happens to stand when the fall takes place. The sensation of a fall in temperature is

merely subjective, bearing reference mainly to the amount and suddenness of the change, and also to the length of time at which an undisturbed temperature has been previously maintained. In this climate (Madeira), perhaps of all others, the force of the last-mentioned circumstance is to be noticed. I have frequently observed that when a depression of only 4° or 5° occurs after many days of constant temperature, the cold is felt, by persons long accustomed to this equable climate, as greatly as a change of much more considerable magnitude in the ever-varying climate of England" (pp. 76, 77).

Another circumstance that greatly affects the endurance of variations of temperature is the proportion of moisture in the atmosphere. In a dry, still atmosphere those changes will exercise less effect; and it is possibly due to the dryness of the mountain air, and its invigorating, stimulating character, that the observed rapid and considerable variations of temperature of mountain sanitaria are unattended by so few ill consequences as we are led to believe.

The humidity of the air and the amount of rainfall are other meteorological conditions to which writers on health-resorts always attach much importance. A humid atmosphere is a general bugbear, and a discreet advocate of a watering-place is commonly much concerned in demonstrating the absolute or the comparative dryness of the favoured spot. Of this matter, again, there is too much made; a moderately moist air is not absolutely inimical to disease at large. There are, indeed, morbid conditions wherein such air is beneficial; and, in general, the importance of the humidity of the air as a hygienic agent must be considered in connection with the temperature of a locality, with the still or disturbed state of the atmosphere, and with the special character of the disease exposed to its influence.

The amount of rain-fall has necessarily no direct relation to the quantity of moisture diffused in the air, for the amount so diffused will much depend on the physical conformation of the surface of the country, on the nature of the soil both at and under the surface, and on the extent to which the locality is covered by woods. At Pau there is a very considerable rainfall, but, nevertheless, a remarkably dry, still atmosphere. On this feature of the place Dr. C. T. Williams has the following observations:

"When we consider the large amount of rain that falls at Pau, and the prevalence of moist westerly breezes, it is rather surprising that the hygrometer should not indicate a greater amount of humidity during the winter, and the phenomenon can only be accounted for by the absorbent nature of the gravelly soil on which the town stands, and the natural drainage of the place by the Gave Stream" (p. 72).

The influence of the physical conformation of a locality on the rainfall is a well-recognised fact, and one illustrated by Dr. Bennet in his account of Mentone. The situation of this favoured town is on the sea-shore, at the base of a mountain chain, which not only protects it from the cold northerly winds, but also from the precipitation of rain that both its sea-side and its geographical position would expose it to. Dr. Bennet writes :

" It very often rains on the mountains, or a few miles out at sea, when it is quite clear and fine on and near the sea-shore. In the former case the wind is generally a southern wind, and, as it ascends the mountain, it evidently meets with colder strata of air, which precipitate its moisture, forming rain-clouds " (p. 67).

Of the whole subject of change of air as a means of restoring health, we may in conclusion remark that, the conditions of heat and of cold, of moisture and of dryness of atmosphere, of mountain elevation and of sea-level, although severally important elements in the constitution of a climate and in their influence on the human organization, cannot singly have attached to them that amount of importance usually accorded. There are subordinate conditions which either concur with them in producing the benefits assigned to them, or which, on the contrary, negative their good results.

This general conclusion is supported by the fact of the variety of places that lay claim to hygienic adaptation for the relief or recovery of the same diseases, and yet that differ materially among themselves in meteorological conditions.

The contention among health-resorts for public favour resembles that of rival tradesmen intent on securing customers, by vaunting the special excellence of their commodities, and by obtaining flattering testimonials in support of their assertions; and that locality may be accounted happy which has secured the goodwill of the fashionable physicians of the day.

The residents of English winter-resorts profess to find in their several localities all the conditions necessary for arresting and healing disease and for prolonging life, and consequently see no reason for invalids incurring toil and cost to transport themselves to some distant place, away from their friends and native land. One consultant, again, advises consumptives to seek the rarer air of mountain heights, whilst another despatches his patients on a sea voyage, or locates them at the sea-side, or imprisons them in a compressed air bath; each one appealing to his experience in favour of the course recommended, and giving philosophical, chemical, and special hygienical explanations of the why and wherefore his plan must be the best.

Dr. Bennet finds no place like Mentone, but Dr. Grabham

cannot admire a place so far north, where frost and cold will intrude, and an English winter *in petto* counteract the good got by the better weather it has interrupted, and which has rendered the invalid more liable to suffer from the reverse. Madeira certainly establishes the highest position for an equable, mild winter climate, and that it has of late years been comparatively deserted is attributed by Dr. Grabham chiefly to the influence of fashion, the current of which has set in towards the highly eulogised Mediterranean stations. Another evident reason for the neglect of Madeira is its distant and isolated position, and the more limited opportunities a residence there affords the invalid to change his quarters.

Dr. Carrière makes out a good case for Pau as a health-resort, urging the advantages presented by its dry and remarkably still atmosphere, and the magnificent panorama of the neighbouring country, and quotes many authorities to show the value of its climate in disease. Dr. Taussig holds Rome to be a superior station for invalids, an opinion not very widely shared ; and so, in short, every writer who takes in hand the medical history of a health-resort lends himself to eulogise it, to picture it in roseate hues, and to keep in the back ground or to explain away all objections to it.

To the benefits derivable from change of air there is a host of places which offer in addition those to be obtained from drinking and from bathing in the waters springing naturally out of the earth, or obtained by boring, and which differ more or less widely from pure water by the intermixture of various alkalies, alkaline earths, and metals.

From the remotest historical period some of these bathing-places have been celebrated, and the experience of ages has lent its weight in confirmation of the remedial value of mineral waters, when drunk and when bathed in, in most of the chronic diseases of the human race. Indeed, if we believed in their entirety the statements of the merits of the several springs, as vouched for by their advocates, there need be few sufferers from chronic disease, save those debarred by poverty from resorting to the healing waters.

Nature has been lavish in the distribution of mineral waters in most countries of the earth. In our own little island there are examples of the principal varieties of such waters, and those of undoubted efficacy. In other parts of Europe more potent springs are here and there met with, but in several instances are not very available for use. In proportion to its size the small duchy of Nassau is pre-eminent for the abundance of its mineral waters ; and, judging from the lists attached to the several recognised kinds of waters in the classification adopted

by Meyer-Ahrens, Switzerland must stand next in order. France also is very rich in mineral springs, as many as 1200 being enumerated.

The valuation of the beneficial results of the use of mineral waters is, from the greater complexity of agents in operation, more difficult than that of change of air alone. The diligent bather and drinker at the watering-place is prone to attribute all the good derived to the waters. This, doubtless, is a more common error than that of regarding the waters as impotent, and the change of air as the efficient factor in the recovery ; and, in the face of so much and so prolonged experience as we possess, it is impossible to deny the value of mineral waters, both when drunk and when bathed in ; although, indeed, from consideration of the chemical constitution of the majority, an *à priori* argument against their supposed efficacy might be indulged in, so inconsiderable in quantity and sometimes so comparatively inert in character are their constituents. Indeed, this argument has been largely employed and particularly so in reference to bathing, experiment being also adduced to prove the almost impossibility of absorption of dissolved and of diffused mineral matters through the skin. And leaving the vantage-ground of vast experience, the upholders of the virtues of mineral waters have ventured on some very dubious expositions of their mode of action. They act, they say, by their chemical composition and by their mode of application, and in the case of thermal waters their natural heat must be duly allowed for ; but as this account of their action can avail little to any sceptic, they call into requisition a theory of some special electrical action, connected with a particular molecular disposition of the ingredients of the waters, or they quote the fact of the chemical compounds being in a nascent state " in the very act of being compounded," whereby their absorption and utilization by the animal economy are facilitated ; or, lastly, they insist on a vital relation subsisting between the mineral contents of the waters and the chemical constituents of the body, by reason of the former having originally been derived from the vegetable kingdom (?), and elaborated by nature in the recesses of the earth.

But, laying aside such more or less fanciful explanations of the fact, it remains, as certain as human experience can make it, that nature presents us in her mineral springs compounds of remarkable chemical complexity, which exercise an influence upon the human frame superior to that obtainable from any similar artificial combinations, and also to what can be assigned to the doses of the several ingredients contained in them.

In the external application of water to the skin it is held that its mineral contents, when present, act only by simple contact,

provoking increased cutaneous activity. In reply to this opinion it is asked how the apparent salutary influence of mineral baths in neuralgia, and in some skin affections where cutaneous activity alone would appear detrimental, can be explained. This reply is very feeble, and could not stand the test of examination ; but there is some argument in favour of the belief that mineral waters exercise effects over and above those attributable to mere contact, deducible from the acknowledged fact that the skin can absorb gases, and in the instance of many mineral springs there are free gases and also vapours holding mineral matter in solution or suspension.

Dr. Macpherson, in his work (' Baths and Wells of Europe ') quotes the results arrived at by Clemens, viz.—

" 1. That a few gaseous substances, such as hydrosulphuric acid, readily penetrate the skin. 2. Other substances penetrate slowly, but they take so much time that their doing so can really be of little importance in balneology, such as iodine and water. 3. Others can only penetrate the epidermis, and work solely by their stimulant effect on the surface nerves, such as common salt, chloride of lime, salts of lithia, corrosive sublimate, salts of lead. 4. Some substances only penetrate the epidermis in the most minute quantities, such as sulphate of iron, iodide of potash, sulphate of soda" (pp. 102, 103).

Aronssohn, the author of a treatise on the mineral springs of Nassau, has arranged, under four heads, the direct or immediate effects of mineral waters, to wit—

" 1. *Dynamic action*.—A. Stimulant—*a*, to the cutaneous surface by their thermal state, and by their alkaline salts and the hydrosulphuric acid gas they contain ; *b*, to the nervous system in general, and the cerebro-spinal axis in particular, by heat, carbonic gas, and the shock (impulsion) of douches ; *c*, on the heart, by heat and iron ; *d*, on the stomach, by the sodic and ferruginous carbonates ; *e*, on the kidneys, by the soda and lime salts ; *f*, on the uterus, by iron and the impulsion of ascending douches. B. Sedative—to the nervous system and the cutaneous organ when charged with saline matters, and containing an azotised substance.

" 2. *Alterative action*, modifying the composition of the liquids, either by diluting their ingredients held in solution, or by augmenting some of them, or, again, by introducing some fresh one. Hence— A. A diluent action on the blood, bile, or urine, by the introduction of water into the circulation. B. Restorative to the blood by iron. C. Specific—*a*, on the glandular system by iodine, bromine, and alkaline chlorides ; *b*, on the cutaneous surface by sulphuretted hydrogen and arsenious acid.

" 3. *Eliminant action*, by expelling noxious principles from the humours through the natural emunctories—*a*, the skin, by heat and

water; *b*, the intestines, by sulphate of magnesia and soda chloride; *c*, the kidneys, by water and soda and lime chlorides.

"4. *Revulsive action*, by energetic action on an organ remote from the seat of disease, as, for example, on the intestines in affections of the brain and liver."

There is much merit in this analysis of the modes of action of mineral waters, and it might be proposed. as a basis for a mixed physiological and therapeutical classification, but experience teaches that, as Dr. Macpherson observes (op. cit., p. 95), the results produced by the use of such waters will not justify the attempt to classify them " according to the diseases they cure, or their general effects on the system. Besides, it is found that the same source cures the most different diseases, and that similar diseases are often cured by very different waters." Moreover, the action of the waters is modified by the mode of their administration and by the temperature at which they are taken.

Failing a therapeutical classification, balneologists have to content themselves with a chemical one. But, as a matter of course, several modes of chemical classification have been proposed. The late Dr. Pereira put forward one of much completeness, and various French and German writers have contrived others of various degrees of complexity and merit, yet all open to many objections, for, as Dr. Macpherson remarks, " the extremely complicated composition of many springs stands in the way of satisfactory classification."

This excellent authority adduces two systems of classification proposed—the one of French, the other of German invention; but he contents himself with a division of mineral waters founded on their predominating chemical constituents, with little reference to their less important ones. His first consideration is, whether the waters are used for drinking or for bathing. Waters for bathing are treated of under the several following heads:— Indifferent and earthy; sulphur and salt baths. Waters for drinking are examined in the following order:—Indifferent and earthy wells; sulphur wells; salt springs; alkaline, purgative, and iron waters. Supplementary chapters are added on artificial baths and inhalations, and on the presence of minute quantities of salts and of carbonic acid in springs, and on artificial waters.

H. Buignet and Verjon (op. cit., p. 236 and p. 256) adopt the following simple division:—Acidulated gaseous waters; alkaline, saline, sulphurous, and ferruginous waters.

The determination, by the aid of some such classification of the sort of spring promising benefit to the invalid in search of health, is a comparatively easy process to that of selecting the special bathing-place to be his temporary residence. There is

veritably in this matter a true " embarras de richesses," from the multitude of places possessing similar waters, each place vaunting its superior merits in the activity and in the wondrous admixture of its waters, its Elysian position and surroundings, its resources for amusement, its fashionable votaries, its miraculous cures, and every other conceivable circumstance calculated to attract visitors. But the embarrassment does not end here. The doctor who wishes to retain the good opinion of his patient must know also what are the fashionable resorts of the day, and not these only, but also the fashionable fancies respecting them. Indeed, we believe there is far too much of fashion and of a wish to recommend some station having the charm of novelty, in the selection of places, both for change of air and for the employment of mineral waters, and too little rational and genuine advice ; and we are pleased to have our opinion strengthened by that of Dr. Macpherson, who thus expresses himself :

" There is an absurd amount of fashion which often determines the popularity or otherwise of a new place—much petty refinement about shades of climate. A new station is spoken of like a new medicine. Unnaturally sharp lines of demarcation are drawn between the various forms of lung disease and between the different climates suited to each" (p. 43).

The influence of fashion is exhibited in the history of the spas, both of this country and of the Continent. Some of great fame in past generations are now neglected and well-nigh forgotten ; others, more recently famous, are in a state of decadence, supplanted in popularity by new claimants for it. Examples will occur to every reader ; and another fact likewise will assert itself, namely, the amount of control over fashion itself exercised by popular medical men, who become the eulogists of this or that health-resort. Indeed, not a few such places have been called into existence by the persevering energies of medical men in forcing them upon public attention.

The exercise of personal influence is legitimate enough within certain bounds, and the influence of fashion is at all times inevitable ; but the extent to which such influences operate affords evidence of the absence of a rational and legitimate investigation into the actual and the relative merits of the several spas in existence ; whence it happens, also, that the knowledge possessed by the profession of the therapeutical value of the best known mineral waters and of the indications for their use is insufficient to bring their employment within the region of rational medicine.

Health-resorts, as we commenced the article by stating, have a literature of large proportions of a legitimate character ; they have also one of an ambiguous character, prolific in puffs, in

advertising pamphlets, and in the paraphernalia generally of quackery. It seems, indeed, a difficult task for the professional and professedly philosophical describer of any particular watering-place to confine himself to the simple narration of facts. The invigorating air and health-restoring waters act as stimulants on the brain, and the cerebral tension discharges itself by the imagination; and in general the professed medical exposition of the characteristics of the climate and waters resolves itself into an undiscriminating eulogy on the locality, profitless to the serious inquirer into its real merits.

There is likewise a loose, unphilosophical way of referring to diseases to be cured by the waters of each spa. A whole series of maladies are strung together, and it is made to appear that the same routine of eating, taking exercise, drinking the waters, and bathing in them, is equally beneficial in one and all of them. A process is prescribed which is to be gone through with, like the requisite details of a charm. The mineral spring is a Fetish, to be worshipped according to set rules in well-nigh whatever malady torments the devotee. Disease is a something duly ticketed with a name, and so treated as an unvarying entity; complications, constitutional peculiarities, and diathesis counting for little or nothing, until, by their rebellion to the routinism, they disappoint the hopes of the patient, and drive the water-doctor to rash expedients or to equally rash explanations of failure.

Another defect in the literature of health-resorts is, that the majority of works on such places are written as much, if not more, for the public than for the profession. This being so, the endeavour is to make them pleasing and attractive; and hence the calm, philosophic investigation of their climatology and of the maladies for which their air and waters appear salutary is sacrificed to a superficial and flattering account of their many virtues and natural beauties. Moreover, as by this state of things the public verdict is sought in the selection of a health-resort, it is not surprising that medical opinion is often not asked, or, if asked, slighted; or that medical men often pursue a *laissez-faire* policy with many of their patients intent on trying some fashionable or well-advertised wonder-working spa.

Apart from these prevalent faults in the descriptions of watering-places, and the consequent impediments to ascertaining the precise operation and value of their waters in various diseases, a medical man, as before remarked, is embarrassed by the number of resorts possessing, in respect to their general chemical composition, similar waters. He has, indeed, accomplished a considerable task when he has acquainted himself with the geographical position and the general chemical constitution of the leading

spas of Europe. Those who have not attained this knowledge
will find great assistance from Dr. Macpherson's work on ' The
Baths and Wells of Europe.' That author has brought together
in a very small compass a notice of the principal spas of this
country and of the Continent, and by means of an index of the
towns mentioned the reader can refer to it as to a dictionary for
an account of the leading characters of the springs. In the case
of several of the more renowned spas he gives a succinct
history, not only of their chemical characters, but also of their
mode of administration and uses. Dr. Edwin Lee has more fully
detailed these particulars with respect to the ' Baths of Rhenish
Germany,' and has given sundry other information of general
interest touching their climate, local features, and accommoda-
tion for visitors. The source of most of Dr. Lee's information
is from local historians, and consequently allowance must be made
for a prevailing *couleur de rose.*

The article on the therapeutics of mineral waters in the
' Nouveau Dictionnaire de Médecine et de Chirurgie,' by Dr.
Verjon, is very brief considering the largeness of the subject,
and chiefly concerned with the mineral sources of France. The
general remarks on the applications of the several classes of
mineral waters are good ; and an appended table of the chronic
diseases for which such waters are recommended, and of the
principal stations appropriate to those diseases, is very useful by
the manner in which it at once brings under the eye that most
important amount of information.

The brochure on the mineral waters of Contrexéville, a
village in the Vosges, made famous by the battle fought around
it during the recent terrible conflict between France and Prussia,
is written by the local medical inspector, and, as a matter of
course, partakes of the character attaching to the literary pro-
ductions of local doctors, who consider themselves as holding a
retainer for the advocacy of a place and an interest. The
principal source belongs to the alkaline group of mineral waters,
rich in soda and lime salts. A recent analyst has also discovered
lithia in extremely minute proportion. Marvels are recounted
of their operation in the cure of gravel, stone, and vesical
catarrh.

Nothing like an analytical critique can be made of Dr.
Meyer-Ahren's bulky ' Treatise on the Mineral Springs and
Health-Resorts of Switzerland,' without a proportionate amount
of space. The treatise exhibits what may be done by a patient,
plodding writer who desires to make his work an exhaustive
one. The book is a complete mine of information, and enter-
prising book-makers may freely borrow from it without fear of
detection. . The whole, true, full, and particular account of each

place that pretends to be of hygienic value is given, and, in several instances, an effective pictorial illustration is added. We are gratified to bear witness to the completeness of the treatise and to the amount of learning and of patient inquiry it contains, and also to find that it has been so appreciated by his countrymen and others as to have reached a second edition, a circumstance which, if it occurred in England in connexion with a similar publication, would rank among the marvels of literature.

There is much useful and fairly precise information conveyed in Dr. Williams's small treatise, which is likewise less occupied with extraneous matter than the work of Dr. Bennet, and, unlike this, intended rather for the library of the medical man than for the drawing-room. Dr. Williams also has briefly dealt with the special subject of Dr. Yeo's book, viz. that of the worth of mountain stations for invalids, a question that merits further inquiry and separate discussion.

V.—Lee's Surgical Pathology.[1]

In the literature of the medical profession it would be difficult to overlook or under-estimate the value of the numerous contributions made by the author of these lectures to the pathology of the various blood-poisons and of the lower bowel.

The views embodied in these contributions have been put forward at various times in a more or less detached form, so as to make them familiar to every member of the profession who has the slightest pretension to rise to the level of his professional brethren. To those who have not up to the present time attained to that decent altitude, the work before us offers an opportunity which should not be neglected to repair that deficiency.

In two considerable volumes, printed in a type considerate in its conspicuousness, each volume preceded by a table of contents which is full enough to be short notes of the subject-matter, suggestive enough to give a hasty, hurried, or superficial reader a fair sketch of the ideas of the author without the trouble of reading through the book, we have a résumé of Mr. Lee's well-known opinions upon those points of surgical pathology which he has made peculiarly his own.

The first volume (containing nineteen lectures) deals with the important subjects of Purulent Infection, Phlebitis, Varicose Veins, Embolism; the common diseases of the Rectum, such as

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[1] *Lectures on some Subjects connected with Practical Pathology and Surgery.* By HENRY LEE, F R.C.S., Surgeon to St. George's Hospital, Hon. Fell. King's College, London.

Piles, Fistula, Stricture, Spasm of Sphincter, and malignant disease, together with the operations, including those for the relief of lacerations and congenital malformations. Abscess of Bone and Excision of Joints form the subjects of the two last lectures.

The second volume is devoted entirely to the great subject of Mr. Lee's persevering observations and most valuable contributions, viz. Syphilis and other Venereal diseases, with a concluding lecture on Albuminuria after surgical operations.

In the first lecture, on *Purulent infection*, the author combats Cruveilhier's theory of primary and secondary *phlebitis*, and refers to his own observations, that the lining membranes of veins do not become inflamed so readily as other serous membranes. He supports the theory maintained by Virchow, that the morbid phenomena start with changes in the centre rather than at the periphery of the coagulum which first blocks up the veins. The author throughout is careful to speak of these changes as resulting in the formation of *purulent-looking* deposits, whence we infer that he is not prepared to maintain that they contain real purulent matter or pus-cells ; but, on the other hand, he states that the cells which *resemble* pus-cells are the cellular constituents of the fibrin of the blood-clot, such as white blood-corpuscles, shrivelled red corpuscles, and molecular débris, such as may be found in a piece of dead fibrin removed from the body, and subjected for a while to a temperature of 100°, as shown by Professor Gulliver. He states that, though the internal coat of veins is not very subject to ordinary inflammation, yet that it may be affected by a perverted nutrition *allied to* a state of inflammation, and so may lead to a coagulation of the blood within, in the way described by Professor Lister.

It is, perhaps, difficult for the reader to judge precisely from this statement what the definite opinion of the author may be upon this last important point, to which his researches, published in the 'Medico-Chirurgical Transactions' for 1852, vol. xxv, were especially directed to. In the work before us he certainly states explicitly (p. 18) that real phlebitis undoubtedly occurs, sometimes as a consequence of injury or external irritation, as in piles, and so becomes the cause of the formation of a clot, and sometimes as a consequence of some irritating matters introduced into the blood. Such matters, he believes, may, in the first place, either cause its coagulation, or, in the second, produce its decomposition (p. 24). In all cases in which layers of fibrin are formed upon the walls of the vein he considers them to be derived from the blood contained within its cavity, and not from that circulating in its walls. Upon this point, however, it can hardly be said that the proof lies in the record before us ; and it is more than probable that in the veins, as in

the arteries, the substance that seals up the tube permanently is derived from both sources.

The interesting experiments of M. Gaspard cited in this lecture, as well as the experiment performed for the author himself, prove clearly that the injection of putrid matter into the living blood-vessels sets up inflammation of the whole alimentary and respiratory mucous membrane, and explain the occurrence of diarrhœa and pneumonia in cases of septic blood-poisoning. This is, no doubt, evidence of an attempt at excreting the poison through these channels.

The occurrence of limited and circumscribed patches of gangrene in some of these cases is attributed to the blocking up of the smaller radicles of the arteries supplying the part, by embolism. In the section on the *treatment* of phlebitis the author gives an interesting case in which a festering sore on the index finger was followed by spreading phlebitis along the vein, which the author describes, somewhat regardless of the ordinary anatomical nomenclature, as the *basilic* vein in the *forearm.* Under this vein (which we suppose to have been that which is described in the standard works of anatomy as the *radial* vein, since it is that which leads from the index finger) two needles were placed, and the vessel was divided between them. The result was a stoppage of the inflammation at the point operated on, and the formation of two abscesses, one on the so-called *basilic* vein in the forearm, but whether these occurred at the place operated on or no (a point of some importance) is not mentioned. In a second case, of bursting of a varicose saphena vein in the thigh, succeeded by spreading phlebitis, a similar course was pursued, also resulting in the formation of two abscesses, one of which was placed *above* the point operated on. In the same case a previous operation to arrest the bleeding by acupressure resulted in the puncture of the vein itself by one of the needles. A similar mishap occurred in the case next recorded (p. 65), in which the operation by two needles, with intervening section of the vein, was done for varicose saphena; this was followed by rigors and phlebitis, which were treated by a more successful application of a single needle higher up the thigh, without subcutaneous division. A fourth case of phlebitis of the *basilic* (?) in the forearm, this time on the *inner side,* was equally successfully treated by a simple pad placed upon the vessel immediately above the inflamed part.

The deduction drawn by the author from these cases is scarcely made evident to the reader by the description given, viz. that a preference should be accorded in such cases to the operation of double acupressure, with division of the vein between. It very commonly happens, indeed, that the progress of

phlebitis is arrested without any such operative interference whatever. The occurrence in the two first cases of an abscess *above* the point of subcutaneous section ; the passage of the morbid action beyond the part divided, with subsequent rigor and exacerbation of the symptoms in the third case; together with a more successful result without any such unpleasant symptoms, and equally without any such operation, in the fourth case ; all combine to suggest an opposite conclusion to that expressed by the author in the interest of his favorite method of procedure.

The remarks of the author upon the intimate etiological connection between phlebitis, inflamed lymphatics, erysipelas, pyæmia, and putrid infection, and on the occurrence of pyæmia from exposure to erysipelatous inflammation, are of the sound and practical character which one expects from the extensive experience which he has had in such matters ; but we must protest against such a definition of an irritable wound as a *teazed* state of it in its ineffective efforts at repair (p. 68). Such mental attributes given to mere organic processes smack strongly of the radical vice of systems of nomenclature now happily antiquated.

The succeeding chapters on *varicose veins* are devoted chiefly to the author's operation of double acupressure with subcutaneous division of the vein between, an operation which we believe to be excellently applied in certain cases, but not the best for all cases. In the anatomical preamble we are again startled by a novel assertion, once more contradictory to the anatomy which we picked up at school, viz., that the deeper veins of the limbs possess *stronger coats* than the superficial ones (p. 74).

In the nineteen cases of varicose saphena veins treated by the author upon this method, given in Lecture V, the results were very satisfactory ; the duration of treatment to time of discharge being from eight days to thirty-one days, the most of them averaging under twenty-one days. But the author has found, as is not uncommon in the experience of surgeons by other methods, that sometimes the current of blood has been reestablished, and the varicose condition kept up by the enlargement of another vein (perhaps a double saphena) connecting the original channels above and below the point of section. The occurrence suggests the possibility, which is very obvious indeed, that between the points of acupressure a collateral branch may open into the vein operated on, and subject the patient not only to the danger of hæmorrhage (which may thus occur without the vein being transfixed by the pin, which is the usual explanation), but also to that of purulent absorption from the abscess, which not uncommonly forms at the point of section. The

remark made by the author in the next chapter (Lecture VI, on *Varicocele*) shows that this has sometimes occurred in his own practice (though he states *generally* in insignificant quantity), after section of the spermatic veins. In some instances the bleeding has occurred through section of a vein which had not been secured by the pin. In three cases he states that he has had arterial bleeding, checked by the application of another needle placed above the first. In this operation he uses elastic bands placed over the pins, instead of silk; but we fail to perceive the advantages of an elastic action over the unyielding, yet soft, pressure of the thick silk usually employed, where the object is to prevent absolutely the passage of fluids through the vein. Any yielding to the œdematous effusion and swelling by the elastic bands under the heat of the part would also imply a yielding to the forces of the circulation within the trunk of the vein itself, either outwards or inwards. In the eight cases of operation for *varicocele* given in the book, the duration of treatment varied from seven, eight, and nine days to thirty days; one being twelve days; another seventeen days; and a third twenty-seven days. One, examined a year afterwards, was found in a satisfactory condition. These results must be considered, so far as they go, as very encouraging.

In Lecture VII the author quotes from the late Mr. Travers' work an account of an operation performed by him very similar to that of the author, viz. a ligature placed upon the vein above and below, and section of the vessel between them. As this was done, however, before the days when subcutaneous surgery and acupressure had established their important advantages, we presume that the ligatures employed by Mr. Travers were silk or hempen ones, and, like the section of the vein itself, not applied subcutaneously. As too commonly occurred to the older surgeons in this manner of proceeding, the patient died from inflammation of the vein and consecutive abscesses: a discouraging result, which the author exemplifies further from the practice of the late Mr. Hodgson, Mr. Freer, of Birmingham, and Mr. Oldknow, of Nottingham. In the last quoted case we have still less reason for surprise at the untoward ending, when we find it carefully recorded (in the fifth volume of the 'Edinburgh Medical and Surgical Journal') that the treatment throughout was *strictly antiphlogistic* with *repeated bleedings*. The well-known case of Sir Benjamin Brodie, of death in four days, with very severe typhoid symptoms, after simple subcutaneous section of the saphena, followed by pressure with a pad and bandage, is also quoted by the author " in terrorem " of following the dark groping example of our ancestors in the matter of vein surgery. The veneration which would " stare

supra antiquas vias " in this respect must be, in these days, very
largely developed indeed, and we re-echo the author's exclama-
tion that it appears strange that no method should have
occurred to the greatest surgical intellects of that day to close
the great vein before and after such an operation.

In Lecture VIII, " *On the Repair of Arteries and Veins after
Injury,*" the author has had the advantage of the able histo-
logical assistance of Dr. Lionel Beale, whose well-known views
of the formation of fibrin from white corpuscles, or from the
substance composing them, which this distinguished observer
has named in his most recent works—*bioplasm,*[1] are embodied in
the description given of the changes which ensue in the colour-
less lymph which seals up the end of a divided vessel.   Ac-
cording to the description before us, both the author and Dr.
Beale consider this colourless lymph to be derived directly from
the plasma of the blood, coagulated within the tube of the cut
vessel, and not to be the result of exudation from the *vasa
vasorum.*   Nor are the numerous small masses of *bioplasm* found
in it the result of proliferation of the *connective-tissue-corpuscles*
of the arterial coats, because these are not found so much in-
creased in numbers, nor so much enlarged in the immediate
neighbourhood of the injury as they would be if undergoing the
rapid proliferation necessary for so large an increase.   But they
are clearly formed in connection with the plasma of the blood,
the corpuscles of which they resemble closely, while the con-
tinuity of the colourless plasma with the red blood clot is
unbroken and distinct.   The author considers that it is, more-
over, deposited from the crassamentum in the same way as the
fibrin which lines the interior of an aneurismal sac, and its
development completed by the agency of the white corpuscles
(bioplasts) therein contained, although whether the permanent
fibrous tissue which replaces the adventitious tissue so found is
the result of a more complete development by the same agency,
or is afterwards supplied by the nuclei of the permanent sur-
rounding textures, is left undecided.   Dr. Beale, however, seems
to incline more decidedly to the former hypothesis.

In the lecture on *Mortification from Diseases of the Arteries*
the author gives cases to show that coagula may form, even in
the large vessels, without any connection with the lining
membrane, by an alteration in the constitution of the blood
itself.   The cases adduced, however, all showed evidences of
diseased lining membrane of a fatty or calcareous nature in some
parts of the arterial system, and are obviously open to the
explanation that the clots may have resulted from such alteration

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[1] ' On Disease Germs: their supposed and real Nature.'

in the condition of some part of the circulatory channel in the manner shown by Professor Lister (even where the blood itself is healthy), although they may not have shown attachment to the sides of the tube in which they were actually found.

We can scarcely go with the author in his explanation of the condition which he describes under the name of "*chronic local multiple abscess*," as resulting from a blocking up by coagula of the small arteries supplying the site of these formations. The cases given seem to us to be cases of syphilitic or tubercular induration, the deposit going on to, and terminating in, the characteristic specific ulceration usual in these diseases.

In the lectures on *Diseases of the Rectum* we find the remark that hæmorrhoidal bleeding is seldom vicarious in its nature, and that its periodic occurrence is more common in the male than in the female, and also more common in Russia and on the continent than in England.

Although the author refers to a general or local plethora, of which it is sometimes the natural relief, we are somewhat disappointed to find no special reference to, or warning of, those diseased conditions of the liver, which have so common and so evident a connection with a distended condition of the hæmor-- rhoidal veins. This is the more remarkable because of the serious mishaps which are constantly occurring in the hands of specialists, regarding solely the rectum of their patients, and the mechanical means of relief for its diseases, and overlooking entirely the condition of the liver, so common among their patients, and predisposing them to the bad consequences of pyemia and its allied results. In the writings of a surgeon so well acquainted with general principles of pathology, and showing his opinions to be so thoroughly imbued with them, such an omission is curious, even when he looks at disease through the specialist's speculum.

In the section upon *Inflammation of the Rectum* we find an erysipelatous condition about the anus alluded to as " phlogis-tic," and another inflammatory state described as " phlegmon," and meaning a state of things characterised by the author as " the exact reverse." Such an adherence to antiquated terms, conveying confused ideas now justly exploded, we cannot but criticise as a want of scientific precision which the author shares with but too many writers on practical surgery, even at the present day. In the *treatment of piles* the author makes a judicious distinction between the cases which are fitted for exci-- sion and the actual cautery, and those which are best treated by Houston's plan, with strong nitric acid. The category of cases which he would select for the old-fashioned treatment by ligature presents only one class in which we would take excep-

tion, viz., those in which a lax mucous membrane with prolapsus superadded to a tumour; which, we believe, are better treated by nitric acid combined with ablation of the tumour proper.

The author, we believe, makes with considerable justice a claim to priority, or at any rate equality, in the matter of the use of a clamp with the actual cautery; but we find in his present pages no reference to the improvements or practice of others in this special department of rectum surgery.

The three valid and good reasons for the author's preference of the actual cautery used with the clamp are, that it is less painful, safer, and takes less time for recovery than any other means of equal efficacy.

Two cases of reflex hyperæsthesia or nervous pain, one in the heel and the other in the outside of the thigh, cured by operation for piles, are interesting in their relation to those remarkable cases of reflex paralysis dependent upon perineal affections sometimes met·with.

The observations upon *Fistula Ani* and *Stricture of the Rectum* are sound, practical, and shrewd. To say that they are little original and in no wise novel, is to say that in matters in which to be simple and true is to be practical and honest, the author is distinguished in being untainted by the pretentious quackery which has too commonly burdened and defiled the lower bowel.

The descriptions of the several diseases bear, for the most part, evident marks of their origin in independent observation. In their treatment, the remarks seem to be confined mainly to methods which form the usual practice of the author, with the omission of plans of treatment which have been successfully practised by others. Conspicuous by such omission is the plan of treatment so much in vogue in the United States and in France, and in this country also, of treating spasmodic contraction of the sphincter ani by forcible mechanical distension.

There are two methods of performing this operation; one by inserting the two thumbs, well oiled, fairly within the opening of the bowel with the nails opposed to each other, then grasping the nates with the fingers on each side, and forcibly separating the thumbs so as to over-distend or stretch the sphincter. The other plan is to introduce the whole hand, well oiled, with the fingers closed in a wedge shape, into the bowel; and then, making a fist, to draw the closed hand through the anal orifice and so overstretch it.

The former practice is very well spoken of by Van Buren, and the latter is the one practised by Maisonneuve. Of these it may be said the first is, in appearance, much less revolting, and is more applicable by surgeons of great muscular power and

large hands; while the latter is an alternative course which may be taken among the fair natural compensations for a small hand and feeble frame. The total silence of the author either in praise or condemnation of this plan of treating spasm and fissure of the anus, implies that he has not hitherto given it a trial. If he were to do so he would find it to be a very useful addition to his resources, especially in cases to whom the use of the knife is objectionable.

It seems to operate much upon the same principle as forcible dilatation of urethral stricture, but it certainly is free from the serious and in very many cases fatal consequences of that proceeding.

The section on *Restorative Operations* on the rectum is far inferior in extent of information and interest to the rest of the volume, and might be expunged altogether with benefit; and we think also that the author gives somewhat too sanguine an impression of the results of operations for *imperforate anus.* It is scarcely too much to say that three fourths of these cases die within a comparatively short time afterwards, while the rest endure an uncomfortable and limited existence under the effects of strictured rectum.

In Lecture XVIII the author takes up the very different subject of *long-continued pain in bone* from *abscess, condensation,* and other causes. He gives the details of some very remarkable cases of the first-mentioned disease, producing most intense localised pain, and more or less general enlargement of the shaft of the tibia. There was usually a history of injury to the shin; one case occurred in a patient of a decidedly scrofulous habit, and in another the cavity in the bone was filled with tubercle. Much decision and judgment is shown in the author's treatment of these cases by the application of a small trephine in that part of the bone at which the injury was received, or which was the most projecting; or, in default of these indications, at that part where the temperature was highest. This plan of treatment, we believe, the author was one of the first, if not the first, to practise. Even in the cases very likely to occur, in which no matter is discovered by the trephine in the thickened and indurated bone, a great improvement of the symptoms, and often a total cessation of the pain, is procured by this deep incision.

In case iv (p. 287) we have the details of a remarkable case of supposed *hysterical pain* in the arm, after an injury to the forearm followed by abscess and a stiff elbow. To cure this last-named condition forcible extension was employed, under chloroform, and this was followed directly (as in but too many instances of this treatment of joint disease without operation) by abscess, sinus, rigors, shiverings, diarrhœa, and

the other symptoms of acute suppurative fever. For this the
arm was amputated in January, 1867, and an excellent stump
resulted. About the following April this became exceed-
ingly sensitive, and, resisting all treatment, continued to become
aggravated up to the month of February in the following year.
At this time excision of the ends of the nerves of the stump was
performed ; these were found to be expanded into what the
author somewhat loosely calls white *cartilaginous* bulbs (mean-
ing, we presume, the usual *fibrous neuromata*). After this ope-
ration the pain was apparently cured, but returned *after a time*
as severe as ever. All the nerves were then divided close to the
armpit, and again an apparent cure resulted *for a time,* but the
pain again returned so severely as to affect seriously the patient's
health. Mr. Lee now excised the remaining portion of the
humerus at the shoulder in April, 1869; the wound healed
readily in spite of the subsequent formation of an abscess, and
the pain had not returned in November of the same year. A
record of the lapse of more time since the last operation without
a return of the pain would be a satisfactory addendum to the
history of this remarkable case ; we could then more emphati-
cally join the author in his converse corollary upon the dictum
of his favorite authority, Sir B. Brodie, that it is as important
not to mistake real local disease for hysteria as not to make the
reverse blunder, which was the subject of Sir Benjamin's
warning.

In a short lecture upon *Excisions of Joints* the author gives
a tabulation of four cases of excision of the hip-joint, thirteen of
excision of the knee, and four of excision of the elbow. Of these
it may be briefly said that they were almost all characterised by
the usual tedious prolongation of the convalescence, by the per-
sistence of sinuses, and, in many cases, discharge of pieces of
dead bone for a long time after the operation, which have been
prominently insisted on by the old-fashioned opponents of this
style of surgery, but totally without effect in arresting its pro-
gressive development. Two of the four cases of hip-joint,
equally successful with the others, presented more or less exten-
sive disease of the acetabulum, concerning which Sir Benjamin
Brodie originated, and by the force of his great authority
established, a general but totally erroneous opinion that it *must
necessarily* be allowed to remain, and therefore constituted a
serious objection to the operation of excision of this joint.

Of the thirteen cases of excision of the *knee-joint,* two only
died. This would appear to be an unusual amount of success
until the reader casts his eye down the column of ages, when
the explanation will be found in the fact that only two of the
cases were over twenty-one years old, while nine were below

puberty. Singularly enough, the only case which, from a re-
turn of the disease in the bones, subsequently demanded ampu-
tation, was a case of excision of the *elbow*, an operation which
was considered by the late Professor Syme to be the most
successful and the least likely to require such an " ultima ratio"
of all the excisions.

In the second volume the author gives a *résumé* of his well-
known publications on " Syphilis," with some lectures on
" Gonorrhœa," and one on " Albuminuria as a consequence of
Surgical Diseases." The author, we perceive, still adheres to
the doctrine that the soft suppurating sore does *not* result in the
occurrence of constitutional symptoms, and quotes, in confirma-
tion, Dr. Daniellsen's experience of inoculation upon lepers, in
whom many thousand inoculations of suppurating sores resulted
in the manifestation of constitutional symptoms in only one case,
and this was one in which nearly 400 inoculations had pre-
viously been made without such symptoms occurring. It was
afterwards found that in the one which had that result the
secretion of an indurated chancre had been accidentally used.
This is certainly very direct and strong evidence, in addition to
the results of his own experience and of that of other surgeons,
which the author believes to point in the same way.

He lays down the following doctrines strongly, viz. 1st, that
the true indurated form of disease is *not* inoculable upon the
same patient, because the system is already saturated with the
poison, except under certain circumstances ; 2nd, that by the
occurrence of suppuration of the sore from which the virus is
taken it may become so ; 3rd, that the presence of an absolute
pustule or sore is not an essential feature of the true syphilitic
disease, but that there may be a hard induration only in the site
of the infection ; and, 4th, that in this disease the glands of the
groin are hard, and that they scarcely ever suppurate, and that
when they do so the poison may be, and is likely to be, com-
pletely evacuated from the system, and save the patient from
secondary symptoms and the other sequelæ.

From this it follows that the actual pus-cells of the soft
chancre are the agents in communicating the disease by inocula-
tion, in the same or in another person. The cases that un-
doubtedly happen frequently in the practice of every surgeon of
any experience in these matters, in which secondary symptoms
are observed after soft chancre, and which led the Committee of
the Report to the Admiralty and War Office to describe " a soft
sore which is followed by constitutional disease ;" and to state
that, " whether a given local affection will result in syphilis,
cannot be known with certainty until the constitution is actually
involved," are explained by the author on the supposition that

such a sore is either the product of mixed poisons, or that an inflammatory swelling and suppuration, more or less accidental in character, has masked the specific induration which should always exist in a true chancre.   We suppose that the only alternative to this ingenious way of accounting for such cases is the adoption of the opinion of there being at least two kinds of enthetic disease, differing somewhat in the natural severity of their secondary manifestations, as advocated by Carmichael, Bumstead, and Morgan, of Dublin;[1] or that the constitutions of patients differ in their nature and in the reaction of the soil required for the full development of the true syphilitic results. Such a difference may be the result of hereditary transmission of syphilitic impunity, to a greater or less extent, by infection of former generations.

The latter supposition receives confirmation from the well-known security from infection enjoyed by some patients, and by the amelioration of the symptoms of the disease in races with whom it has been long domiciled.   This impunity, as alluded to by the author, is present to a remarkable extent in the Portuguese, and has been obtained at the expense of some of the highest race characteristics.   And it appears that most or all of the European races have already to some extent arrived at the syphilised diathesis, as evidenced by the mitigation of the whole series of syphilitic consequences, as compared with those described by competent writers when the foul infection wrought its fell ravages in the sixteenth century—a change which, according to Ulrich van Hutten, began even in the same century. Whether a race deterioration similar to that of the Portuguese has already obtained in them, as suggested by Dr. Fergusson, or is in process of so doing, is a question which cannot yet be solved satisfactorily.   Syphilis, it may be said, is a powerful, but not the sole cause of the decay of nations.

The above-named two varieties of syphilitic poison, producing respectively the hard and soft chancre, were not recognised by Ricord, and to our author belongs a great deal of the credit of making the distinction clearly defined.   The last-named distinguished syphilographer fell also, like Hunter, into the serious mistake of dogmatising to the effect, that secondary syphilitic sores were incapable of communicating the disease.

In his twenty-sixth lecture the author proves, by numerous cases (among which are those of the French commission of 1858, of which MM. Velpeau and Ricord were members), that not only may the disease be communicated by secondary and tertiary sores, but that inoculation of the blood only, as well as

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[1] See paper read before the Surgical Society of Dublin on the "Duality of the Venereal Virus."

of the specific inflammatory secretions of syphilitic patients, will give the constitutional disease to another person, and that even the transplantation of a tooth, carefully wiped and cleaned, will also do so. Cases of the latter kind were described by Hunter, although he himself came to the conclusion that the secretions of secondary syphilis affections were *not* inoculable. Cases of blood-inoculation are given from the practice of Professor Pelizzari in 1860, in addition to Waller's well-known case.

In the important question of the inoculation of the syphilitic poison along with *vaccine lymph*, the author gives numerous instances, in addition to the remarkable Rivalta cases, which go to prove the reality of vaccino-syphilitic inoculation : but he is very decided in the opinion that if only the vaccine lymph be taken from the pustule, even of a syphilitic vaccinifer, without the admixture of blood or pus, or other sore secretions, it is not capable of communicating the disease ; and to ensure this he lays down, among other common-sense rules regarding absolute cleanliness and the choice of a healthy child, the maxims to take the lymph from the vaccinifer vesicle *not later than the eighth day*.

With regard to the protective influence of one syphilitic constitutional contamination against another infection, we find the conclusion, drawn from cases given by Diday, De Meric, and from the author's own experience, that after a certain time from the apparent cure of the first disease, a fresh constitutional disease may be communicated, but that it usually appears in a very modified form, and capable of a real cure without mercury, and also that such a measure of impunity may be enjoyed by the immediate progeny of syphilised persons.

In referring to the theory of Hutchinson, that *tertiary* symptoms are to syphilis what *sequelæ* are to fevers in general, the author, while acknowledging that the blood and morbid products in this stage are not usually inoculable, yet considers that the peculiarity of the morbid process indicates the continued persistence of some kind of specific action.

In respect to treatment, the author advocates the destruction of the soft sore by means of fluid caustics ; but he considers that this means is not to be relied upon in true hard chancre, in which the period of incubation has usually passed, and the system affected before medical aid has been applied for.

For curing the primary sore quickly, as well as for the treatment of all kinds of secondary affections, the author adheres to his system of calomel fumigation, and states that general experience proves that no remedy exists possessing so great a power over the syphilitic poison as mercury, and that, though the iodide and bromide of potassium possess, in an eminent degree, the

power of removing some forms of secondary eruption, they neither prevent the occurrence nor recurrence of the symptoms in the same way as mercury. He believes that the reputation of the iodide has mainly been founded upon the treatment of soft sores which are not usually followed by secondaries.

With respect to the *syphilization* theory advocated by Dr. Boeck, the author's expressed views of the non-auto-inoculability of true syphilis present, at the very outset, an impossibility of agreement. We infer, indeed, from the experiments adduced by the author from various sources, that the explanation which satisfies his own mind as to the success of inoculation in Dr. Boeck's numerous cases is this, "that the virus of syphilis, in its evolution, engenders a proclivity in the skin to react upon the application of slight irritants. This points to a natural tendency to eliminative action in syphilitic subjects, and explains, it may be, the results of the *inoculation of pus* in syphilization" (p. 280). He states even that these results have been obtained from inoculation of the pus taken from pustular scabies in a patient affected with secondary syphilis by Roder and Kraus, at Pick's suggestion.

His chief practical conclusion is, " that the time required for the treatment of syphilis in this way is so long, and the inconveniences attending it are so great, that it is not at all likely to be generally adopted in practice." Upon this we may observe that whatever may be thought as to the force or conclusiveness of the author's theoretical reasons hereupon, one can have no hesitation whatever in subscribing to this opinion.

We should strongly recommend the perusal of the melancholy chapter on *Hereditary and Infantile Syphilis* to those well-intentioned and indignantly virtuous, but ignorant people who have agitated so furiously against the Contagious Diseases Act. The premature death and the maimed and repulsive life of so many innocent victims of the sins of their guilty progenitors, distinctly traced out by the light of modern science in the hands of Jenner, Farre, Virchow, Barnes, and Hutchinson, form a terrible forecast of the destiny which awaits the race and people who neglect the plain warnings given by intelligent observation. The pegged teeth indicated by Hutchinson as the effect of syphilitic disease during dentition are, unfortunately, so common in all classes of modern society as to indicate to all who are open to instruction the fatal extent of this moral and physical ulcer which preys upon the vigour of the race. The author inclines to the belief that syphilis may be transmitted from father to child without implicating the system of the mother, although somewhat contravening this view is the curious fact pointed out by Colles, of Dublin, that mothers are never inoculated at the

nipple by syphilitic children, while wet nurses frequently are so. This, of course, points directly to a syphilized condition of the mother's system.

Mr. Hutchinson also believes that a foetus affected only from the father may infect the system of the mother while " in utero."

In the chapters on *Gonorrhœa* we find (p. 329), in addition to the ordinary description of the disease and its consequences, that " the symptoms may be produced by various agents other than the application of a gonorrhœal pus," and in support of this opinion the statements of Ricord, Diday, Skey, Sir H. Thompson, and Whitehead are alleged ; while, on the other hand, the experiments of Van Rosbröck and Piringer, and the conclusions of Gullie, Macgregor, and Simon are also in favour of the idea that the action of inflammations of every kind are, *to some extent*, contagious.

The opinion of Hunter that the poisons of syphilis and gonorrhœa were more or less identical, does not seem, even in the present day, to be entirely disproved ; and it seems to be allowed by the author that a syphilitic vaginal or uterine discharge may give rise to gonorrheal discharge in the male at the same time as the primary syphilitic disease, and he quotes a case in the ' Medico-Chir. Transactions ' (vol. xlv, p. 425) in support of this.

We unhesitatingly endorse the author's opinion as to the uselessness of strong injections employed early in the disease, and the dangerous consequences which often follow attempts at the abortive treatment. We believe that even Ricord himself has latterly come to the same conclusion. The copious use of weak injections to wash away the infectious discharges frequently is a much more rational proceeding. A good deal depends upon the efficiency with which the syringe is used, and the patient should always have its use well explained or demonstrated. It is a common mistake to suppose that the specific inflammation is limited to the first inch or two of the urethra.

The author prefers camphor as a remedy for chordee. We think that he scarcely gives sufficient importance to the bromide of potassium as a remedy. He commends the use of the older remedies, copaiba and cubebs, internally administered, as well as of the sulphate, acetate and chloride of zinc, and also of the recently introduced sulpho-carbolate of zinc as an injection. Like the author, we have found this latter of decided benefit in all stages of the disease, with the addition of carbolic acid in the later and more chronic stages. To the statistics of Professor Sigmund he adds observations of his own as to the limitation of the inflammation in gonorrhœal orchitis to the epididymis, tunica vaginalis, and cord.

This fact, already sufficiently well established, has an im-
portant bearing upon the practice of M. Petit, Vidal de Cassis,
and Ricord, of puncturing the tunica albuginea in these cases,
with a view to relieve the supposed congestion of the interior of
the testis.   The relief afforded by this simple operation (and
such relief is unquestionable) is due to the evacuation of the
effused serous fluid from the distended tunica vaginalis, and may
be equally well obtained by limiting the puncture to that struc-
ture, and thus avoiding the complications that sometimes result
from interference with the tubular spermatic structures.

In respect to the cause of *gonorrhœal rheumatism* the author
is inclined to agree with Dr. Wilks as to its subacute pyæmic
character.   In very many cases, doubtless, it is simply due to
the development of a rheumatic predisposition, consequent upon
the lowering effect of the gonorrhœal disease, with its complica-
tions, and its remedies.

In conclusion, while we award a very high encomium to the
practical shrewdness, intelligent experience, and extensive
mastery of current literature shown in the bulk of the second
volume treating of *syphilis* (a subject with which the author's
labours will be ever inseparably and honorably connected), we
think the last chapter on *Albuminuria* to be decidedly a weak
point in the work, and one which might, like some others in the
first volume before alluded to, be either omitted with advantage
or much improved, in future editions.

VI.—Rogers on Therapeutics.[1]

THIS is a book which well deserves study, and yet a book
which will hardly appeal to the great bulk of medical readers,
the men who aim at practice rather than theory.   Nevertheless,
it is one of the most careful inquiries into therapeutics we have
seen, and likewise one of the best aimed blows we have en-
countered at the tenets of Hahnemann.   With regard to this
subject the author says, " I readily admit that it has been
repeatedly and satisfactorily proved that most of its secondary
principles are quite unfounded ; but it by no means follows that
the fundamental principle itself, *similia similibus*, must likewise
be false."   In point of fact only Jörg has fairly grappled the
principles, and by a series of long continued experiments on
himself and others signally overthrown the basis of homœopathic
practice.   To this task also, but in a more exhaustive manner,

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[1] ' *On the Recent State of Therapeutics, with some Suggestions for placing it
upon a more Scientific Basis.*' By JAMES ROGERS, M.D., formerly Physician
to the British Legation, and to the Abouchoff Hospital, St. Petersburg.

Dr. Rogers girds himself, and for this purpose he selects these cardinal instances, on the proof or disproof of which must rest the establishment or overthrow of Hahnemannism.

The remedies selected were cinchona, sulphur, and mercury. The trials were made on healthy individuals; in each instance the trial was unfavorable to homœopathy. It is well known that on the effects of bark and its supposed powers of inducing fever, Hahnemann founded his system, but extended and careful trials go to show that in no instance does the drug produce symptoms at all assimilating to those of intermittent fever. The experience of our cruisers on the coast of Africa ought to be decisive on this point, but Dr. Rogers has thought it right not only to cite unquestionable authority, but to experiment in the matter himself. His results we have above stated.

The next remedy chosen for experiment was sulphur. The import of sulphur provings may be hardly so well known to the bulk of the profession as those of quinine, and to those acquainted with them anything further would seem needless; nevertheless, Dr. Rogers has thought it necessary to enter further into the matter. In the days of Hahnemann the nature of itch was unknown, and in his theory of chronic disease suppressed itch played a most important part. Any form of disease which he did not readily understand was explained by suppressed itch lying at the bottom of it. To us, knowing the existence of the itch mite, the idea that sulphur should act homœopathically in destroying it seems utterly absurd; were the doctrine true, sulphur given to a healthy person should have the power of developing the itch mite, or something like it, a proposition utterly preposterous. In point of fact the only effects observed from the continued use of sulphur were lax bowels and a tendency to the formation of sulphuretted hydrogen gas.

The third remedy experimented on was mercury, the analogy of whose effects to those of syphilis have been so often quoted as to be very generally believed. Some, indeed, have gone so far as to credit the whole of the symptoms of secondary and tertiary syphilis to the effects of the mercury given to relieve the earlier form of the malady. Any man of sense knowing the history of syphilis, especially as it prevailed towards the end of the fifteenth century, ere yet mercury had been prescribed as a remedy for its relief, knows how utterly false such assertions are. But as it cannot be denied that both mercury and syphilis tend to induce a cachectic state of the system (as many other things do), it has been roundly asserted that their effects are the same, and that mercury cures syphilis by virtue of the law of similars. Most of the arguments adduced in favour of this view have undoubtedly been imported from the use of mercury in disease,

a kind of argument which should be rejected by true homœo-paths. The prolonged use of mercury in massive (as opposed to infinitesimal) doses would hardly be admissible in the healthy subject, but it so happens that in certain classes of workmen—those engaged in quicksilver mines, and in those employed in silvering looking-glasses by a process, however, now seldom adopted—we have the means of testing the validity of the theory. The experience derived from this source flatly con-tradicts the assertion that mercury can produce the symptoms of syphilis ; what illustration have we of mercurial tremor being produced by syphilis ? or of syphilitic paralysis as the result of mercurial erythism ? Tested by these cardinal instances, the doctrine of *similia similibus* falls to the ground.

Nor does the cause of Hahnemann succeed better in the next chapter, which deals with instances of natural diseases affecting each other homœopathically. Of all here enumerated we shall select but one, which, though at first sight most promising to the homœopathic school, is, in point of fact, that which tells most against it. If one disease or one remedy can be called homœo-pathic to another, surely vaccinia is to smallpox, and *vice versa*, but let us examine the two. If the two be introduced into the system about the same time, each runs its course independent of the other. Should the vaccine virus have a fair start, it modifies the disease of the smallpox first, it shortens the period of the vaccinia. According to Hahnemann's doctrines, each should remove the other. This, and certain other instances, have induced advanced homœopaths to say of Hahnemann that they place his judgment or his love of truth in no favorable light.

But yet, again, the homœopathic doctrines preclude the spontaneous cure of disease—one can be removed only by setting up another. How much this is opposed to modern doctrines, and, let us add, to modern practice, it needs but a moment to consider, and of all men in the world homœopaths, if our estimate of their practice be correct, should, we had almost said must, be the last to deny, and yet they are bound to uphold the doctrine. A word on the homœopathic doctrines of drug action, and we have done with this part of our subject. A disease, say they, can only be cured by a more powerful affection of a similar kind, artificial or natural, as smallpox arrests vaccinia, according to Hahnemann. Thus, mercury given for the cure of syphilis acts by inducing a specific malady closely resembling syphilis, and more potent, inasmuch as it arrests the other, but what is to arrest it ? *Quis custodiet ipsos custodes ?* Here the power of nature is called in, which although powerless against the primary disease—is not the law *similia similibus ?*—shows itself more potent than that which, being more powerful, expelled the

original complaint. The fallacy of such an argument is transparent.

But do homœopaths practically hold their fundamental law all-sufficient? It is plain from their writings as from their practice that they do not, for personal experience is called in, not to select the *similimum* to the disease from past experiments as exhibited in a repertory, but from their knowledge of its uses in disease (*usus in morbis*), a principle clean contrary to the law of similia similibus. Even Hahnemann himself, although he constantly inveighed against this *usus in morbis*, largely employed it in practice, especially in the treatment of chronic disease. When everything had been tried which, by any twisting of the imagination, could be construed to resemble the disease in its action, and everything had failed, then, as a last resource, it was *Es liegt innere psora zu grunde,* " concealed itch, is at the bottom of the mischief;" another prescription came accordingly.

In his next chapter Dr. Rogers deals with the subject of homœopathic dilutions, but this subject has been so often discussed that it is hardly worth while to enter into it. The calculations made by the late Sir James Simpson are here employed to show the absurdity of dosing patients with the thirtieth (or decillionth) dilution, that which Hahnemann latterly used in all cases, and which many homœopaths still employ, whilst one says that the 2000th is sometimes hurtful. Of course the use of remedies in such dilutions had to be justified, and the superstition of dynamisation was introduced, that is, men apparently sane contended that the power of a drug was increased by every dilution by the virtue of its trituration. It is useless to contend in favour of this doctrine that very small quantities of matter can produce sensible effects; that every one is ready to admit, but that a medicine increases in strength by weakening it, is a totally different assertion.

The origin of infinitesimal doses is next alluded to. There can be but little doubt that the system was introduced by Hahnemann to spite the druggists, who had prosecuted him for dispensing his own remedies; and the assertion he subsequently made of the prejudicial effects of massive doses in aggravating the symptoms of a disease are clear contradictions to his experience prior to adopting the infinitesimal doses.

The concluding chapter of this portion of the work deals with what are called the provings of remedies, that is, their effects on the healthy individual. The absurdities of some of these so-called provings are patent: a man takes a globule, and thereafter comes a fit of indigestion; forthwith all the symptoms of the indigestion are referred to the globule. This is no joke, for

absurdities even greater are contained in Hahnemann's ' Pure Materia Medica,' a book admitted by homœopaths to be full of the rankest errors.

But enough of this. Dr. Rogers has effectually proved, what before was patent to any man of sense, that the homœopathic system is neither more nor less than a gross superstition, equally fallacious with the sympathetic powder of Sir Kenelm Digby or the talismans of the middle ages ; in point of fact, owing its success to exactly the same causes as these did, viz. to mental influences and attention to accessories. The logical consequences of this conclusion are carried out in the next part; homœopathic medication means no medication, and we may use the results obtained by homœopathic practitioners as of cases treated on the expectant or no-treatment method, and may establish a comparison between them as such and those obtained by practitioners of the old school of the so-called legitimate medicine.

The author next proceeds, therefore, to investigate the different modes of treatment, and the results of each treatment, as seen in rheumatism, intermittent fever, cholera, typhus fever, and pneumonia. In the case of rheumatism he refers to the memorable discussion on its management which took place in the Academy of Medicine at Paris, in 1850, a discussion noteworthy for the singular unanimity of dissent, if one might use the expression, displayed by all the speakers. The discussion showed plainly that not only were they all at sea as to the best mode of treating the disease, but that they were utterly ignorant of its nature, nor can we say that we are at all in a better position at the present day. He next briefly deals with the expectant system, as adopted at home and abroad ; the results are good, and, in point of fact, are much the same as those obtained by homœopaths, who, however, on their own confession, "have this disadvantage in comparison with their opponents, that they are not aware of the fact" that but little can be done for this disease medicinally. As to intermittent fever, their position is still worse ; with quinine the disease is ordinarily most manageable ; treated homœopathically, it does not seem to be so, and such practitioners often experience very considerable difficulty in selecting the exact remedy suited to the case. Some homœopaths go further, and undisguisedly deal with the complaint as allopathic practitioners are wont to do, rejecting for the nonce both homœopathy and homœopathic doses. Still, it is undeniable that the patients of homœopaths suffering from ague do get well, which would seem to show that hygienic and dietetic measures are capable of coping with the disease in its less inveterate form. Of typhus and typhoid the treatment nowadays adopted in this country is essentially expectant ; in the olden time it was decidedly antiphlogistic,

and the statistics of the two periods should not be commingled. By treating these diseases homœopathically better results are obtained than of old, as these compared statistics show. But it is quite clear that cases neither of typhus nor of typhoid are included in the homœopathic returns, several of gastro-intestinal catarrh being detectable, and the two former diseases are further treated as one, although their mortality is very different, especially at different periods. Pneumonia has been treated in so many ways, and its statistics are so abundant, that there is little difficulty in comparing the results of different modes of management. From the statistics given it seems that some regular practitioners, as Barthez, Ziemssen, Hughes Bennett, and Dietl, have obtained results decidedly superior to those of any homœopath, whilst it must also be admitted that the latter have succeeded better than practitioners dealing with the disease on antiphlogistic principles.

In comparing the results of ordinary and homœopathic practitioners, several serious difficulties have to be encountered, the chief of these being the paucity of reliable homœopathic returns. It is plain that the returns derivable from private practice would not be available, no sufficient opportunity existing for securing accuracy and preventing misrepresentation; the number of homœopathic hospitals is limited, and of skilful homœopathic practitioners, perhaps, still more so. Tessier's results have been generally admitted, so have those of Wurmb and Caspar as a rule, whilst many of Fleischman's are here unceremoniously rejected as unsound and unreliable. Nevertheless, Dr. Rogers thinks he may conclude that homœopathic practice about equals, in point of success, that of the best non-homœopathic practitioners; and as that success closely corresponds with the natural tendency to recovery, it follows that homœopathic medicines in homœopathic doses may be regarded as inert, and their results the results of the ordinary tendency of disease. The conclusion is not flattering to orthodox therapeutics, and the question arises how best to rid ourselves of the opprobrium.

Hitherto Dr. Rogers has exercised his powers as an iconoclast to no mean purpose; but when it comes to his turn to construct new theories and form new hypotheses, or to show how best to construct a reliable system of therapeutics, he comes somewhat short of what, at all events, we should like to see. To secure new and sound bases for therapeutics he thinks we ought to look first to physiology, pathology, and chemistry to help us. We should strive to obtain a better acquaintance with the natural course of disease. We should set ourselves to know more of the physiological action of remedies, and we should try to use the influence of the mind on the body in a more scientific fashion.

As to the first of these, Dr. Rogers, contrary to many other authorities, expects no great help from what some are fond of calling scientific therapeutics.   As has been well said, not knowing the true laws of nature, we cannot tell *à priori* what will act in accordance with, or in antagonism to them ; but no good treatment—good, that is to say, in its results—can be in opposition to these laws.   But if Dr. Rogers expects too little from the first source of information, we cannot help thinking that he expects too much from the second.   Disease is no separate entity, but a compound condition, made up of an original morbid impulse and the constitutional predisposition and disposition of the individual attacked.   The former varies, and so do the latter, and it would hardly be possible to draw up a scheme of diseases available for the therapeutic uses to which Dr. Rogers would put it, on account of this very variety.   We do not see how it would be possible to deduce from the phenomena of a disease, as expressed in a given individual, the fact that a certain remedy had produced a certain effect.

The plan of testing the effects of remedies on the living body in a state of health is an old and good one, which, however, has unfortunately been carried out but imperfectly.   The homœopaths have adopted the practice, but, seeing that with their doses the imagination entirely supersedes physical effects, their results, it cannot be wondered at, are anything but satisfactory to a scientific mind.

The effects of the imagination are well known.   Let any one consult the advertisement columns of a religious newspaper, and read the commendations given by honest men to worthless drugs, and they will be convinced of it.   Nevertheless, any attempt to use this weapon in the fight with disease is difficult, and may prove dangerous.

In conclusion, we would bespeak for Dr. Rogers's book a most careful perusal.   If we cannot agree with its author in every respect, we are willing to admit, and do most readily concede, the rare perseverance and single-mindedness displayed in the research here made public.   He has had in view the quest of truth, not of party, and his work is proportionately laudable. We trust it will receive the support it merits.

VII.—Army and Navy Re orts.[1]

THESE annual reports are always interesting and sugges-

[1] *Statistical Report of the Health of the Navy for the Year* 1868.   8vo, pp. 446, 1870.
Army Medical Department Report for the Year 1868.   8vo, pp. 509, 1870.

tive. The interest of the present volumes is the greater from
the circumstance that this is the first occasion on which the
reports of the two services for the year treated of have appeared
within a few months of each other. Thanks to the untiring
energy of Dr. Mackay, the Admiralty are in respect to the time
of publishing their Reports nearly abreast of the War Office.

In the present article we do not propose to survey the general
contents of these official records, but rather to select a single
subject for notice and comment, one that, from its importance
and complexity, must always be of interest, and respecting
which the experience of army and navy medical men may be
specially instructive—we mean that of fevers in different climates
and regions of the world. Most of our illustrations will be
drawn from the Navy Report, as the information about these
diseases is much more ample and circumstantial in it than in
the sister report. The example of the one service in this respect
might, we think, be very advantageously followed by the other;
it would certainly add much to the value of the short statistical
data as to the general amount of sickness and mortality from
fevers among our troops in different countries, if occasional
extracts from the reports of the medical officers explanatory of
their occurrence were at the same time inserted.

In the naval force on the home station, of 289 attacks
attributed to 'continued and remittent fever,' the great bulk of
them were cases of 'febricula' or 'ephemeral fever,' induced by
exposure to weather, or by some irregularity or excess in diet,
&c. Of the total sixteen deaths under this head, occurring, it
is to be remembered, in ten or twelve different ships, two thirds
at least were due to 'enteric fever,' a disease which appears to
have been generally contracted on shore. In two or three
instances, the fever seems to have been true 'typhus,' having
" the characteristic head symptoms and maculæ." These, too,
had originated out of the ships. In one instance, the medical
officer contracted the fever from a sick seaman who lodged on
shore, and he died from it on the eighth day of the attack. In
none of the other fatal cases, does the disease appear to have
spread to other persons. Little is said respecting its probable
origin in any of these instances.

It is more than doubtful whether there was any case of
genuine 'remittent' fever among the whole list of febrile
attacks. But there were no fewer than 138 cases of 'inter-
mittent' during the year, and one of them was fatal. Nearly
one half of the attacks occurred in the force stationed at Sheer-
ness, which is notoriously malarial. Most of the other cases
had been contracted abroad. The type of the fever at Sheerness
was often puzzling, in consequence of the febrile paroxysms

being at times irregular in the days of their recurrence as well as in the hour of the day at which they took place. In many instances the attack seemed to follow after a debauch on shore. Quinine generally soon cured the disease; in the more persistent cases, change of locality had the most beneficial effect.

Among the troops in the United Kingdom the only point deserving notice is the high death-rate from ' continued fever ' at Dublin, in consequence of the continued occurrence of several cases of that peculiar form of the disease " returned under the various names of purpuric fever, malignant typhus, and cerebrospinal meningitis." In all the cases of ' paroxysmal fever,' the malady was manifestly the result of previous tropical service.

In the Mediterranean, ' continued and remittent fever ' was between four and five times, and ' intermittent fever ' more than twice, as frequent in our fleet as on the home station. Of course, a large proportion of the cases of the former group was due to ' febricula ' or ' simple continued ;' the ratio cannot exactly be given. But, in not a few of the cases, the symptoms were obviously more serious than those of ordinary ephemeral fever, and seem to have been of an obscure or masked remittent or enteric type, being followed often by intractable rheumatism and " the peculiar form of cachexia so commonly met with at Malta and on the Mediterranean station generally."[1] Most of the fatal cases of fever in the fleet seem to have been distinctly ' enteric.' There are several noted *habitats* of this dangerous endemic on this station. The harbours of Naples and Palermo, of Barcelona and Malaga, not to mention others, are every year infested with it; but no locality is so bad for our ships of war as Malta itself, where the Dockyard Creek " is little more than a gigantic cesspool," and the result is that—

"Especially during the summer and autumn months, enteric fever is endemic among the shipping in the creek and the surrounding houses, and much loss of service and mortality have at different times been occasioned by it."

A fatal case of this fever, contracted at Jerusalem, was complicated with " severe hæmorrhage from the lungs, bowels, kidneys, &c., and the skin was completely covered with hæmorrhagic spots."

What proportion the cases of genuine remittent bore to those of the other forms of pyrexia with which they are classified in the returns of the navy, it is impossible to decide with any

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[1] In connection with the subject of the prevalence, and of the aggravation of the type, of fevers on board our ships of war, the observations by the surgeon of the "Caledonia," in his letter to the admiral, are most valuable, and ought to lead to improved ventilation in the quarters of the men and officers.

degree of certainty. Most of the attacks of remittent fever were contracted on the coast of Sicily, Crete, and Syria, or in the lower part of the Danube, " where periodic fevers were exceedingly prevalent over the whole country, especially at Toultcha and Galatz." The majority of the cases of intermittent fever, or true ague, in the squadron throughout the year occurred in one ship, which had been long detained near the mouth of that river.

Among the troops stationed at Gibraltar and Malta typhoid fever was again, as in 1867, prevalent to a considerable extent. In both places, sewer effluvia were considered to be the main cause of the disease in the barracks where the cases occurred.

In the West India Naval Command (which embraces the coast of North America and the island of Bermuda), the proportion of fever cases was fully one third greater than in the Mediterranean. The death-rate from them in 1868 was, however, less. This was mainly due to the almost entire absence of epidemic yellow fever during the year. A large majority of the 408 registered cases of ' continued and remittent fever' were ' febricular,' and were due either to exposure in the sun while at work on board, or to some intemperance on shore. Occasionally—

" The cases of febricula certainly were not ephemeral in duration. They appear, in fact, to have been mainly of the remittent type, and were in several instances followed by a general cachectic state of the system."

The usual character of the endemic remittent fever of the West Indies may be gathered from the description of the symptoms of the disease, on board the " Phœbe," contracted off the coast of Honduras :

" The attacks usually set in with sudden chilliness, great weakness, giddiness, and slight nausea, followed shortly by frontal headache, hot skin, suffused countenance, rapid pulse, thirst, pain or tenderness over the epigastrium, nausea, and vomiting of bilious or mucous matter. The tongue was coated, and pain, chiefly in the lumbar region, was complained of. These symptoms, lasting from twelve to twenty hours, were followed generally by perspiration, when an alleviation of the symptoms took place, but with some headache and nausea remaining, with diffused tenderness over the abdomen, increased upon pressure, and a tendency to diarrhœa. In some cases the pain would be referred to the hepatic or splenic regions, but to no great extent. . . . . On a remission showing itself, quinine with a saline mixture was given with much benefit, together with nourishing diet and stimulants."

In some attacks of the fever elsewhere, there was, in the early

paroxysms, "incessant vomiting and purging; the urine was high coloured, scanty, and voided with much pain, and there was a peculiar odour of the breath." At times, the febrile symptoms were preceded by an attack of a choleraic character, in which the diarrhœa was periodic and very exhausting. No mention is made of any of the cases of fever in the squadron exhibiting the features of enteric or typhoid complication; and possibly the absence of this complication may have had something to do with the small mortality from pyrexial disease in the naval force this year. Moreover, there were but two recorded cases of yellow fever, and both recovered. One occurred in the "Phœbe," and the other in the "Aboukir," the receiving-ship in Port Royal Harbour, Jamaica. Isolated attacks of an epidemic disease like yellow fever are always very instructive, and demand careful scrutiny.[1] The case in the "Phœbe" occurred seven days after leaving Grenada (where the fever existed to some extent, but not epidemically), in a man who had slept on shore there one night. The ship was then at St. Vincent. Her surgeon, suspicious of the nature of the febrile attack, wished to land the patients—for another man who had spent the night along with the former had also sickened about the same time—in the hospital there, with the view of precaution for the rest of the crew; but the island authorities refused to receive them.[2] Respecting the first of these two cases, we are informed that—

"About the third day of the febrile attack the urine (which had been daily examined) was found to contain albumen, which continued to increase until it was loaded with it, the urine daily passed amounting to about a pint. Bile was also passed in very large quantities. About the sixth day the conjunctivæ had a bilious tinge, which gradually increased, his whole surface slowly assuming the same appearance. There was slight hæmorrhage from the edges of the gums, and the dejections were dark and pitchy. *The presence of albumen in the urine (which is now looked upon by those experienced in such*

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[1] In 1867, a year when the pestilence was wide-spread in the New World, there was only one solitary case in the West African fleet. It occurred at sea, two days after the ship left St. Paul de Loando, which, it is said, was healthy at the time. The man died on the fourth day of the attack; the urine was albuminous, and the other symptoms were unmistakable. The narrative of the case and of the necroscopic appearances, in the report of that year, is full of interest.

[2] We learn from the Army Report that the patient was subsequently landed at Barbadoes, where four cases had occurred among the military in the previous February; three of them had proved fatal, two in women and one in a child. The only other remark to be made respecting our troops in the West Indies, in respect of fevers in 1868, is that in Jamaica, "compared with the results for the last nine years, there has been a very great decrease in *paroxysmal* fevers, but this has been to some extent counterbalanced by an increase in those of a *continued* type." The same thing was observed in Bermuda.

cases as pathognomonic of yellow fever), accompanied by the jaundiced appearance of the conjunctivæ and general surface, evidently indicated it to be a mild form of the disease."

We have purposely italicised the last sentence, to draw attention to a very important point in the pathology of yellow fever, which still requires further investigation before it can be accepted as an established and pathognomonic truth. It need only be added that in the second case, which was altogether milder, the urine was abundant and free from albumen, and that the symptoms " assumed more of the remittent type." The medical officer remarks :

"It certainly appeared strange that the two men, having contracted fever under precisely the same circumstances and presenting the same symptoms, one should exhibit albumen in his urine, while in the other there was no trace of it, and that the one case should prove very protracted while in the other recovery was rapid."

In the case which occurred at Port Royal, and was transferred to the Naval Hospital there, the fever was at first registered as remittent ; " the case, however, proved to be one of yellow fever, but of a mild type. Albumen, in considerable quantity, was found in the urine." It was the last of the epidemic outbreak of yellow fever at Port Royal, which commenced in November, 1866, and which caused twenty-six deaths out of seventy-three admissions into the hospital there.

The results of the experience then acquired, as to the albuminous condition of the urine, are given in the very able report of Dr. Donnet, the chief medical officer of the hospital, in the Navy Report for 1867. Albumen was observed in every case without exception, at some stage of the fever :

"Its presence and its continuance during the progress of the disease, whether towards a fatal issue or a recovery, *provided continued fever coexisted*, was of pathognomic value, for by the coexistence of these two symptoms this specific form of fever was diagnosed from others bearing in their general aspect some resemblance to yellow fever."

The earliest appearance of the albumen varied from the first or second day of the febrile attack to the seventh or eighth day ; in the great majority of the cases it was observed on the second, third, or fourth days. It generally was observed " at first as a trace, gradually increasing with the fever, and as gradually decreasing as convalescence set in, whilst in the fatal cases this symptom was constant to the last. It was invariably found in the urine of fatal cases examined after death." Together with albumen, the presence of bile in the urine was frequently discovered. Dr. Donnet remarks that—

"In remittent fever albuminuria is likewise observed, and, in the absence of a distinct remission, remittent has been confounded with yellow fever; but as albuminous urine is only observed during the very early stage of the pyrexia, and again at the period of convalescence, and *not* during the continuance of the remittent fever, a distinction may be made between them."

This remark needs confirmation. The whole report merits careful study ; the detailed narrative of all the cases, seventy-two in number, makes it very instructive.

It will, indeed, prove a nosological acquisition of the highest importance in many respects, if experience shall confirm the reliability of the urinary diagnosis of tropical fevers in the New World. The attention of all naval and military medical officers should be earnestly directed in future to this point, by systematic observation and experiment on every available occasion. Yellow fever was very sparingly diffused in the West India islands during 1868, neither does it seem to have been prevalent on the Spanish Main or on the coast of Brazil. But on the other or west side of South America, it prevailed in force at several points of the shores of Chili and Peru :

"During the year a terrible epidemic of yellow fever raged along the Pacific coast. It invaded every town from Panama to Islay, inflicting fearful ravages. The disease was originally carried from St. Thomas's, in the early part of 1867, to the Isthmus of Panama, where it proved very fatal amongst the foreign population. There can be no reason to doubt that the rapid spread of the disease is due to the frequent communication between the different ports, and the absence of an efficient system of quarantine."

To nearly the same effect writes the surgeon of another of our ships of war on the station. He tells us that—

"The disease commenced in Callao about the middle of February. The cases were then comparatively rare. In March they began to increase in numbers and severity, and about the same time it was communicated to the merchant shipping in the bay. The disease had not been seen in Callao since 1854. Some medical men at first denied that it was yellow fever, and were of opinion that it was a bad form of the ordinary bilious remittent, occasionally met with in the neighbourhood. At the end of June the disease began to subside, both in Callao and Lima, and very shortly afterwards it almost entirely disappeared."

At Callao, out of a population of nearly 22,000, as many as 1800 perished ; and at Lima the mortality was estimated at nearly 6000 in a population of about 70,000. That the course of the epidemic was from north to south, spreading over a period of twelve or thirteen months, from Panama, in lat. 9° N., to Callao, in lat. 12$''$° S., appears to be certain ; but the evidence

that this transmission was entirely due to intercourse by steamer intercommunication, as is confidently asserted, is little better than conjectural. No information whatever is given as to the antecedent state of the public health in the places attacked, prior to the occurrence of the first cases of the pestilence. From a statement in this Journal for July, 1869 (p. 225), it appears that when yellow fever was present in Callao and Lima, " a bad form of typhoid fever prevailed in the northern inland districts of Peru, and also in Ecuador and Venezuela." The synchronous prevalence of these two forms of fever has been repeatedly observed. Fortunately, none of our ships of war on the Pacific station contracted the infection in 1868, although more than one of them seem to have been at Callao when it was sickly ; and there must, of course, have been more or less communication with the shore while they lay there. The pestilence seems to have manifested no tendency to advance from Panama—its supposed starting-point—in a northerly direction, along the western coast of Mexico, as it did southwards towards Chili and Peru. This fact is the more noteworthy, as that part of the Mexican shore extending from Panama to about Mazatlan, in lat. 23° N., is at various points (especially at the ports of San Blas, Manzanilla, and Acapulco) infested with remittent of the worst type. The following is the description of the fever as it affected the crew of the " Pylades" after leaving Manzanilla ; the urine was unfortunately not tested, an omission to be regretted.

" Of the total admissions (between November 5th and 29th) one died, thirty-six returned to duty after an average of about thirteen days' sickness, and eight continued on the sick-list at the end of the year. Head symptoms : constant and very severe headache, chiefly frontal, in the worst cases very persistent, with great cerebral excitement, and wandering at night. Tongue : in the light cases white and creamy, with red edges ; in the severe cases dark brown, or intensely red and dry. In all the severe cases there was, during the height of the fever, and during the subsequent relapses, a very peculiar and offensive fœtor of the breath. There was abdominal pain or tenderness, chiefly referred to the region of the liver and spleen. Vomiting was present in every case, and in a few of them it was very obstinate, and recurred with every relapse or after remissions. The pulse was generally high, about 100, small, and in many cases jerky. The bowels were, as a rule, confined ; the urine scant in quantity, and high-coloured. The skin at the invasion of the disease was cold and clammy ; pains in the back and limbs were complained of ; yellowness of the skin and conjunctivæ was in some cases well marked, and in all very persistent. There was great debility. In the exacerbation the rigors, with fever, returned at short but irregular intervals, although, as a rule, the remissions occurred during the early

morning. The matter ejected from the stomach, when empty, was green-coloured. Many of the cases, after their return to duty, had to be readmitted on the sick-list with either diarrhœa or catarrh, &c., followed by debility, nervous palpitation, and flying pains about the left side of the chest; a few of them ran into well-marked inter-mittent fever."

Taken in connection with the description of the remittent fever in the West Indies already cited, it is interesting to com-pare the symptomatology with that of yellow fever in the less severe cases which recover, as given by Dr. Donnet :

" Rigors, preceded in some cases by general malaise; headache, sometimes severe; rachialgia and pains in the limbs; epigastric ten-derness; congested state and yellowness of the eyes; yellowness of the skin; a high temperature of the surface of the body; coated tongue; a pulse quick at times (seldom hard), soft and compressible, and slow at others; a constipated or relaxed state of bowels; albu-minous urine, and hæmorrhages from the nose and gums."

Dr. Donnet maintains that true yellow fever never exhibits any pyrexial remissions, but is a continued fever throughout; also that it " is of a contagious nature," whereas remittent fever is not. We shall have occasion to revert to these points of alleged diagnostic difference in the sequel.

Crossing now the Pacific from the west coast of North Ame-rica till we reach China and Japan, we find that the fever rate in our squadron there was higher than that on the Pacific sta-tion, but to what particular type of fever the excess was due we cannot determine. There was, of course, a large proportion of remittents, varying in their duration of attack from six to twenty or thirty days. Perhaps the most notable circumstance to be gathered from the record is the very frequent mention of enteric fever among the sick. The disease seems to have been contracted in several instances at Yokohama and other ports of Japan, also at Hong Kong. Of three cases on board the "Ocean," when at the former of these places, her surgeon writes:

" In all three the disease disclosed itself very insidiously. General malaise, followed by slight rigors and abdominal uneasiness, were the symptoms which had troubled the patients for a few days before applying for treatment. Evidences of gastro-intestinal irritation soon appeared; diarrhœa, with watery, pea-soupy stools, and abdo-minal tenderness; pyrexia, and the usual tongue, dry, fissured, and furred in the centre, moist round the tip and edges. In two only of the cases did the characteristic eruption appear, whilst in the third tremendous bilious vomiting was the earliest and most intractable symptom, succeeded on the day following his admission by an im-perfect aguish paroxysm. Two of the patients, a boy and a young ordinary seaman, had not been on shore for months, and were in

excellent health immediately before the invasion of the disease. The boy had just joined us from her Majesty's ship "Basilisk," in which vessel no similar cases had occurred. . . . . All the cases occurred in the autumn season, which was warm and wet. No exciting cause could be traced. All were discharged to sick quarters on shore as soon as the nature of the disease became evident, and all three recovered."[1]

In the "Princess Charlotte," the receiving ship at Hong Kong, there seems to have been "an epidemic of enteric fever." Full particulars have not yet been received, but the following statement by her medical officer, after sending to the Naval Hospital on shore there two cases, both of which proved fatal, deserves special notice:

"Having been informed by the Deputy Inspector-General that, previous to my having sent these cases to hospital, two cases of a like nature had been received into hospital from her Majesty's ship "Manilla," both of which died, and taking into consideration that the crew of the latter ship had only recently been berthed on board the "Princess Charlotte," and the absence of any other probable cause, I came to the conclusion that the 'origo mali' lay in this ship, and I was the more convinced in my opinion after examining the condition of the bilges, holds, &c. These were found to be in anything but a sanitary condition, as the ship had not been cleared out thoroughly for a number of years. Prompt measures were then taken for the immediate removal of the ship's company, and a large gang of coolies were employed to clear her out thoroughly. The bilges were washed out, disinfected with chloride of zinc and dried, and the whole ship ventilated and left clear for twenty-five days. No cases of fever have since occurred."[2]

That several of these fever cases exhibited more or less distinct pyrexial remissions, and were regarded at first as partaking of a remittent type, may be inferred from the circumstance that quinine was at first administered in frequently repeated doses. As might be expected, the drug was of no benefit in arresting the progress of the malady, but in all probability did harm, aggravating the cerebral distress, as quinine is so extremely apt to do when injudiciously employed. We read

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[1] The health of the European troops stationed at Hong Kong appears to have much improved of recent years. In 1868 they "have been," writes the deputy inspector, "more healthy than in any year since Hong Kong has been occupied. This I attribute to the fact of the men having had much space in the barracks, the use of punkahs at night in the hot weather, good diet, and light night duty."

[2] The suspicions expressed as to the probable cause of the fever on board were confirmed, as stated above, on examination of the hold and lower parts of the ship, which were found to be extremely foul and offensive. The water-tanks were, however, perfectly clean and pure within, a fact to be noted in relation to the probable causation of the disease.

that " in all the cases the head symptoms were prominent, and often well-marked signs of cerebral congestion were present." That the successful administration of quinine as a febrifuge demands the utmost attention to the history of each case, and the most diligent observation of every symptom from day to day, is conspicuously evident from many details in the report we are now considering.

That fever of the typhoid or enteric type constitutes a considerable proportion of the fevers on most, if not on all, the stations of our naval forces, is becoming every year more and more manifest. In the Australian squadron, numerous cases occurred in 1868 ; most of them were contracted at Sydney, where the harbour has become of late years extremely foul. Of sixteen cases in the " Challenger," while she lay at Sydney, six are registered as typhoid ; and the surgeon of the " Charybdis," writing of the probable cause of the disease on board his ship, says :

" During the hot months at the beginning of the year a good deal of sickness, in the form of diarrhœa, accompanied with feverish symptoms, was experienced at Sydney ; and as this form of disease prevailed both among the other ships in the harbour as well as on shore, it was naturally attributed to climatic influences. The comparatively stagnant water of the harbour, polluted by sewage, and exposed to a very high temperature, no doubt contributed much to the production of these complaints on board ship. The ships at anchor at Farm Cove, which is the usual anchorage for men-of-war, were more than usually exposed to such emanations from one of the main sewers of the town, which emptied itself into the harbour within 200 yards of the spot where the "Charybdis" at this time lay."[1]

An important nosological question is mooted by some observations of the medical officer of the "Virago," viz.—Whether malarial remittent fever and enteric fever are ever combined in the same patient. Six cases occurred while the ship was at sea on a cruise, and four or five weeks at least after leaving Sydney. Take the first case as an example. The symptoms were at first those of febrile catarrh. Then, for a week the sickness seemed to be remittent fever, indicated by " slight exacerbations in the afternoon or evening, and slight daily remissions, just enough to exempt it from a continued type." In the second week " the fever became almost continued," and typhoid in character,

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[1] If timely precautions are not taken, other Australian cities besides Sydney may ere long become infested with the same preventable sickness. In the Army Report we read—"The healthy climate of Melbourne, and the immunity it has hitherto enjoyed from serious epidemics, appear unfortunately to have led the municipality to overlook the importance of good drainage. This neglect, if not remedied, may, in the event of any serious visitation, be followed by the gravest consequences to the inhabitants and the troops."

together with a scanty eruption of rose-red papules over the abdomen. "The eruption continued to appear in scanty crops over the belly, in threes or fours, at intervals of a day or two, as those preceding faded, till the twenty-seventh day." The patient eventually recovered. Dr. Crosbie remarks:

"There can be no reasonable doubt that this was a case of 'remittent typhoid fever,' of typhoid fever caused by, or due to, malaria. The remittent character of the fever, with the knowledge of the occurrence of other cases about the same time, are sufficient to point it out as due to this cause, and the eruption as allying it with enteric fever as usually met with. There were all the characters of enteric fever with few exceptions, with those of remittent super-added. The eruption was carefully marked as it appeared. The dark-coloured stools were unlike those of enteric fever, and, although there was tympanitis and gurgling once, there was not at any time pain or tenderness in the left iliac region of the belly, and no swelling could be felt due to engorgement of the mesenteric glands. Would the difference in the character of the stools be sufficient to distinguish the remittent from the usual form of enteric fever? The emaciation was very rapid."

Then followed two mild cases of 'remittent febricula,' which were quickly cured by moderate doses of quinine; and then two others, not more severe, but more slow and tedious.

"In both the exacerbations took place in the afternoon with tolerable regularity; but in one diarrhœa interfered with the regular display of the symptoms, and in the other there was an occasional forenoon accession of fever. Quina modified both cases, and it was found difficult to determine when it might be safely discontinued, for the disease recurred in both after the medicine had been given up."

The sixth case was a much more severe and dangerous one. At an early period, the symptoms became adynamic, and sanguinolent bullæ and boils appeared on different parts of the body. The type of the fever was more or less decidedly paroxysmal.

Now, what was the true nature and the proper designation of these cases? Dr. Crosbie considers and records them as 're-mittent.' It may be so; but that there was an enteric or typhoid complication in most, if not in all of them, cannot well be doubted. "It is highly improbable," says Dr. Crosbie, "that the disease was contracted at Sydney, for we had been nearly four months there without fever." The history of these apparently mixed or hybrid forms of fever is fraught with ex-ceeding interest, and naval medical officers may do much by diligent observation to elucidate it. Exact necroscopic details in all fatal cases are, of course, indispensable.

We come now to the Cape of Good Hope and East India station in our geographical notice of fevers.

It stands, in respect of the relative frequency of these diseases in our naval forces, second on the list, being inferior only to the West African station.   The oceanic area which it includes is of immense extent, for it comprises not only the whole Indian Ocean, but also the Persian Gulf, Red Sea, and all the eastern shore of Africa thence to the Cape, together with the coasts of Madagascar, Mauritius, and other islands.   Between one fourth and one fifth of the entire naval force on this station suffered from attacks of fever, of one form or another, during 1868, the year of the Abyssinian expedition, in connection with which there was a small squadron engaged in the Red Sea.   In what relative proportion the different forms of pyrexia included under the head of 'continued and remittent fevers' occurred cannot be ascertained, as it is quite obvious that the classification varied not a little in different ships.   Many of the cases reported as 'febricula' partook of a malarious or paroxysmal type, and were treated as such.   Such was certainly the case with the sickness on board the troopship "Euphrates," although the attacks were not recorded as of remittent, but of febricular fever.   Again, when we find that the average duration of each case of 'continued fever' in one troopship is only eight days, and that in another it was twenty-two days, it may be fairly presumed that the disease was not quite the same in nature in the two vessels. It seems, moreover, pretty certain that a good many of the sixty 'remittent' cases in the "Octavia," contracted at Annesley Bay and at Suez, were more or less decidedly typhoid, possibly of a mixed character from a blending of two morbific elements in their production.

On the West African station, the fever station *par excellence*, the great bulk of the cases were doubtless of paludal origin, and were more or less decidedly of a paroxysmal type.   Many of the milder attacks are, indeed, classed as 'febricular' or 'ephemeral,' but that often they were essentially of the same nature and character as the more tedious and severe cases cannot be questioned, as, for example, in the eighteen cases contracted up the Niger in the "Investigator."   One was fatal, that of the medical officer of the ship, in whom cerebral symptoms early appeared, and who died comatose on the second or third day of the attack. The condition of the merchant shipping on this coast is incidentally referred to as being too often most lamentable.   At the mouth of the Congo—

"I visited," writes the surgeon of the "Myrmidon," "the British vessel "Camilla," and found the first mate to be dying, the second but little better, and, excepting one white boy, all the crew, whites

and West Indians, suffering from fever. The first mate was insensible, and unable to swallow. The second mate vomited nearly everything he took, but managed to retain a large dose (forty minims) of chlorodyne. I mixed up, in proper doses, a quantity of their quinine, *which had not before been used*, and supplied them with a pound of carbolic acid for their bilges. The first mate and one man died, and one man, after recovering from the fever, remained idiotic."

The experience of this officer and of others, as to the prophylactic properties of quinine, is favorable to its use. " In most cases," he says, " it protects from fever ; in others it renders the attack less violent." The protean character of the symptoms of malarial poisoning has often been referred to by tropical practitioners :

" In many cases," remarks the surgeon of the " Pioneer" respecting the fever in the Niger, "I noticed pain in the right hypochondrium, slight enlargement of the spleen, and slight cough, with dyspnœa. Cerebral excitement existed in one or two cases. Many suffered from irritability of the stomach, without any other accompanying symptom. It was interesting to watch the cases in which this occurred. It might happen after dinner, when the men came up to smoke. Suddenly they felt a desire to evacuate the contents of the stomach, and this was done without any effort on their part, nor did they feel any inconvenience afterwards."[1]

The resemblance of the early symptoms to those of typhoid fever is alluded to by the surgeon of the " Rattlesnake" in respect of the fever contracted in the Congo :

" The attack was preceded by general malaise, lassitude, yellowness of complexion, and slight headache. Sometimes the cold stage was very slightly marked, and the paroxysms rather irregular. The symptoms were always more violent in the middle watch at night. . . . The type of the disease was æsthenic, being marked by great debility from the first. In this respect it resembled typhoid fever, from the very sudden prostration accompanying it, as well as from the disturbance of the sensorial and nervous system, as evidenced by the low rambling delirium and incoherence of ideas, especially at night ; the headache, sometimes very severe ; vertigo, a weary kind of pain across the loins, and weakness of the extremities. The duration of the attack was not long, averaging from seven to ten days."

Happily, the fatality of the fever during 1868 was not great. The deaths did not exceed five in the whole squadron. In two

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[1] According to the observations of one of the medical officers, the period of the incubation of the malarial poison is generally from ten to twelve days. The incubative period of the yellow fever poison is set down by Dr. Donnet, from his experience of the epidemic at Port Royal, as varying from between one and two days to thirteen or fourteen days.

of the fatal cases the cause of death was cerebral; in the others it seemed to be general exhaustion, which, in two of them, had been preceded by extreme irritability of the stomach and vomiting "of thick grumous matter, evidently altered blood." No instance of genuine yellow fever appears in the naval and military returns for 1868.

Having now completed our cursory circuit of fever prevalence in different regions of the globe, we shall, after a few remarks on the nosological arrangement adopted in the two public services, close with some further observations illustrative of the present state of our knowledge with respect to yellow fever.

It is obviously very desirable that the same classification of fevers, as well as of all other diseases, should be followed in both services, otherwise no useful comparison can possibly be made of their respective experiences. The arrangement used in the navy is, as we have seen, into two groups, viz., "continued and remittent" and "intermittent," whereas in the army it is into "paroxysmal," including remittent and intermittent, and "continued." Both systems will, it is to be hoped, before long be superseded by the classification proposed by the College of Physicians; not that this or any other arrangement will, in numerous instances, serve to define or distinguish, with clear precision, the protean shapes and forms of pyrexial disease met with in all climates, and under every condition of life and service. Most difficult it often is, as every man of experience knows, to diagnosticate with exactness the true nature of all febrile attacks, even at home; but this difficulty is enormously increased when the family of paroxysmal or malarial fevers is associated, and possibly at times blended, with those of the proper continued type, whether of short or of long duration. No subject of clinical medicine is so perplexing to the military and naval medical officer as the correct designation of the multiform pyrexial diseases which he has to encounter in different regions of the world. Often it is by no means very clear, when the attacks in malarial regions are of comparatively short duration, whether the fever has been strictly only "febricula," *i. e.* an ephemeral form of simple continued fever, having no specific character, or whether it is a mild and transitory attack of "paroxysmal fever," quickly passing away under appropriate treatment.

We have already noticed several examples of this sort as occurring on board ship, in different localities, and the 'Army Report' alludes to the same thing among the troops. At Bermuda "the cases of continued fever appear to have been of malarial origin, and might, without impropriety, have been returned as remittent." Occasionally, but this is of rare occurrence, febricular attacks exhibit the features of "relapsing fever."

Several of the cases in the "Clio," at Valparaiso, and on the voyage thence to England, were of this character.

" One case [says the medical officer] terminated with profuse perspiration on the fourth day ; but, after apparent recovery, he had a sudden relapse on the fourteenth day, which ran a similar course as the first attack, leaving him much weakened.   Other two cases also appeared to be recovering, when sudden relapses occurred about the same period as in the former instance.   Both were remarkable for the predominance of head symptoms.   In another case there was a similar relapse, but on the twentieth day.   In one case the recovery was retarded by jaundice."

The symptoms were those of synochal fever, and generally lasted from three to six, eight, or rarely more days.   The temperature in the axilla, by the third day, was in the severer cases 102° in the morning, and 104° in the evening; in the milder cases, a degree or so less.   There were generally slight nocturnal exacerbations, but never any considerable or prolonged abatement in the symptoms that could be called a remission or intermission.   No eruption was observed in any of the twenty-nine cases.   The use of quinine as a febrifuge was not productive of any good, but only beneficial as a tonic during convalescence.

Again, it may be fairly questioned whether or not a few of the cases of more protracted " simple continued fever" were not of a masked typhoid or enteric type.   Many things seem to indicate that this form of fever is far more common and more widely spread geographically, than has yet been generally supposed. Throughout the Mediterranean command, it seems to be endemic in almost every place that is visited by our ships of war, the crews of which often contract it after leave on shore.   It is only of recent years that its presence in tropical countries has been distinctly recognised and discriminated.   That it has often been confounded with, and mistaken for, paroxysmal fever cannot be doubted ; nor is this very wonderful when it is remembered that not only are the pyrexial symptoms, in the early stage of typhoid, often remittent during the twenty-four hours, having distinct abatements in the morning and exacerbations in the evening, but also that the pathognomonic intestinal symptoms, and likewise the cutaneous eruption, are frequently very obscure, or, it may be, absent altogether.

To the first of these points Dr. Stone has drawn special attention, in his instructive narrative of the ' Epidemic of Typhoid Fever at Port of Spain, in Trinidad.'[1]   In a practical point of view, it is of supreme importance to diagnosticate the one fever from the other, as the treatment deemed specific against the

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[1] *Vide* ' B. and F. Med.-Chirurg. Review,' for July 1869.

one, viz. the anti-periodic administration of quinine, can do no good, and will probably do much harm in the other.

Whether the causal poisons of the two forms of fever may ever be acting simultaneously on the system, and thus give rise to a composite or hybrid pyrexia, can only be determined by most careful and repeated clinical scrutiny. There are many circumstances which render this idea not improbable. It is to our military and naval confrères that we must mainly look for a solution of this as well as other questions respecting the nature and genesis of some obscure forms of febrile disease. From the exact knowledge which they can generally have of all the antecedent and concomitant circumstances of the attacks among their patients, they possess a great advantage over the civil practitioner in forming accurate conclusions respecting the probable origin or uprise of attacks of fever, and many of the circumstances affecting their spread and persistence. For example, how easy, comparatively, it might often be for the naval medical officer, in particular, to determine with precision whether the occurrence of cases of typhoid fever (and the remark applies to cholera also) has been presumably due to the drinking of foul water; and, if there should be a succession of cases, whether the subsequent attacks could be at all dependent upon the primary case or cases, in relation to the water supply on board.[1] We cannot but think that if a searching analysis of the history of all fever outbreaks, whether in solitary cases or in groups, were systematically made and recorded by our brethren in the public service, much light might be thrown on various points that are still obscure, and are even now the subjects of doubt or controversy just as they were seventy years ago. Take, for example, the present opinions regarding the nature and attributes of yellow fever, that signal *opprobrium medicorum* in every respect. And here it may be noted as a strange fact that the sentiments of the medical officers of the two public services have, in recent years, generally differed, the one from the other, on the important questions relating to the origin and propagation of this deadly pestilence. In the naval service, the doctrine that personal contagion (*i. e.* the transmission of the morbific poison from the sick, or from objects which have been infected by them) is the paramount, if not the only, agency in its production

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[1] The narratives of the cases of enteric fever in the "Endymion," the "Malacca," and the "Challenger," attributed by the surgeons of these ships to the use of impure water at Jerusalem, at Valparaiso, and at Sydney, afford little more than merely conjectural evidence as to the presumed origin of the disease; and the circumstance that, in two at least of the above instances, one or two persons only were attacked, while a large majority of the men, equally exposed to the same suspected morbific influence, seem to have quite escaped, certainly renders the opinion very questionable.

and spreading, has, with few exceptions, found general accept-
ance, and been urged with great pertinacity and zeal. For
several years, the Navy reports were deeply tinctured with ex-
treme views upon this point, insisting strongly as they did that
the fever was " a disease of persons, not of places," and that,
whenever a case occurred in a ship of war, she should imme-
diately run to a cold climate as the only known means of safety.
So marked has been the bias in this direction of late, that the
author, a talented officer of the service, of the article " Yellow
Fever" in Reynolds' 'System of Medicine,' and other recent
writers, regard contagiousness as an essential and distinguishing
attribute of the disease.[1] The weight of military medical testi-
mony has, on the whole, been decidedly in the other direction,
as may be gathered from the evidence in the official reports on
the successive epidemics in Bermuda since 1853, in the report
of Dr. Lawson (in this journal for October, 1859) on the Jamaica
epidemic of 1856, and again in that of the military commission
on the epidemic of 1866-67. While admitting that the fever is
liable to manifest contagious properties under unfavorable hy-
gienic conditions, they refuse to admit that it is never developed
independently of communication with persons already infected,
or that the spreading of the disease is mainly due to such com-
munication, and may be most efficiently prevented or arrested
by strict quarantine against this source of contamination. The
history of the last Jamaica epidemic, in respect to the question
at issue, is especially interesting, as we have simultaneously (for
the first time, we believe) two separate reports, both very able,
from the principal medical officers of the navy and of the army
in the island at the time respecting it. Dr. Donnet has exer-
cised, as it seems to us, a judicious caution in the declaration of
his opinion when he simply states that " the evidence which the
history of this epidemic offers has much in it that is conclusive
towards proving that *contagion played some part in its develop-
ment.*" This moderate view cannot, we think, be fairly gain-
said by any impartial examiner of the whole record ; to go

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[1] Dr. Macdonald's definition is that it is an " infectious continued fever." Dr.
Aitken defines it to be " a specific malignant fever of a continuous type, occurring as
a rule only once during life, and propagated by contagion." He makes two distinct
forms of the disease, viz. :—a 'specific yellow fever,' or the above, and a 'mala-
rious yellow fever,' which is thus defined : " febrile phenomena due to malaria, in
which the exacerbations and remissions are so connected that the fever resembles
a continued fever, and is characterised by intense headache and yellowness of skin,
but in which the urine is not suppressed, and continues free from blood or albu-
men." The definition of yellow fever by the College of Physicians is altogether
to be preferred :—" A malignant epidemic fever, usually continued but sometimes
assuming a paroxysmal type, characterised by yellowness of the skin, and accom-
panied in the severest cases by hæmorrhages from the stomach (black vomit),
nose, and mouth."

further, either affirmatively or negatively, would be, as it seems
to us, unscientific and practically unwise. The general conclu-
sion to which the Military Commission, of which Deputy-Inspec-
tor O'Flaherty was the medical member, came after a careful
examination of the voluminous evidence they had collected, is
thus given in the 'Army Medical Report' for 1867:

" The Commission having carefully considered all the facts con-
nected with the origin and spread of yellow fever in Jamaica in
1866 and 1867, and their relation to each other as cause and effect,
consider that general and climatic causes were combined in the pro-
duction of the disease in the island; the former as shown by the
prevalence of the disease in the countries marked on the map, and
with which Jamaica has not unfrequent communication; the latter
by the occurrence of cases such as those at Port Morant and Morant
Bay, which had no external origin by any previous connection with
ships or persons at infected places, together with those cases that
there is little doubt of occurred at sea, prior to their arrival in the
island, in ships which during their transit had not visited any infected
place."

We have failed to discover the details of the evidence on which
the closing statement in this passage rests. The omission is
much to be regretted, as the fact, if such it was, would have all
but decided the moot question as to the origination of the pesti-
lence, and would have been of the highest epidemiological inte-
rest. This incident, along with others which will occur to the
attentive reader of the two reports, indicates how very desirable
it would be that in future the two public services should be
always associated together in conducting such inquiries. We
cannot but believe that had this been the case in the examina-
tion of the Jamaica epidemic of 1866-67, some notable gaps in
the evidence would most probably have been filled up, and some
apparently discrepant statements might have been avoided, if
not reconciled. Such association would serve, moreover, to bring
the medical officers of the two services most usefully together in
the carrying out of those scientific investigations respecting the
geographical distribution of epidemic diseases, now so much
desiderated. The co-operation, too, of the resident medical prac-
titioners should likewise be invariably sought for; it is they only
who can afford reliable information respecting the public health
and other antecedent phenomena of an epidemic visitation; and
it is on this very point that the history of the recent Jamaica
pestilence is most defective. In consequence of this event, it
cannot be discovered with any precision what was the health
state of either the outports, where the earliest cases occurred in
July,[1] or of Kingston itself prior to the first fatal case there in

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[1] The report of the Commissioners states that "a vessel from England, which

October, in one of the crew of a collier, who seems to have been taken ill within a day or two after arrival. We are not told whether any other person on board suffered before or subsequently, nor yet how long the vessel had been on the voyage from St. Thomas, where many supposed she contracted the fever. It is obvious that exact information on points like these is indispensable for a thorough history of the epidemic. That the town and harbour of Kingston speedily became a seat and centre of infection, appears to be indisputable; and as the fact was perfectly well known to the naval authorities, it seems strange that leave on shore to ramble about for two or three days should be granted to the crews of men-of-war under such circumstances of obvious risk. Most, if not all, of the attacks among the men of the "Cadmus" were certainly contracted in this way. After sending the cases to the hospital she went to sea, and remained free from any further traces of the deadly sickness. The same thing seems to have occurred in another ship of the squadron, the "Doris;" several of her men were attacked shortly after leave on shore at Kingston, and were sent to the naval hospital; the rest of the crew did not suffer. Such facts show the importance of obtaining detailed information respecting the health of the shore from the resident medical practitioners, on all occasions of epidemic sickness among our naval and military forces. No history can ever be complete otherwise, and unquestionably there is no pestilence in respect of which the most ample and exact information is so much needed as yellow fever. Uncertainty and difference of opinion still prevail about all that relates alike to its genesis, its nature and pathology, and its treatment, preventive and curative. In regard of the last-named topic, that of the therapeutic treatment of the disease, no better instruction, we believe, can be given to the inexperienced than to avoid the use of all heroic remedies, and to guard diligently against doing mischief by overactive medication of any sort, thereby lessening the chances, small as they too often are, of recovery by the restorative energies of the system, under an abounding supply of pure refreshing air around the sick at all times, both night and day.

That the large and repeated doses of quinine recommended

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anchored at Port Morant, had the captain and several of the crew ill from fever, which proved to be yellow fever. The cases were reported to the Governor, who ordered the vessel to proceed to sea." It is to be hoped that this arbitrary dismissal was not adopted without due precautions having been previously taken for the welfare of the remaining crew. The practice of at once 'ordering off' sickly vessels, especially merchantmen, in the hope of preserving a country from a threatened epidemic, is surely discreditable to a nation like ours, and serves to sanction the monstrous proceedings of the Spanish and Portuguese quarantine authorities.

by Blair and others are, on the whole, powerless for good, and have often done much harm, seems to be now generally admitted. Dr. Donnet altogether abstained from this line of treatment, or from the use of any other active remedies, and confined his endeavours to mitigating the most distressing symptoms as well as he could. Considering the important part which the disordered urinary secretion seems to play in the progress and fatality of the disease, it may be reasonably inferred that sedulous attention should be given to promoting free diuresis from the earliest stage, and to relieving by all appropriate means the congested condition of the kidneys. When the irritability of the stomach forbids the use of copious diluents by the mouth, the frequent administration of large simple enemata will probably be found to be advantageous. Inspector-General Lawson, in his admirable papers in this Journal for April and October, 1862, alludes to other beneficial effects from their use, by acting upon the bowels—

" Nothing is of more importance than to re-establish the secreting function of the colon and to obtain feculent evacuations, not mere bilious discharges—for a patient may have these and die—but proper dark brown feculent stools."

Whether the addition of oil of turpentine—recommended so highly by the late Dr. Archibald Smith from his experience of its effects in the " hæmogastric " fevers of Peru—to the enemata might be safely and usefully made, is well worthy of attention. In respect of this, as of every other therapeutic suggestion, it is to be remembered, as Dr. Lawson remarks, that " all practice in yellow fever must at present be more or less empiric, and we can expect to substitute more rational plans only as our knowledge of the diseased actions and their results becomes extended." Such is the practical conclusion arrived at by this excellent observer, after a long and varied experience of the disease both in Africa and in the West Indies. That experience has led him to opinions respecting its nature and properties which coincide much more with those of several of the most practised observers in the last century than with the more positive and confident declarations of recent authors. Hunter, Jackson, and Moseley held that yellow fever was a mixed fever, of a variable type between remittent and continued fevers ; and this is the view which he has likewise adopted, as will be seen by the following passage from one of his papers, after the anatomical and chemical pathology of the disease had been minutely described :

" Fevers in tropical climates are by no means so simple or well-defined in their forms on all occasions as many suppose; on the

contrary, they are often very complicated. I have known cases commence as remittent, and continue as such to from the sixth to the tenth day, having an intermission on the morning of these days, yet the same afternoon fever recurred, which soon took on the character of yellow fever, and proved fatal on the fourth or fifth day of that form, with black vomit and other unmistakeable symptoms of this disease. I have seen in other cases which commenced as intermittent, diarrhœa ensue, and after three or more tertian periods, the fever became continued, and assumed the character of typhoid fever, and ultimately presented the affection of the kidneys and urine seen in yellow fever, and then terminated in death. On examining the bodies, the intermixture of the morbid appearances peculiar to yellow and typhoid fevers were detected in variable proportions, as already detailed. The cause of the typhoid complication in these cases was a privy immediately in the rear of the building from which they came, but to windward of it at night; this had a deep cesspit, which had been emptied, and thus exposed the additional surface of the sides as well as the bottom to give off emanations. On clearing the building of the inmates, the typhoid complication disappeared. These facts show that yellow fever is not a complaint separate and distinct from all others, but that it becomes mixed up with them in various ways, according to circumstances."

In concluding our notice of these Annual Reports, we have only to add that not only should they be regularly studied by every medical officer in the two public services, but also that they will well repay the perusal of physicians in civil life, enlarging their views in respect of many diseases, and leading them to modify or correct opinions founded on observations in limited fields of inquiry.

VIII.—Life of Dr. Knox.[1]

WE are indebted to Dr. Lonsdale for a volume that is very pleasant to read, but not very easy to condense. We shall, however, endeavour to extract, from the 410 pages of which it consists, the most salient points of the life of the distinguished teacher of whom it treats—a life which serves rather "to point a moral" than to "adorn a tale."

Robert, the fifth son of Robert and Mary Knox, was born in Edinburgh in 1791, and after a good home-education, was sent at an early age to the High School, from which he emerged as Dux to 1810. In the autumn of that year he joined the medical classes of the university, and having studied anatomy under

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[1] *A Sketch of the Life and Writings of Robert Knox, the Anatomist.* By his Pupil and Colleague, HENRY LONSDALE. London, 1870.

Monro *tertius,* was as a natural consequence, unless the Professor's teaching was then very different from what it was thirty years later, rejected on that subject when he went up for his first examination for the M.D. degree.

Stimulated by this defeat, he studied assiduously under Barclay, who then held much the same position as a teacher of anatomy that Knox himself occupied some twenty-four years later, and on his second appearance before his examiners he startled them more by his profound and accurate knowledge than he had previously done by his ignorance. From the date of his graduation in 1814 to the close of his career, anatomy was his favorite pursuit.

Having no private means, he resolved on entering the army as assistant-surgeon. The regiment to which he was appointed was ordered in 1817 to the Cape of Good Hope, and in that colony Dr. Knox probably spent the three happiest years of his chequered existence. In his later days, when his biographer and the writer of these lines knew him, there was no period of his life to which he so often adverted as that which he spent in South Africa, and the traveller's stories, told as only Knox could tell them, that flowed from his lips in a continuous stream for hours together, under the genial influence of a glass of toddy, can never be forgotten by the favoured senior pupils whose pride it used to be to entice their master to a quiet little Saturday-evening supper.

He returned to England at the end of 1820, visited Paris, where he stayed for several months, and studied under Cuvier and Geoffrey St. Hilaire, and in the following year returned to his native city. The numerous original memoirs on comparative anatomy, pathology, ethnology, &c., which he contributed to the Edinburgh societies, soon acquired for him a high scientific position, and in 1825, after he had for some months devoted his gratuitous labours to the College of Surgeons' Museum, he was appointed its conservator at a salary of £100 per annum. This may be regarded as the first decided starting-point in Knox's career. The second, a co-partnery with Dr. Barclay, the greatest anatomical teacher of the period, occurred two months later, in March, 1825. In less than a year and a half afterwards, in August, 1826, Barclay died, and Knox came into the full possession of the class and its total profits. His first course of lectures on anatomy and physiology, delivered in 1825-6, was a great success, and he soon became recognised as incomparably the first teacher in his department. It was at the beginning of his third session, in November, 1827, that Burke and Hare, whose names will always be associated with that of Knox, first appeared in the field. At the close of that month

an old pensioner died at the lodging-house of Hare, and as the
landlord saw no other way of recovering his arrears of rent,
which amounted to four pounds, he resolved to sell the body to
Dr. Monro.

In another of his lodgers, William Burke, whose name is
indelibly incorporated in the English language, he found a ready
accomplice. They repaired in the evening to the College, and
on asking a student the way to the anatomical rooms, and telling
him their errand, they were recommended by him to go to Dr.
Knox's in Surgeon Square. They obtained £7 10s. for the
body ; and the discovery of this easy way of earning money led
to the commission of a series of murders that have been rarely
equalled in the annals of crime. They had not the courage to
become resurrectionists ; they could not afford to wait for such
chance cases as the poor pensioner, and so, at Hare's suggestion,
they resolved to inveigle the old and infirm into his den, and
" do for them." An old woman from the village of Gilmerton
was their first victim. Hare, finding her in the street " fresh
with drink," asked her into his house, and she sang songs to her
murderers, drank freely, and at length became comatose.
" Hare then placed his hands firmly over her nose and mouth to
stop respiration, while Burke laid himself across her body to
ensure stillness. The operation succeeded : the woman of
Gilmerton was dead. The body brought £10." From that hour
burking became an established fact. Burke's mistress and
Hare's wife were speedily made accomplices. Widows, orphans,
prostitutes, and idiots were allured into the fatal den, dosed with
whisky, and suffocated. Within less than a year fifteen murders
had been successfully accomplished, but on the 2nd of
November, 1828, the citizens of Edinburgh were astounded by
the report that a woman named Doherty had been murdered for
the sake of her body, and that it was found in Knox's rooms.
The rabble at once assumed that he was a participator in the
crimes of Burke and Hare ; he was mobbed in the streets ; his
private residence was surrounded by a crowd of ruffians, who
threatened his life ; he was attacked almost universally by the
press ; and the members of his own profession showed him little
sympathy. Relying on his own innocence, and expecting that
the excitement would subside, he for a considerable time made
no effort to vindicate his character. In the succeeding March,
however, he broke silence, and addressed a letter to the 'Caledo-
nian Mercury,' in which he fully explained the ease with which
any anatomical teacher might be imposed upon, and directed
the attention of his readers to the report of a committee who,
at his request, " undertook to investigate the truth or falsehood
of the rumours in circulation against him." When we add that

amongst the leading members of this committee were Sir John Robison, the Secretary to the Royal Society, Professors Russell, Alison, Sir George Ballingall, Sir William Hamilton, Sir George Sinclair, and several other gentlemen of high position, and that they conclude their elaborate report with the remark that "the extent, therefore, to which the committee think that Dr. Knox can be blamed on account of transactions with Burke and Hare is that, by the laxity of the regulations under which bodies were received into his rooms, he unintentionally gave a degree of facility to the disposal of the victims of their crimes, which under better regulations would not have existed," we feel assured that posterity will acquit him of the slightest complicity with Burke and Hare. If he were guilty, two young men then acting as his demonstrators, whose names are now universally known throughout the scientific world, namely, John Reid and William Fergusson, must have been at least equally to blame. Surely the most remarkable trio of murderers that ever existed ! Throughout the whole period of his troubles his class stood firmly—we may say affectionately—with him.

"His anatomical establishment was his only haven of peace and rest: each appearance in the lecture-room elicited heart-felt expressions of sympathy from every side of the crowded benches; and no lecturer on science was ever so idolized by a class as Knox during that eventful session of 1828-9."

At the end of that session they presented him with a gold watch and a letter of sympathy.

Never before had a medical teacher such a class in the United Kingdom. From 1826 to 1835, over a period of nine years, his students annually averaged 335; and in the session of 1828-29, to which we have just referred, he had 504 pupils. As Barclay's old class-room could not hold more than 200 persons, Knox was obliged to lecture three times daily on the same subject; and when the College of Surgeons vacated their old hall in Surgeons' Square in 1832, he built a very large class-room on the site and moved there. When on the retirement of Professor Alison in 1841, Dr. Knox offered himself as a candidate for the Chair of Physiology in the University of Edinburgh, he sent in to the Town Council (who were then even more potent for evil than they have recently shown themselves to be) a list of the distinguished physicians and surgeons whom he had educated *practically*. This list, quoted, as he said, hastily and from memory, included the names of " R. Boyd, W. Fergusson, T. W. Jones, John Goodsir, Harry Goodsir, Henry Lonsdale, John Reid, J. W. Balfour, James Duncan, Douglas Maclagan, Patrick Newbigging, John H. Bennett," &c. The enormous classes

which for many years filled his lecture-room were mainly attracted by the unrivalled eloquence of his style, by his earnestness of purpose, and by his profound knowledge of human and comparative anatomy and ethnology; but to a certain degree his success was due to the utterly rotten state of the university at that period. With the exception of Alison, Christison, and Hope, there was no one fit to compete with Knox, Liston, Syme, J. Lizars, MacIntosh, and Sharpey, who were then extra-academical teachers. Knox further singularly strengthened his position by the aid of his assistants; in 1828-9 he commissioned Mr. (now Sir William) Fergusson, who had previously assisted him in his class-work, to give demonstrations on surgical anatomy, which was then first introduced into anatomical teaching. For several years Mr. Fergusson was the chief demonstrator, and in January, 1833, Dr. John Reid joined Dr. Knox and Mr. Fergusson in conducting the anatomical rooms. Each member of the co-partnery seemed to exert himself for the common good; their diligence and supervision extended over the whole day, and the result was eminently successful in promoting the anatomical interests of large classes in "Old Surgeon's Hall."

"Such a triumvirate," says Dr. Lonsdale, "as Knox the master, and William Fergusson and John Reid, apprenticed coadjutors, labouring together in one institution, can hardly be paralleled in the annals of anatomical teaching. Whilst alike in setting forth the elementary instructions, each teacher had his higher walk, and assiduously cultivated it. If Mr. Fergusson, by his dexterity and thorough knowledge of anatomy, created a love for surgery, his colleague, Dr. John Reid, gave promise of high reward from the following of physiology; both men were highly prized by their pupils. Knox was not wanting in any direction; there was a 'dash and go' in him that surpassed all men of his time, as it does all description; it lent a charm to everything he did." P. 158.

The medical school of Edinburgh began to show signs of decadence about the year 1835, and went on declining for many subsequent years; indeed, until John Goodsir succeeded Monro in the anatomical chair of the Univerity. One of the various causes of this decline seems to have been the extreme difficulty that Knox and his assistants had in procuring subjects, the University having acquired "a monopoly which was deemed the more intolerable outside the walls, that it recalled too truly the fable of the dog and the manger."

From this period Knox's career began to decline, at first slowly, but afterwards with appalling rapidity. In 1837 we find him offering himself as a candidate for the vacant chair of General Pathology, but his unpopularity with the electors, whom he openly treated with the most profound contempt, ren-

dered his success an impossibility. In 1839 he asked John Goodsir, who was then assisting his father at Anstruther, to join him in the lectureship of anatomy, and urged him to bring over his brother Harry (who was lost in the Franklin expedition) to take a share in the Practical Rooms. As this arrangement could not be carried out, he then applied to Dr. Lonsdale, his biographer, who consented to join him as his demonstrator and partner in May, 1840. This fact, as well as that of the removal of the school to Argyle Square, is recorded in p. 217, and we read on, with the anticipation of meeting with, from this time forward, even a fuller account of Knox's life, inasmuch as his biographer was more intimately associated with him. Strange as it may seem, the new partner simply announces that he has associated his lecturing fortunes with those of his old master, when (with trifling exceptions, recorded in pp. 249 and 255) he vanishes from the scene. For many reasons—some affecting Dr. Lonsdale himself—we wish that some history should have been given of the short working career of the partners; but we are told absolutely nothing, and in p. 287, without any intimation that the partnership has been dissolved, we read that " regardless of both legal and moral obligations, he (Knox) commenced lecturing on anatomy at Edinburgh in November, 1842, but got no class." As it stands, this sentence is utterly unintelligible; but we are able, and deem it our duty, to explain it. The true state of the case is that one very essential condition of the partnership was that Knox should retire from lecturing in August, 1842. By the above attempt at lecturing in opposition to the covenant, Dr. Lonsdale was compelled to apply for an interdict to prevent him; and thus this unfortunate union caused little or nothing but annoyance to the junior partner. No one can fail to honour the feelings which led to this reticence on the part of his biographer, while all must admit that it has caused a certain degree of obscurity in this portion of the history of Knox's Life.

In 1843-4, notwithstanding the failure of the preceding session, he attempted, with no better success, to give a course of lectures on physiology. From about this time his fall was as rapid as his original success had been. In 1844-5 he joined the Portland Street School of Medicine in Glasgow; but having to contend with the University and the Andersonian Institution, his class was so small that he returned his fees to his pupils before November was out. " Like his great military idol, he had had his Austerlitz, and now had come his Moscow." From 1842 to within a few years of his death he may be said to have been actually homeless, sometimes living with an old pupil, sometimes making provincial tours, and lecturing on " The

Races of Man," and sometimes obtaining a precarious income as a bookseller's hack, or as a newspaper contributor.

Once only during these troublous times did our old master find a harbour of rest. The story, as we heard it, was that an eccentric old gentleman, at Shirley, near Southampton, who accidentally heard him lecture, at once offered him house and home, urging that if Dr. Knox would accept the offer, he (the old gentleman) would regard it as a privilege to provide for the wants of so distinguished a philosopher; and we believe that the offer was accepted, and that Dr. Knox made Shirley his home for two or three years. We cannot help suspecting that our old gentleman is in reality identical with the Maria described in p. 389, who was " comely and comfortable in means," and " who became enamoured of his person and cleverness." Several of poor Knox's best Cape stories, as, for instance, why you should not take a pointer when you go out elephant shooting, were told with marvellous variations.

In 1847, while residing for a short time in Edinburgh, he issued a proposal to establish " an agricultural college, within the walls of which should be taught the sciences bearing on agriculture, and in particular the sciences of chemistry, vegetable physiology, veterinary medicine, and geology." It was, if we mistake not, in the very same year, when dining in London with Edward Forbes, at the house of the writer of this article, he observed that he had all but completely worked out the details of a scheme by which we should all speedily make our fortunes. Upon inquiry it turned out that a joint-stock company was to be formed to purchase or lease the central part of Leicester Square, on which a gigantic medical school was to be erected. " I," he observed, " shall take the anatomy; you (addressing the present writer) shall take medicine; Fergusson, even if he won't join at once, will soon be glad to give up King's College, and take our surgery chair; and our friend Forbes will follow his example, and shall have natural history. I have had upwards of 5000 students, of whom, at the lowest estimate, 1000 are now practising and taking apprentices. If each of these would send us one pupil every second year we should have at least 500 new students every session." It is needless to add that no more was heard of the Agricultural College, or the " Knox Institute," as the Leicester Square school was to be called. But these are good illustrations of the marvellous schemes which were always circulating in our old friend's fertile brain.

In 1852 we find him applying, of course in vain, for an appointment in the British Museum. When the war with Russia broke out he was desirous of an appointment as staff-surgeon in the Crimea, and his application was supported by

several influential friends; but his age (he was then sixty-three) was urged as a fatal obstacle. In 1856 he was appointed pathological anatomist to the Cancer Hospital; but it was a merely honorary office, involving labour with no direct remuneration.

During the last few years of his life Dr. Knox " took to practice" in Hackney, and strange as it may appear to his old pupils, who have listened with wondering ears to the great operations he had performed at the Cape—how, for example, he had succeeded in a case of lithotomy in extracting the stone with a tablespoon, after his chief had failed with the forceps—he became a man-midwife, or male howdie, and, as his biographer tells us, did a great deal in the obstetric department. We regret that no facts worthy of record have been obtained regarding his declining years. We know little more than that, on the 9th of December, 1862, he came home from the Cancer Hospital in a very exhausted state, and, after a slight stimulant, he retired to bed. In a short time he was found apoplectic, and, with little or no rallying, he died on the 22nd.

We shall not enter into any details regarding the painful causes that led to the rapid, we may say degrading, fall of this great anatomist. His pupils and assistants loved him, while with few exceptions he was detested by all the rest of the world with whom he came professionally in contact. If our readers wish to know with what bitter sarcasm he could use his tongue or his pen, let us refer them to the grand passage at arms between himself and the professorial clique of the Royal Society, described in pp. 190-93, or to his letter of application for the physiology chair (addressed to the town councillors), in which he briefly, but very pungently, sketches the professional characters of his opponents, Drs. Allen Thomson and Carpenter (see pp. 261-64). As his biographer observes of this letter, " every sentence of it conveyed a homethrust at private individuals or corporate bodies."

Another cause that materially contributed to his ostracism from Edinburgh was his avowed unorthodoxy. Brought up as a strict Calvinist, in his manhood he belonged to no Church, and " seemed to view all religious sects and denominations, from the Mummy-maker Egyptian down to the worshippers of the Winking Virgin of Rimini of these later days, as much alike in character, having their origin in idolatrous credulity and ignorance;" and yet (as his biographer tells us) he " was, nevertheless, a man of high reverence and belief."

In conclusion, we heartily commend this volume to all of our readers who have a personal interest in the history of the Edinburgh School of Medicine.

IX.—A National Registration of Sickness.[1]

ON the 14th of October, 1870, the Right Hon. G. J. Goschen, as President of the Poor Law Board, received a deputation from the British Medical Association and the Poor Law Medical Officers' Association, on the subject of poor law reform and the

[1] 1. *On the Formation of a System of National Medical Police and Hygiène.* By W. STRANGE, M.D. 'London Medical Gazette,' 1846.

2. *On the Connexion between Medical Poor Law Relief and the Sanitary Condition of the People.* By JOHN LIDDLE, Esq. 'Journal of Public Health,' Feb., 1848.

3. *Health of the Metropolis.* Weekly return printed by the General Board of Health.
Rise and Decline of Disease. Compiled from the District Returns; with remarks by CONWAY EVANS, M.B. 1857-8.

4. *The Right Use of Records founded on Local Facts.* Being two papers read before the National Association for Promoting Social Science; with an account of subsequent proceedings, &c. By H. W. RUMSEY. London, 1860. Pamphlet.

5. *Facts and Suggestions on the Registration of Disease.* By BENJAMIN RICHARDSON, M.D. 'Transact. Social Science Assoc.,' 1861, p. 535.

6. *Disease in St. Marylebone and Manchester during the years* 1860-65. By A. RANSOME, M.B. 'Manchester and Salford Sanitary Association Reports.' Pamphlet.

7. *On the Registration of Births, Deaths, and Diseases.* Read before the Social Science Association. Dublin, 1861. By ALEX. HARKIN, M.D. Pamphlet.

8. *Reports of Committee of the Manchester and Salford Sanitary Association,* 18 ⁑2-7.

9. *Health and Meteorology of Newcastle and Gateshead.* By G. H. PHILIPSON M.D. Communicated to the Northumberland and Durham Medical Society. 1864-70.

10. *On State Medicine in Great Britain and Ireland.* By HENRY W. RUMSEY, M.D., F.R.C.S. Pamphlet. London, 1867.

11. *Address before the Society for Promoting Social Science.* By W. FARR, M.D. 'Social Science Transactions,' 1866.

12. *Extracts from a Memorandum on the Advantages to be derived from a Registration of Disease, and on the mode in which such a Record may be obtained.* Adopted at a Meeting of a Committee representing the St. Andrew's Medical Graduates' Assoc., the Medical Soc. of London, the Metropolitan Assoc. of Medical Officers of Health, and the Poor Law Medical Officers' Assoc., held June 16, 1869. 'Brit. Med. Journ.,' Nov. 13, 1869.

13. *Minutes of Evidence before the Royal Sanitary Commission.* London, 1869. Blue-Book.

14. *Statistical Review of Ten Years of Disease in Manchester and Salford.* By ARTHUR RANSOME, M.D. 'Brit. Med. Journ.,' Dec. 3rd, 1870.

15. *On the Registration of Disease.* By G. H. PHILIPSON, M.D. 'Brit. Med. Journ.,' Nov. 6, 1869.

16. *Suggestions for National Returns of Sickness.* By JAMES LEWIS. 1870. Pamphlet.

17. *National Returns of Sickness.* By JAMES LEWIS. Paper in 'Sessional Proceedings of the National Assoc. for the Promotion of Social Science.' Vol. iii, No. 17, for March 24, 1870, p. 309.

18. *Fourteenth Report of the Commissioners of H. M. Customs.* Medical Report, by WALTER DICKSON, M.D., R.N., Medical Inspector of H. M. Customs. London, 1870. Blue-Book.

registration of disease.   The first proposition submitted by the
joint committee was to the following effect :

"That medical relief and the sanitary care of the poorer classes,
with which the registration of disease is indissolubly connected, are
questions which ought not to be treated independently of each other ;
and that they require to be settled on improved principles by a con-
nected and consistent scheme of legislation and administration."[1]

Referring to one section of the subject before him, Mr. Goschen
replied that—

"The arguments in favour of speedy returns (of sickness) were
such that nothing could be said against the proposition made to him,
and the next question was that of cost."

Such is the present aspect of the great question of National
Sickness Returns, and its promoters have no reason to be
disappointed with the progress made.   It is something to have
gained a favorable hearing from a thoughtful member of the
Government, and to have reduced the question to one of cost.

Long years of energetic, arduous work are required in
England before the idea of a few enthusiasts (so called) becomes
a conviction in the minds of the many ; before the idea and the
conviction by some happy combination of chances are brought
home to one in whom are centred the will and the power to give
them effect.

The registration of disease is no new idea ; for the greater
part of a century it has been constantly recurring to men's
minds as a thing to be desired.   It seems now almost within
our grasp, and in anticipation of the removal of the official *veto*,
it may be well to look a little more closely at the ends to be
gained by a national registration of sickness—to inform our-
selves of what has been thought and said on the subject, and to
mark the shoals on which practical men have made shipwreck ;
we shall thus be in a better position to consider the principles
which should pervade any new organization, and the position
which this should take in the sanitary machinery of the State.

It had long been the aim of sanitarians to establish some
reliable test of health—a "health barometer," as Dr. Farr aptly
called it ; and when, in 1837, the Act for registering births,
deaths, and marriages was passed, such a test was supposed to
have been discovered in the mortuary register.

"As political economy," says Dr. W. Farr, "rests upon the idea
of value, so our science rests upon the idea of health, and it is as
important to us to find a measure of health as it is to the economist
to find a measure of value.   That measure must be simple, and
applicable to all countries ; now the measure that is in universal use
is the rate of mortality. . . . . The mortality is really a life

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[1] 'British Medical Journal,' Oct. 22nd, 1870.

measure . . . . if it is only an indirect measure of some of the elements of health, according to our larger definitions ; it expresses in masses the sickness, measures very accurately the influence of a variety of causes on life, and is a safe guide in practice."[1]

Now, without for a moment depreciating the known value of a mortuary record, or the results which it has yielded to science in the masterly hands of Dr. W. Farr, we must repeat a protest which has already been urged in the pages of this Review[2] against the fallacies of our registration system as it exists at present. That a high death-rate shows the *intensity* of disease, not necessarily its *amount*, its enervating effects, or its place and date, much less its antecedents, is now well known. A community with a low rate of mortality may yet *quâ* health be a burthen to the State. Perhaps nothing was more striking in the reports on the sanitary condition of the labouring population of England in 1842 than the deterioration of growth and strength by disease among the handloom weavers of Bethnal Green and Spitalfields, shown not by decrease of numbers, nor by tables of mortality, but by the rough-and-ready test of the recruiting sergeant's scrutiny. We are convinced that the most formidable obstacle to a registration of sickness has been and still is the ready acceptance of a mortuary record, with its reported numbers and causes of death, as a sufficient test of health and health conditions.

" It will be urged," says the Registrar-General, " that the machinery of registration should be employed to give an immediate warning of epidemic disease. . . . . When the plague is at the door the people will not wait for its history to bewritten in a blue book."

Certainly not, and, therefore, we cannot agree with his conclusion that—

" It will be sufficient to state in reference to it that I publish a weekly report for *London* on the Tuesday following the termination of each week, and a quarterly report for England and Wales within a month after the close of each quarter."[3]

Can the Registrar-General tell the history of the present epidemic of smallpox from the mortuary returns ? Is it creditable to our health organisation that—

" There was no public knowledge of the existence of diphtheria in England until it had been an epidemic for two years."[4] Or that —" Thirty-four cases of relapsing fever had been admitted into the Fever Hospital during September, and that seven had been brought

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[1] " Address, Social Science Association," 1866.

[2] " Death Certificates and the Registration of Disease," ' Brit. and For. Med.-Chir. Rev.,' Oct., 1869.

[3] ' Twenty-third Annual Report of the Registrar General.'

[4] Simon, ' Royal Sanitary Commission,' Q. 1000.

in on October 1st, and, as was subsequently noted in the 'Lancet,' that sixty-eight cases were admitted in the week ending October 22nd, eighty-nine in the week following, and that on November 6th there were 120 cases under treatment in the same hospital." And yet —"The first appearance of the disease as a cause of death was in the Registrar-General's returns for the week ending November 6th, when two fatal cases were recorded."[1]

In this case a weekly registration of disease would have dispelled the idea of an " outbreak," and would have shown that an epidemic, as remarked by Dr. Morgan, " by little and little feels its way, as though courting the adoption of measures opposed to its spread," and these measures might have been adopted.

Does the shade of poor Admiral Fitzroy never appear before the Registrar-General when he ventures to publish, on the evidence of a death-rate some weeks old, that certain watering-places are healthy ?   Surely sometimes he must be haunted with the dread of sending visitors into the teeth of an epidemic.

But it has been objected that a local publication of sickness returns would create alarm, and such might be the result at first in rare cases.   Dr. Ransome's experience, however, at Manchester, is quite the reverse.[2]   The weekly reports in the public journals, he tells us, allay panic ; they show who bear the brunt of the disease, the poor or the rich ; they exhibit the results of temporary prosperity or reverse in manfactures and trade, as well as the enervating effects of special occupation ; lastly, they make known the first whisper of an invading epidemic, and by warning of danger arm the people against it.

Turning to the wider and more scientific aims of a registration of sickness, we see what use has been made of it by Dr. Ballard, in his many valuable papers on the ætiology of disease, and by Dr. Ransome, in his comparison of the rise and fall of epidemic and climatic disease in Manchester and St. Marylebone during a period of five years.   In this way facts are reached which no mortuary register can reveal, and a pathway is opened to a true science of hygiene.   Diseases are observed, such as syphilis, ague, rheumatic fever, which are rarely known in a death-register, save by their distant issues in dropsy, brain, liver, or heart affections.

Rheumatism and gout, for instance, caused one tenth of the sickness among the men of H.M. Customs in 1869, Dr. Dickson tells us ; and superannuations from this cause have averaged one, sometimes five, yearly ; yet no death was directly attributable to it during a period of thirteen years.

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[1] Lewis, 'National Returns of Sickness.'
[2] 'Brit. Medical Journal,' Dec. 3rd, 1870.

Much light would inevitably be thrown on the influence of climate, atmospheric and telluric, by an extended comparison of meteorological observation with the statistics of disease, and medical men might in time be guided by reason and true science, rather than by caprice in the selection of a winter home for the consumptive, or a spa for the rheumatic. Our statistical system won admiration at the last international congress; let us beware lest the advances of minor states give us a second place in the next. Already has Italy established a system of district medical officers to report on sanitary matters and disease, to collect statistics, and acquire such local knowledge of the medical topography as shall enable them to advise on all points connected with the public health.

And this leads to the most important question connected with sickness registration in England. More than one voluntary effort has been made to determine local health conditions by an organised record of disease; and it has been gravely proposed, with all the weight and authority of the British Medical Association, that voluntary effort should still be relied upon for a registration system embracing the whole of England.[1]

"The country does not at present think the prevention of disease worth paying for," says Dr. Druitt; "the more successful the sanitarian, the worse for him;"[2] but is it not time that the Government and the country should awake from their apathy in this momentous matter, and face it fairly? Half measures are contradictory and mischievous. This is no simple scientific inquiry in the interests of medicine, however much it may contribute to our knowledge of disease; it is not exclusively for the information of Government and statisticians, nor is it merely for local use. To be thorough and national, it must subserve more purposes than one. If the state is interested in knowing the extent of disease as being the chief cause of pauperism and loss of power to the nation, the people are no less interested in learning the subtle dangers which surround them, and the diseases which are silently decimating their numbers.

It is unfair, therefore, to expect from private effort, even in England, that which is so manifestly the concern of all; nor, indeed, can voluntary associations be depended upon for the purpose. The common fate which has befallen all but two of the voluntary attempts at a registration of sickness show only too clearly that the expense of publication is beyond private means, and that a national registration of disease must of necessity be organized by the State, and paid for from the

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[1] 'Brit. Medical Journal,' Aug. 25th, 1866.
[2] 'Evidence, Royal Sanitary Commission.'

public purse. Even as we write, intimation has reached us that the effort of the Northumberland and Durham Medical Society, commenced in 1864, is failing from want of support, and that the registration, so admirably conducted by Dr. Philipson and his zealous coadjutors, will probably cease with the current year.[1]

Passing on to consider the extent to which registration should be carried as regards classes of the community, opinions would seem to be almost unanimous that any public record of cases of disease must be confined, in the first instance, to those attended at the public expense. This limitation applies primarily, of course, to poor law returns, which are calculated to yield some three and a half million cases yearly, but it would include also returns, on a uniform system from prisons, penitentiaries, dockyards, arsenals, police and revenue departments, from endowed schools, and from medical charities—hospitals and dispensaries—certainly much underrated by Mr. Lewis at a million and a half cases[2]—returns which might be made compulsory on payment of moderate fees to the resident medical officers for filling them up. The same inducement might in time be offered to the sanitary authorities, to officers of clubs and provident societies, with their million cases yearly, to contribute regular returns of their sick and hurt members. The records of these institutions, hitherto almost wholly unutilised, might be combined with returns from industrial establishments. The inspectors of mines, factories, workshops, and public works, might also obtain, by reasonable remuneration to the medical officers, a body of information of especial value in demonstrating the effects of insanitary surroundings on the lives and (in military phrase) the effective strength of the working classes.

"Returns of sickness," says Dr. Conway Evans,[3] "to be of value, should consist of cases diagnosed in the first instance with considerable accuracy, should be made on an extended scale, should be contributed with the strictest regularity, and should, so far as practicable, be considered in association with the natural and meteorological features of the locality in which they originate, and the class of persons among whom the diseases recorded for the most part occur."

There can be no doubt that by a judicious combination of

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[1] 'Health and Meteorology of Newcastle and Gateshead,' Sixth Report for 1870.

[2] From inquiries by Mr. Rumsey in 1843, it appeared that "In seven unions containing large towns in the north of England the ratio of pauper cases to the population is 2·27, and of charity patients, 5·90 per cent.; while in thirteen town unions of the south of England, the sick paupers average 6·41, and the patients of the medical charities, 4·66 in every 100 inhabitants."—*Health and Sickness of Town Populations*, p. 21.

[3] 'Weekly Returns Metrop. Off. Health,' vol. i, No. 36.

voluntary effort with state machinery these requirements may be fully met.

It is true the results of observation in private practice will be wanting, and it is doubtful whether they could ever be obtained in this country with sufficient regularity to be available;[1] but the brunt of disease, especially of preventible disease, falls on the poor, and it is precisely among the poor that facts are most readily obtained; their proportion to the whole would be such as to give a fair insight into the health and health conditions of the entire population.

Next as to the machinery, local, central, and intermediate; universal opinion points to the poor law medical officer as well fitted by his universal range, his acquirements, habit, and daily experience, to collect the local facts connected with disease attended at the public expense. Greater accuracy and belief in an ulterior purpose would go far towards giving the present reports the value of a scientific record, and if sanitary duties are in future to be committed to the Poor Law Service, an additional incentive will be afforded, so that

" The labours of each and all, by becoming instrumental to an important scientific and social end, will rise in public usefulness, and, therefore, in public esteem, for whatever exalts a profession in character is sure to strengthen it in the long run in influence and weight."

But passing on to consider the details of sickness returns, it seems generally agreed that the requisites for a good record of disease should include—

I. Uniformity of observation and co-operation of all available scientific strength.

II. A ready mode of recording.

III. A local centre for collection and analysis.

IV. A central authority for abstract comparison and diffusion.

The question of uniformity has in theory been reduced to the simplest terms by the publication of the new 'Nomenclature of Disease.' It is adopted in the army and navy reports with the most satisfactory results, and no other classification or nosology could now be selected in preference. The practical difficulty lies in the redundance of provincialisms in England, and the imperfect acquaintance or carelessness of medical men respecting the exact terms of science; as Dr. Farr remarks, " they have to learn the difficult duty of returning fatal diseases on a uniform system, and under the same names."[2]

As to the form of the returns, and the manner in which

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[1] ' Brit. Med. Journ.,' Jan. 21st, 1871, paper by Dr. Philipson.
[2] ' Twenty-seventh Annual Rept., Reg.-General. '

they should be made, there seems much difference of opinion; the chief questions at issue depending on the frequency with which the returns are to be made, and the objects which they are intended to serve. To take the latter first, it may seem superfluous to warn Englishmen of the dangers of centralisation, yet in health matters the danger has a real existence. What advantage, for instance, do provincial towns obtain from the census with its intricate machinery and those minute details concerning the population in streets and alleys which are so often sought in vain by inquirers on the spot? It is strange, yet true, that the schedules of the enumerators, rich with local fact, are hurried away and lost for ever in the great stream which goes to form the census of the state. It is so with the death register, that sacred and inaccessible volume which, after manipulation at Somerset House, contributes its quota to the tables of a quarterly report, wonderful for their accuracy and statistical symmetry, but utterly useless for their first and natural purpose, the prompt information to local authorities respecting the mortality which so intimately concerns them. The evidence of Mr. Simon, and much that has been lately said concerning the registration of disease, would lead us to apprehend that in this great measure of sanitary reform of which we are treating, local and provincial interests may again be sacrificed to centralising aims. We will quote Mr. Simon in explanation of what we mean; he says, Q. 1848:

"The medical officer of the local authorities of course ought to have access to whatever information is in their district, in public or quasi-public institutions, as to sickness, but that would usually be a matter of personal arrangement rather than one requiring absolute law; but it seems to me that it is as much or *more with reference to the central government* than with reference to the local authorities that this wants consideration."

And (1912)—

"As to the poor law officers of the country, I think it must be expected of them that they will, and they do in fact at present, make their returns to the boards of guardians, and the boards of guardians ought to be required to have certain broad results of these returns put in a tabular form every three months for the information of the central office and of the public."

And again, in 1910—

"I think that all medical charities ought to keep records to some extent on a uniform plan prescribed by the central authority, and to report summarily their statistics every year."

A yearly summary from medical charities and a quarterly summary under the auspices of boards of guardians for central

use : such is Mr. Simon's plan for a national registration of disease ! Dr. Richardson has proposed

" That the weekly return of disease, immediately after it has served its local purpose, should be *dispatched at once to the metropolis* to be reported upon weekly, after the manner of the reports of the Registrar-General of births, marriages, and deaths ;"[1] a scheme which Mr. Lewis condemns as impossible.

" No force," he says, " at the central office coming within the limits of probable attainment could classify, tabulate, and issue a weekly or even a monthly report on the details contained in the medical relief books of 3200 poor law practitioners."[2]

The Registrar-General might well be alarmed[3] at the threatened inroad of infantile ailments, and exclaim in the bitterness of his soul, " There is nothing we cannot collect in the way of statistics if you give us money, *except the diseases of the public.*"[4]

But we cannot think that this wholesale centralisation could be seriously advocated by any one who has taken the cost and labour into consideration. If Mr. Simon, who is probably the best judge of the requirements of the central authority, is content with quarterly summaries of the sickness throughout the country, the question is so far narrowed, and we may address ourselves to the wants of local bodies.

These would vary with circumstances of time and place, and no system could be considered adequate which was not sufficiently expansive to meet them all. The health officer of a large town in time of epidemic would require daily information of the inroads of disease ; whereas a weekly, or in thinly populated districts, a monthly summary of cases might in ordinary circumstances suffice for sanitary requirements.

No subject would seem more easy of solution, yet none has given rise to more controversy than the utilisation of poor law returns with the least cost of trouble to the medical officers and of money to the ratepayers. Many, among whom are Dr. Rumsey and Dr. Ransome, despair of complete success,[5] without a thorough reorganisation of health supervision in the country ; and there can be no doubt that a registration of sickness would be rendered more complete, comprehensive, and satisfactory by the changes they suggest. If our superintendent registrars and registrars were medical men, as was suggested for Ireland in 1860[6] but without effect, not only might the reports and sum-

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[1] 'Dublin paper,' p. 14.
[2] 'National Returns of Sickness,' p. 314.
[3] 'Evidence, Sanitary Commission,' Q. 6459.
[4] Ibid., Q. 6482.   [5] 'Brit. Med. Journ.,' Oct. 22nd, 1870.
[6] 'Resolutions of Committee on Registration and Sanitary Police, adopted by Council of Social Sc. Assoc.,' 1860.

maries of deaths be more reliable, but the services of these officers might be enlisted for the collection of sickness returns. If health officers were appointed for every union, and registration or superintendent medical officers established for extensive districts, the local summaries of disease would form part of their necessary duties.

But can we not begin at once on a satisfactory basis, and reap advantage in the present, while making provision for possible reform in the future? Dr. Richardson and Mr. Lewis think we can, and each has proposed a plan by which existing machinery may be utilised for the purpose.

To take Dr. Richardson's first, as elaborated under the auspices of the deputation to the Poor Law Board in November, 1869. In his own attempts at a registration of sickness, recorded in the 'Sanitary Review,' he had proposed to ascertain merely

" The progress of the diseases named at given points of latitude and longitude, their prevalence according to season, the relative duration of each form of disease, and the order in which one epidemic followed another."[1]

Later, in 1858, he had suggested that the actual returns of the poor law officers, filled in according to a slightly altered form, should be transmitted weekly after local use to the central authorities in the metropolis for weekly analysis. The difficulties of such a plan have already been noticed, and they certainly are not diminished by the amendments of the deputation in 1869; for it is still proposed to send particulars of each case to the central office in London, particulars which require the co-operation of the clerk to the guardians and the medical officer in filling up the necessary forms;[2] and Mr. Lewis justly asks whether this required co-operation between two officers (who may live miles apart) is compatible with a weekly return of cases to the central office.

Such a plan would certainly throw much additional labour upon medical officers already over-burthened with work, and cost the ratepayers no small sum for the transmission of papers and books; moreover, it ignores the returns from charitable and other sources, which have a value equal if not superior to those from the Poor Law Service. Mr. Lewis's plan seems in every way superior, and may be described in his own words:

" I claim for my plan that it is applicable not only to Poor Law Service, but also to sickness occurring in the practice of charitable institutions, friendly societies, &c., for I *attach great importance to dealing with the collective sickness of the country* on a uniform

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[1] 'Social Science Transactions,' 1861, p. 535.

[2] 'Appendix B' to Dr. Druitt's 'Evidence before Royal Sanitary Commission.'

method. . . . . I quote, as expressing my own views on this matter, the following sentence from a paper by Dr. Rumsey : ‘ No project would deserve support if it proposed to seize the raw materials and send them straight off to be engulfed in some central office in the metropolis ; still less if it meant to distribute the various returns among several government departments, that is to say, if the schedules of pauper sickness were to be forwarded to the Poor Law Board, and the Medical Charity Reports to some new department, as has been more than once suggested by men of mark in London ; thus making the task of recovering the dispersed materials for local use more difficult and laborious.’ . . . . What I propose is, that directly the workhouse or district medical officer has ascertained from his relief book the number of new cases of disease occurring within the prescribed interval, and has recorded that information for transmission to the central office, the sheets of his book containing the details of each case for the week or other interval should be then at the disposal of the medical officer of health of his district. That official would make arrangements for collecting the sheets at stated periods, and he would thus possess in the utmost completeness all the details which he could need for local use. Pending the appointment universally of medical officers of health, the detailed sheets might be collected by the health officers when they already exist, and might be deposited with the union clerks in other cases.

“ The principle *I advocate is the retention of details for local use, and the transmission of summaries only for use at the central office.*”[1]

The scheme here advocated by Mr. Lewis is eminently practical, as might be expected, and meets the chief difficulties in the case ; not only is the labour more divided, but the difference between postage, &c., of some 4000 sets of returns and 700 summarised sheets is saved on poor law practice alone, but although comparative tables, summaries, and analyses of course predicate a local centre for collecting and analysing, it is not to be expected that any intermediate authority will be accepted without opposition in influential quarters.

Mr. Simon objects to it as likely to obstruct the direct action of the Privy Council under the Nuisance Law, to act as “ a mere buffer ”[2] between the central office and refractory local authorities ; but this opinion is not generally shared by sanitarians, and Mr. Simon seems to forget that *immediate* intimation of epidemic outbreak or of obstinate refusal on the part of local bodies to act on advice, might be one of the first duties of the authority which he condemns. “An estimate of the requirements of the districts would,” to use Mr. Simon’s own words, “ be formed in one of two ways—special representations made to

[1] “ Lewis’s National Registration of Sickness,” ‘ Soc. Sc. Sessional Proceedings,’ p. 317.
[2] ‘ Evidence Roy. San. Com.,’ Q. 1829.

the central authority, or the death returns and sickness returns *of the quarter;*" and the objection " that the central authority might receive no representation from the local authority" would fall to the ground."[1]

Refractory local authorities would then be without excuse, and the central authority would not be compelled to wait three months for information, the value of which is in exact proportion to the promptness with which it is given.

It would appear, then, to be of the first importance that the local machinery employed for the compilation of sickness returns should be of so skilled a nature as to insure their accuracy and validity, and to apply them promptly and authoritatively to local requirements.

Dr. Rumsey has directed attention to some of the difficulties arising out of the complexity of our areas for local government and other purposes.

" The labour," he says, " of extracting particulars relating to any group of population, not being a registration district, is immense. No one who has not made the attempt can have any idea of the task. A special officer is required to bring this information in a correct form to bear upon local administration."[2]

Much more would such local knowledge be required in preparing information for the central department.   Again, if we consider the variety of sources, and the large body of observers from which the returns are to be obtained, uniformity and strict accuracy cannot be looked for.   Provincialisms introduced in carelessness, or wilfully in deference to ignorance at the board of guardians, will have to be reduced to the common terms of a reformed nomenclature ; contradictory assertions such as are common in death certificates, and now pass unchallenged, must be inquired into and corrected ; careless and imperfect entries must be filled in and amplified before the true meaning and weight of the collective mass can be rendered intelligible to the central authority.   Access not only of the local authority, but of the scientific superintendent to local returns, must be by right, and not by courtesy, if the proposed registration of sickness is to be a measure in the interests of public health, and not a mere dalliance with an unmeaning mass of figures.

The principle of local revision and summary of returns, then, seems so essential to the proper working, nay, even to the existence of a national registration of sickness, that it is somewhat disheartening to find men like Mr. Simon, who have themselves felt the need and the difficulty of obtaining local informa-

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[1] ' Evidence Roy. San. Com.,' Q. 2031.
[2] Ibid., Q. 4275.

tion,[1] depreciating its importance, and making little or no provision for it in the schemes they have proposed. Provincial reformers, regarding it from an opposite point of view, have been all but unanimous in their demand not only for local supervision of sickness and mortuary returns, but for a higher class of medical officers in England, around whom the local health organisations might centre. The ideal of Dr. Farr's registration medical officer had been proposed years before by Dr. Walker, of Huddersfield, and reported to the Medical Relief Inquiry in 1844;[2] it was again brought forward by Dr. W. Strange, of Worcester, in 1846, and especially by Dr. Rumsey in his two papers read at Bradford, in which the whole subject of registration is so ably and exhaustively treated as to leave little beyond practical details to be dealt with by subsequent writers.

"If complete records of sickness," he says, "and mortality were compiled and published in the several registration districts by a legally constituted order of men of superior education and large medical experience habituated to scientific processes and in respectable position, any serious misuse of evidence, any deliberate concealment or perversion of facts would be next to impossible; while the number of the recorders and the universality of the jurisdictions would furnish the necessary corrections for occasional or individual errors."[3]

The local health government of the future will occupy a prominent place in the suggestions of the Royal Sanitary Commission, and evidence seems strongly in favour of converting boards of guardians into boards of local government, incorporating by amalgamation existing "local boards" as health authorities, and adopting the poor law unions as the sanitary units of area. The poor law medical staff would then perform sanitary duties of an ordinary kind, whilst inspection, supervision, and inquiry will in all probability be committed to superior medical officers, with jurisdiction extending over a wider area.[4]

But time will certainly elapse before the suggestions of the Commission become the law of the land, and it is important that a registration of sickness should be commenced without needless delay. Where an officer of health exists the difficulty of local analysis finds its own solution. He would, of course, receive the returns of poor law and public practice, and tabulate them as required for local or central purposes. In other cases it has been suggested that the returns should be sent to the union clerks or to the registrars; but the latter are already fully

[1] 'Roy. San. Commission, Evidence,' 1924.   [2] 'Evidence Med. Relief Inq.,' 9155.
[3] 'Right Use of Records founded on Local Facts, Preface,' p. xii.
[4] How far the recommendations of the Commissioners fall short of these reasonable expectations may be seen from their report just published.

occupied, even if they were not unfitted by education and social position to deal with returns more complicated even than causes of death.[1]

Nor can we expect, from the legal mind of the union clerk, a thorough appreciation and summary of disease in its infinite variety of detail. As a temporary expedient, when officers of health do not exist, it would perhaps be advisable to appoint (under central, not local, influences) some one of the medical officers in hospital or union practice as local compiler of returns, armed with all requisite authority, and adequately remunerated for the work.

The choice of a central department for the reception of local summaries will lie between the Poor Law Board, the Privy Council, and the General Register Office. We cannot think that any one will advocate the first until at least its position in a new health organisation has been more fully defined, nor, indeed, can we believe that it could ever deal satisfactorily with returns from other sources than its own. Mr. Simon's department in the Privy Council, as being closely connected with the sanitary supervision of the country, and requiring early information of outbreaks of disease, would seem to have better claims, but both Dr. Rumsey and Mr. Lewis have given good grounds for believing that economy and convenience alike point to the statistical department of Government as best fitted to deal with the sickness returns of the country.

"I will venture an opinion," says the latter, "that, so far as the central office is concerned, the cost of sickness returns would in any new department be almost, if not quite, double what it would be if their compilation were assigned to the Registrar-General's department. . . . . I cannot imagine how anybody well informed on these matters can advocate a separation of the returns of sickness from the returns of death. They are complementary to each other, and should be compiled by one and the same department; and when it is remembered that the Registrar-General is also the sole authority in this country on matters relating to population (an element which would necessarily enter into statistics of sickness as it does into the death statistics), I can come to no other conclusion than that in the statistical branch of the Registrar-General's office we have the nucleus of what ought eventually to become the department of English vital statistics, with its three subdivisions for census, sickness and mortality returns."[2]

"With regard to the statistics of disease," observes Dr. Rumsey, "it would be difficult to devise machinery more suitable for noting, collecting, and distributing truthful information, than that which is actually ready for our use. In the established registration system

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[1] "Notes on the Quarterly Return of the Registrar-General," by E. T. Wilson, M.B., 'Brit. Med. Journal,' July 23rd, 1870.

[2] 'Lewis's National Returns of Sickness,' p. 320.

we possess an organisation co-extensive with Great Britain in full and effective operation. It merely needs the grant of additional powers, with the exaction of additional duties, and, above all, competent local supervision to fit it perfectly for our purpose."[1]

Before passing to the question of cost, it may be well to consider briefly, as bearing closely upon it, the forms of the returns themselves, and the extent to which summary and analysis should be carried. The practical difficulties attending a return of all new cases of sickness have been overcome in the army, and cannot, therefore, be considered insuperable in ordinary practice. Inaccuracies in diagnosis must be accepted as inseparable from human fallibility, and the value of the results will vary for each locality and each separate class of disease. To such an extent has this been felt to be the case, that the earlier attempts at registration have been limited to particulars relating to epidemics, with the addition generally of acute or otherwise well-defined divisions of sickness. The tabular form suggested by the British Medical Association in 1867 has been the model adopted by Newcastle, with acknowledged success. In Manchester the diseases most easily recognised were selected without any fine distinctions,[2] but something more than this would probably be expected in a national registration system. The register books of our hospitals and dispensaries would require some slight additions and modifications in their forms to reduce them to a uniform system, not only the date of admissions but the date of attack, and the locality in which the disease originated should, according to Miss Nightingale's suggestion,[3] form part of the information supplied. With regard to the returns of the poor law officers, also, which were designed for a very different purpose, some alterations would be required before they could be enrolled with advantage in a common record of disease. Additional columns would be needed for "*occupation*" and "*date of commencement of disease.*" The columns, then, with which we are concerned would read from left to right in the following order:—1. *Name.* 2. *Age.* 3. *Residence.* 4. *Occupation.* 5. *Nature of disease*, and this should have more space than is allowed at present. 6. *Date of commencement of disease.* 7. *Result or observations.* Further complication would probably defeat its own purpose, and result in carelessness and inaccuracy. With Dr. Ballard we are of opinion " that the simpler the schedules the better."[4]

[1] 'Right Use of Records, founded on Local Facts,' p. xii.

[2] ' Brit. Med. Journal,' Dec. 3rd, 1870.

[3] ' Notes on Nursing,' by Florence Nightingale, 3rd edit., p. 164.

[4] ' Brit. Med. Journal,' Feb. 26th, 1870; Meeting of Metropolitan Assoc. of Officers of Health.

The returns, then, such portion, at least, as we have noticed, would be required in duplicate, one for the board of guardians, one for the local compiler, and the trouble involved in this would seem to be reduced to a minimum by a system of transfer copies,[1] such as are common in the ordinary mercantile transactions of the country.

The slips so obtained from the poor law forms would be forwarded unaltered to the local compiler for weekly correction and analysis. The returns from other sources would probably be in the form of weekly summaries, on a plan sanctioned by the central authority, and accepted throughout the country. The details of sickness would in this way be secured for local use in towns, in agricultural, mining, or manufacturing districts, where peculiarities of climate, soil, or social conditions may give special meaning and importance to an otherwise insignificant disease, and where the first unit of an infection has more meaning as a local warning than all the rest. It is in this adaptation of local summaries to local requirements that the uses of a national registration of sickness become most apparent; at the same time the regular transmission by the local officer of summaries, analysed on a uniform plan to the metropolis, would place a mass of information at the service of the Government, which might be used as evidence against offending local bodies, or become the basis of national measures of reform.

Turning, in conclusion, to the question of expense, we find the widest differences of opinion, with no definite calculation on which reliance can be placed; indeed, it is not possible to treat the cost of registration apart from other matters connected with public health, for no officer would exist exclusively for registration purposes. As far as the medical officers making the returns are concerned, it would involve little beyond increased care in filling up forms allied to those at present in use; and this would be, as it is now, but one among the many laborious duties they perform; *a fortiori* would this be the case with the local compiler. It is certainly matter of regret that Dr. Morgan and Dr. Rogers had not conferred together before subjecting themselves to the questioning of the President of the Poor-law Board;[2] they would thus have avoided vague guesses on a subject which they had not well considered, and it would probably have occurred to both that one section at least of the difficulties, that of payment for the poor law returns, might vanish before a reform affecting the position, duties, and emoluments of the poor law medical officers.

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[1] A suggestion due to Dr. Ransome, 'Brit. Med. Journ.,' Dec. 3rd, 1870.
[2] 'Brit. Med. Journ.,' Oct. 22nd, 1870.

" Granting their necessity," Mr. Lewis says of sickness returns, " a reasonable expenditure must be assumed for obtaining them ; whether the local costs should be paid out of the local rates in the same manner as local registration is paid for, the central cost like the central cost of registration, being defrayed out of the Imperial Exchequer, is matter for consideration.

" I find that, in the year 1868, the whole cost of registration was £107,503, of which £66,645 came out of the local rates, and £40,858 out of the Exchequer.

" It appears to me fair that the local costs should be borne by the local rates, and that the payment to each contribution should be an annual or a quarterly one, calculated for the poor law medical officers upon the estimated population under each officer's charge. There would, perhaps, be a little difficulty in devising a method of payment for returns contributed by medical charities, friendly societies, and the like."[1]

But these difficulties are certainly not of a nature to stand in the way of an important measure of reform. Medical men must of course be remunerated for extra work ; we cannot adopt the arbitrary measures of the Board of Health at New York, and demand certificates within twenty-four hours under penalty of 100 dollars for each omission.[2] With regard to the poor law returns, Dr. Rogers suggests payment for extra care and labour on the returns in proportion to the work done, commencing with a minimum of two shillings and sixpence per week; and this strikes us as fairer and more practical than any calculation derived from estimates of population under poor law care, which must be utterly untrustworthy in town districts, where large numbers, if not a majority, of the poor are relieved by charitable and provident societies.

Pending the consolidation of the relief arrangements of the country, it might suffice to make a calculation for medical officers of poor law and public institutions alike, on the average number of cases attended and likely to find a place in the returns. The cost, though considerable, could not be considered excessive when set against the advantages likely to be derived from the local and central use of sickness returns. If " public health is public wealth ;" if sickness as a chief cause of poverty is the most expensive nuisance with which the State has to contend, and if preventible disease accounts for one fifth,[3] or even one fourth,[4] of the mortality in the country, surely no well-reasoned and practicable measure for the check of disease should be rejected for the sake of false economy and paltry saving to the State. The space allotted to us is already exhausted, and we must be content with the briefest summary by

[1] 'National Returns of Sickness,' p. 321. [2] Brit. Med. Journ.,' Jan. 14th, 1871. [3] Dr. W. Budd. [4] Prof. Christison's Address, ' Soc. Science Trans.,' 1863.

way of conclusion. It has been our object in the foregoing pages to bring the great question of a national registration of sickness to some practical issue by directing attention to the scattered writings on the subject, and to the points of detail on which opinions seem most divided.

The feasibility and abstract advantages of such a measure can scarcely admit of doubt; but abstract advantages in themselves have little weight unless it can be shown that the gain is worth all that would be spent upon it. For this reason we have laid special stress on the local advantages and working details of the proposed system, believing that they are in danger of being ignored and over-ridden by the centralising tendencies of our health authorities. A practicable machinery has been shown to exist by which both local and central requirements may be satisfied, and at a cost which the country should not grudge, divided as it would be between the local rates and the State exchequer. That this machinery may soon be improved is no argument for delay. Sickness does not pause, and if, as has been remarked, "our sanitary victories have hitherto been won with a statistical 'Brown Bess,'" it behoves us to lose no time in providing ourselves with the "arm of precision" such as a registration of sickness would place in our hands.

Note.—The above article was already in print when the Report of the Royal Sanitary Commission appeared; it would scarcely be complete, however, without some notice of the conclusions to which the members of the Commission have come on the subjects we have been considering.

We are sure that much disappointment will be felt by those who looked for a fuller recognition of local needs, to find that all intermediate authority, beyond central inspection, is condemned as useless, if not pernicious; and that the registrars of births, deaths and marriages, are considered competent and the fit persons to collect records of disease. On the extent to which registration should be carried, the Report says (p. 60), "The number of cases severe enough to disable from work or to require medical help is probably in England and Wales not less than 13 millions a year; the cost of registering so vast a number of facts, however simply, would be far beyond its value"—an assertion which is no more than a *petitio principii*, so long as both cost and value are unknown quantities. What seems useless to the central authority may be of inestimable value in the hands of an intelligent observer on the spot, ready to profit by the teachings of even unfashionable forms of disease. Who, again, can define "diseases which affect large numbers of the population which may be considered as in greater or less degree preventible by sanitary arrangements," when the prevalence of a disease varies with locality or occupation, when the limits of prevention, as applied to sickness, are as yet undefined?

A partial registration of sickness, such as that sketched out in the Report, must fall very far short of the expectations indulged in by sanitarians. Devised almost exclusively in the interests of the central authority, without any power of adaptation to local requirements in their infinite variety, it will but repeat the worst features of our system for the registration of deaths. It may, indeed, augment the power of the central sanitary authority, and do much for the *public* health, but it will give little aid to the practitioner in the local study of disease, or to the sanitarian, if he be not attached to the central bureau, in his investigations of morbid phenomena.

𝔅ibliographical 𝔑ecord.

Myers' Heart Disease among Soldiers.[1]—It will be remembered that a subscription was raised some years since for a bust of the late Mr. Alexander, to be placed in the Royal Victoria Hospital, Netley; and this object having been accomplished, it was determined to invest the surplus funds for the purpose of awarding a triennial prize for the best essay on some subject connected with military medicine, surgery, or hygiene. To the essay now before us this prize has just been awarded.

Mr. Myers treats his subject under four heads, namely, I, the prevalence of diseases of the heart in the army as compared with other classes; II, the particular forms of disease so prevalent; III, the causes of such disease; and IV, the remedies proposed.

In reference to the first question, namely, the prevalence of diseases of the heart among soldiers, it would be supposed at first sight that these diseases were more common in the civil population than among the military, inasmuch as the existence of such disease in a recruit would render him ineligible for military service; and moreover as the period of service is limited, disease of the heart, as a very common complication of old age, can be seldom observed in the soldier. Nevertheless it appears from the evidence of statistics that fatal disease of the heart is actually more prevalent among the military than among civilians, and that the death rate from this cause among the former would be greater than it now is if the soldiers with diseased heart were retained in the service instead of being discharged as is the rule. It is also a somewhat curious fact that although sailors, from the nature of their occupation, are apparently more exposed to the causes of heart disease than soldiers, yet the army loses more men than the navy from this affection.

The next question, the particular nature of the diseases found to prevail in the army, cannot be very satisfactorily answered by

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[1] *On the Etiology and Prevalence of Diseases of the Heart among Soldiers.* The "Alexander" Prize Essay. By Arthur B. R. Myers, Assistant-Surgeon, Coldstream Guards. Pp. 92. London, 1870.

the returns available, partly because the statements as to the precise pathological lesion are not always verified by post-mortem examination, and partly because some of the names assigned as the causes of death (such as *morbus cordis, carditis,* and *syncope*) are very vague.   It may be stated in general terms that the deaths from diseases of the circulatory system in the army may be grouped under three heads, namely, valvular disease, hypertrophy, and aneurism.

The third point, namely, the causes of heart disease in the soldier, is a very important one.   Among the civil population, as is well known, the causes of heart disease are principally rheumatism and Bright's disease among the young and middle-aged, and the degeneration of arterial coats in advanced life; but it appears that neither rheumatism nor Bright's disease are particularly prevalent in the army, and the diseases incident to old age are necessarily absent in the case of the soldier during his period of service.   The soldier ought therefore to suffer less than the civilian from cardiac disease, whereas, as we have just seen, he actually suffers more.   It appears that, in consequence of the opinion freely expressed in military circles that the cardiac diseases in the army were really due to the same morbid influences which produced heart disease among civilians, all the invalids suffering from cardiac disease in Netley Hospital were lately collected together and examined by Dr. Parkes, when that very competent observer found that out of the whole number, which amounted to seventy, only two or three had any previous history of disease, rheumatic, renal, syphilitic, or otherwise, and he therefore expressed his unqualified opinion that the great bulk of these cases could only be attributed to causes which do not exist among the civil population.

Inasmuch, then, as diseases of the heart in the army must arise from some cause peculiar to the soldier's life or habits, Mr. Myers reviews the various circumstances which might be supposed to have such a tendency, namely, service in India and other hot climates, syphilis, and the abuse of alcohol and tobacco; but he fails to find in any of these a satisfactory explanation of the prevalence of cardiac affections.   He then proceeds to notice the special causes of these affections in the soldier, namely, the particular form of clothing which he wears, and the amount and arrangement of his accoutrements when performing exceptional or even ordinary duty.   Mr. Myers draws attention to the fact that in civil life, when any prolonged or powerful exertion of the body is to be made, either by necessity or for recreation, all constriction of dress is avoided, so as to allow the chest and other parts of the body to expand freely, or to allow the uncontrolled play of the muscles.   The method

of equipping the soldier is guided by the very opposite principle, for he is clothed in a close-fitting tunic, his neck is constricted by a tight-fitting collar, his waistband is bound tightly below the chest, and the knapsack straps and the pouch belt add their share to the general compression.

The subject of heart disease in the army, as caused by the peculiar dress and accoutrement of the soldier, has been brought before the notice of the Government in the report of a committee appointed for the purpose in 1864, and in this document the morbid effects caused by the constrictions just referred to are pointed out, but it does not appear that any steps have yet been taken to remedy the existing evils.

The same committee stated that the special disease from which the young soldier suffers is not disease of the valves, but an extreme excitability of the heart, combined with some but not great enlargement; and Dr. Myers, believing that this irritable condition of the heart might be demonstrated by the sphygmograph, examined, by the aid of this instrument, the radial pulse of a large number of young soldiers, some of whom were suffering from the affection and others who were predisposed to it, and he found in all a common feature, namely, a greater or less dicrotism present in each case.   This dicrotism of the pulse is believed by Mr. Myers to be due to the abnormally excitable condition of the heart, the blood being thereby propelled with an unwonted force, and then, returning with unnatural abruptness on the closed valves of the aorta, giving a second shock to the column of blood to such an extent as can be made apparent to the eye by means of the sphygmograph.   Mr. Myers gives a series of tracings taken by himself by means of this instrument, in which the dicrotic condition of the pulse is made visible. Mr. Myers then proceeds to prove that organic disease of the heart is actually more frequent in the army than in the civil population, for although, as he candidly admits, the diagnosis of heart disease made among soldiers during life is not always to be implicitly relied upon, yet the records of the post-mortem examinations at Netley Hospital conclusively show the prevalence and fatality of these diseases, and they show moreover that while mitral valve disease is proportionately more common among the civil population, aortic disease is more prevalent in the army. He also shows that aneurism is of very frequent and disproportionate occurrence in the army.   Mr. Myers, to quote his own words, concludes from his researches " that it is an undeniable fact that disease of the heart is more prevalent in the army than in the civil population ; that its three main causes, as generally understood, namely, rheumatism, Bright's disease, and violent manual labours, apply more to the latter than to the former;

that syphilis, whatever may be its effects on the heart, directly or indirectly, by attacking both classes to nearly the same extent, must produce a relatively equal deteriorating effect; that disease of the mitral is more common than disease of the aortic valves in the civil population, and aortic more than mitral in the army, and, consequently, that there must be something specially associated with the life of the soldier to produce this marked difference; that though the heat and malarious diseases of India and of other countries in which our army has to serve may not, according to statistics, produce a greater ratio of heart disease than this more healthy climate of Great Britain, it is probable that such is their tendency, as well as to develop more rapidly disease, the foundation of which has been laid in the young soldier before he leaves his own country; that the very frequent functional derangement of the heart of the young soldier can be readily detected by the sphygmograph before it is otherwise recognisable, and therefore that this instrument might be made of great use in directing attention to an abnormal condition, which, amenable to treatment at first, is only the precursor, if neglected, of diseases that, though capable of being kept within certain limits, cannot be cured; that there is one special cause of heart disease in our army now clearly laid down by those who have most studied the subject, namely, the prejudicial constriction of the uniform and accoutrements—this producing such obstruction to the circulation, that either directly or indirectly, as by aneurism and disease of the aortic coats, &c., the heart is abnormally strained, and frequently passes into a state of functional derangement and ultimately of organic disease," pp. 81 and 82.

The important question of the measures which ought to be taken to check heart disease in the army is discussed by Mr. Myers, at considerable length and with much judgment; and while it is admitted that little can be done in the way of cure, yet very much good may result from measures of prevention. A more loose style of dress should be worn by the soldier, especially when he is on active duty; the training of recruits should extend over a longer period than is now devoted to the purpose; the age of admission into the army should be limited to twenty instead of eighteen as at present; and the weight of the accoutrements, when on the march or on drill, should be diminished.

These and other suggestions of a similar nature are made by Mr. Myers for the prevention of heart disease in the army, and the whole essay is worthy of attentive perusal, more especially by those who direct our military establishments both at home and abroad.

Dr. J. M. Duncan on Mortality of Maternity Hospitals.[1]—The very great importance which naturally pertains to the subject of Dr. Duncan's work has still more increased by the controversy which has for some years been carried on by, on the one hand, the advocates of a sweeping change in reference to hospitals, and on the other, by those who, while partaking of the general desire to improve the sanitary state of the community, both in and out of hospitals, deny that hospitals are fairly credited with very many of the charges brought against them.

Men of unquestionable ability have entered the lists against hospitals, unless of certain diminutive proportions—proportions which, in the judgment of the great majority of the profession in all countries, would either fail to meet the wants of the great mass of those in need of medical care in some such shape, or, if carried out on such a scale as to meet all requirements, would be attended with an expense relatively so great as to render the attempt impracticable. It is also asserted by very competent authority that, the statement that small hospitals possess the alleged advantages is not correct, while, on the other hand, it is held by men of veracity and ability that the alleged injurious effects of large hospitals do not exist.

At the present time, therefore, the work of Dr. Duncan comes most acceptably, inasmuch as it is the work of an accomplished physician upon a subject of great importance, and one which needs all the light that sound judgment and ability as well as experience can shed upon it.

To use the author's own words:

"The present work is, in some respects, premature. Questions are raised in it which cannot as yet be settled. But although in this respect it is unripe for publication, yet it appears to the author that some work of the kind is loudly called for at the present epoch. In times of revolutionary violence, when useful institutions are attacked, it is necessary to defend them with such weapons as can be quickly got; in science the only weapons available are truths and sound arguments. This book is an attempt to arrive at truths, and to use them in argument justly, so as to reach sound conclusions, and expose and destroy the unsound.

" The work consists mainly of various essays composed during the recent discussions as to the value of hospitals. The author has, as might be expected, taken maternity hospitals as the field for his observations and arguments. But though an obstetrician naturally takes his facts from the statistics of lying-in hospitals, yet the author believes that they are, on the whole, best adapted for the discussion of the value of hospitals generally. There is a unity about child-birth that does not exist in connection with amputations or any

[1] *On the Mortality of Childbed and Maternity Hospitals.* By J. MATTHEW DUNCAN, A.M., M.D., L.R.C.S.E., F.R.C.P.E., F.R.S.E., &c.

other surgical operations.   Childbirths can be scrutinised in vast numbers; their data have been collected without a view to any controversy.   A lying-in woman is very liable to be affected by all kinds of insalubrious influences," &c.

Several parts of the work require special and attentive consideration, and it will very probably obtain, with other works allied to it, more detailed treatment at our hands on a subsequent occasion; it only remains for us at present to observe that the subject has been handled by Dr. Duncan in his accustomed able and clear style, and that the work will amply repay the reader the trouble of perusal, and should form a part of the library of every obstetric physician.

Dr. D. C. Black on Therapeutics and Disease.[1]—In this essay Dr. Black attempts to lay down the foundation of a scientific system of therapeutics by describing, in the first place, the conditions that produce disease, and in the second place, the antagonistic powers which control or counteract them.   Two great operations are continually proceeding in the animal body, namely, the generation of new tissue, or *histogenesis*, and the removal of the old, or *histolysis*, and, on the balance of these two, health is maintained.   But histolysis may be excessive or defective, in the first case producing the class of diseases which are distinguished by wasting, such as fever, where there is undue oxygenation of tissue; and in the second, producing diseases characterised by insufficient oxygenation, such as gout, rheumatism, oxaluria, diabetes, and several others.   The essential functions of organized life, according to Dr. Black, may for all practical purposes be divided into two categories, the vital or physiological, and the chemical; and the author conceives that a comprehensive classification of remedies may be instituted under the heads Physiological, Chemical, Catalytic, and Mechanical, inasmuch as all therapeutical appliances act in one or more of these directions.   The *chemical* remedies are those agents which exist in the blood itself, and which, when administered, supply or modify some of the constituents of that fluid, and act as diuretics, stimulants, tonics, antacids, lithontriptics, &c. · The *physiological* are agents foreign to any of the constituents of the body, and which act specifically or vitally, as digitalis, opium, copper, zinc, &c., &c.   The *mechanical* are those which act by direct contact, such as cowhage, iron filings, gum arabic, linseed, &c.   The *catalytic* comprise the medicinal agents which effect changes in the living body, without being themselves changed, as mercury, arsenic, iodine, bromine.   Such being the

[1] *Observations on Therapeutics and Disease.*   By DONALD CAMPBELL BLACK M.D., L.R.C.S. Edin.   Pp. 48.   London, 1870.

vital conditions of morbific nature in the human body, and such being the agents which medical science has devised for restoring health to the sick, Dr. Black proceeds to argue not only for the obvious relations of cause and effect which are often observable in disease and its treatment, but also for more obscure relationships which exist at present only in the region of probable hypotheses, such as the efficacy of lemon-juice in rheumatism, colchicum in gout, citrate of soda in diabetes, &c. Dr. Black's essay displays extensive knowledge of his subject, and although many of his views are necessarily open to controversy, they are well worth consideration.

Method and Medicine.[1]—The title of this brochure is quaint in its brevity, but not very explanatory of its object. Why the word " method " should be put in apposition to " medicine " we are at a loss to discover, as there seems to be no relationship of meaning between the two words ; and if any general deduction is to be gathered from the perusal of Dr. Foster's essay, it is that there is not now, and that there never has been, any definite method in medicine at all. The author, however, presents us with an interesting historical sketch of the progress of medicine from the very earliest dawn of its existence down to the present day, and he points out with great fairness the merits and defects of the various authors who have from time to time endeavoured to fix upon a solid foundation the ever-shifting doctrines of the art. That such a foundation has not yet been established is a trite remark, but, nevertheless, the attempt to discover it is not fruitless, as many truths may crop up on the way which are beneficial to humanity in the meantime, and may contribute to build up some consistent system in the future. Dr. Foster introduces us to Medicine as she first appeared among the mysterious arts practised by the priests of Apollo and Æsculapius, and as she afterwards developed herself in a somewhat more visible form in the hands of Pythagoras, who laid down the bases of hygiene and etiology. Thence the art of medicine began to mould itself into something like tangible form, till some of its principles were definitely propounded by the great Hippocrates, one of seven who bore the same common name, and who was said to be a lineal descendant of Æsculapius. But the great father of physic, although his observations on the nature and causes and results of disease are of the highest value, contributed little to the knowledge of therapeutics, and he trusted chiefly to nature as the great restorer. His immediate successors endeavoured to find not only the causes of diseases, but the remedies appropriate

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[1] *Method and Medicine.* An Essay. By BALTHAZAR W. FOSTER, M.D., Professor of Medicine in Queen's College, Birmingham. Pp. 58. London, 1870.

to each case, and in this attempt they either plunged into wild speculations, or followed the routine suggested by empiricism. Galen, three hundred years after Hippocrates, restored the doctrines of his master, and established a despotism of his own, which lasted for twelve centuries, till it was shattered to pieces by the arrogance of Paracelsus, who, amidst much empty pretension, contrived to hit upon some useful truths, and to introduce into medicine some powerful remedies. Since his time truth and error have prevailed in medicine almost in an equal degree, and even the great Bacon, who taught the true method of reasoning in scientific matters, entertained and expressed the most absurd notions in relation to the physiology of the human body and to the action of remedies. The researches of Harvey, of Haller, and of Sydenham, however, materially served to rescue medicine from obscurity, for, leaving the paths both of dogmatism and empiricism, those great investigators of truth questioned Nature herself, and trusted themselves to her guidance. The study of the structure and functions of the human body and the actual observation of disease are the true foundations on which the superstructure of medicine must be built, and he will be the best physician who has studied and observed the most. "Homo naturæ minister et interpres, quantum scit, tantum potest." The above is an outline of the subjects discussed in Dr. Foster's essay.

Dobell on Diet and Regimen.[1]—There are few men in the profession who must not yield the palm to Dr. Dobell for the assiduity and perseverance with which he presses forward any views or conclusions that have forced themselves upon his consciousness or conviction. He is unquestionably of enthusiastic and, may we not add, impulsive temperament; and both the strength and weakness of such a temperament are manifest in his writings. Impulse, whilst operative, is impressive. The consequences of impulse have much of sound and fury in them; or, to use another figure, exhibit much of the bubble nature, and so, on the discharge of the permeating gas, subside into a moderate quantity of still common-place fluid.

Now, Dr. Dobell has achieved to himself a name among modern medical writers and theorisers, and accomplished some useful work; but his impulsive zeal drives him to attempt too much, and the result is the less beneficial to the profession. Some good work by him is to be found in his books on diseases of the

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[1] *On Diet and Regimen in Sickness and Health, and on the Interdependence and Prevention of Diseases, and the Diminution of their Fatality.* By HORACE DOBELL, M.D. Fourth Edition, rewritten and much enlarged. Pp.151. London, 1870.

chest, on winter cough, and on the vestiges of disease, and much ingenious thought is apparent in the pancreatic hypothesis of tuberculosis ; but a prevailing tendency to overestimate the views presented, and to dilute them with overmuch rhetoric, is manifest in all his writings. The work now before us exceeds all the others he has published in diffuse and frothy writing. It is, moreover, one of the grossest examples of mere book-making that we have encountered.

Diet and regimen should constitute its principal subject ; but they are very imperfectly treated, and to a great extent overwhelmed in the mass of matter extracted from various other published contributions of the author, which may, by special pleading only, be held as connected with the subject of regimen.

Both in the title-page and preface it is averred that the present issue is a fourth edition of the author's ' Manual of Diet and Regimen,' a small treatise, first published in 1864. We have neither of the foregoing editions to compare the present one with, and so cannot examine how far the instructions respecting diet and regimen have been rewritten. We may state, however, that this essential section of the book is of small extent. The rules for diet, clothing, bathing, &c., conveyed in forty-one somewhat aphoristic paragraphs, with a short chapter (iv) on the essentials of a normal diet, accompanied by examples of diet tables, and a supplementary chapter on " special recipes, directions, and appliances for the sick room," may, from internal evidence, be concluded as the pith and substance of the earlier editions, and with respect to which all the other matters now included may be regarded as accretions.

The rewriting of this small portion of the treatise was, therefore, no difficult task ; but evidence is not wanting that this task has been slovenly done.

In his brief notes on ventilation and heating, and in his chapter on the essentials of a normal diet, we meet with the usual quotations respecting the consumption of air in breathing, the cubic capacity of air required per head, and the quantity of food and the relative proportion of the chief elements of food necessary for nutrition. But the absence of careful revision is indicated in the statements referring to these matters. His teaching has halted with that propounded by Liebig many years since. Plastic and respiratory food reappears as the accepted division of alimentary matters, although modern researches have shown such a division untenable and conducive to error. Again, he lays down the rule that " from thirty-two to forty ounces avoirdupois of *dry* nutritious food" is an average daily amount in health for an adult active man, yet, although noting that this dry nutriment should possess from two fifths to one

half its weight of water, he has omitted from the essentials the fifty to eighty ounces of water also requisite for securing proper nutrition.

These are comparatively small matters, but they may be taken in evidence that the rewriting of this fourth edition might have been more carefully done.

Excepting the introductory chapter and a paragraph here and there, the remainder of the book consists of extracts from other books previously published by the author, from letters that have appeared in the public journals, and from the works of others. Of the first forty-seven pages only eight and a half are occupied with the rules for regimen, which primarily belong to the treatise, the rest being taken up with quotations; the first of which is "from the author's 'Lectures on Winter Cough, Catarrh, Bronchitis, Emphysema, and Asthma,' delivered at the Royal Hospital for Diseases of the Chest in 1865." And it is, by the way, noteworthy that no opportunity is lost to advertise at large, in the text, the titles of the books, lectures, and papers which its author has from time to time issued.

The quotation just referred to being concluded, another follows —this time from Professor Tyndall's 'Lecture on Dust and Disease;' then we come to a letter addressed, in 1869, to the 'Times' newspaper, to which an answer was vouchsafed in the shape of a leading article, also duly transferred to these pages; and, lastly, the chapter winds up with a long letter, " by the author, addressed to employers, and printed for private circulation in 1852."

We get on for a few pages with some facts about food, heat, and mechanical force, derived from the inquiries of Professor Houghton and others, and presently come again upon another newspaper letter—this time contributed to ' The Daily Telegraph '— the subject, " Bread Diet and Typhus Fever." This is separated by only some short borrowed observations on " Acid and Sugar in Spirituous Liquors," from a transcript of a leading article in the 'Lancet' on "Alcohol in Disease," followed by another article, sent by the author to the ' Chemical News,' " On the Importance of distinguishing between Solid and Liquid Fats," and next by a letter " On Bantingism," written in 1864.

Of the remaining seventy-one pages all but some thirteen are occupied with extracts from the author's lectures and books, already well brought under the notice of the public in one or more ways. Chapter VII is the transcript of a lecture included in his book on ' Winter Cough,' and the long Chapter VIII is a piece of patchwork, taken verbatim from his treatise on ' The Germs and Vestiges of Disease,' of which the subject matter is essentially pathological. In fine, the possessor of the other

writings of Dr. Dobell will find that, in purchasing this present work, he has little else than a *réchauffé* of well-known matter, heretofore published, and a very scanty supply of instruction respecting diet and regimen.

Medico-Chirurgical Transactions.[1]—This volume is of an average character, and more especially taken up with records of practical surgery gathered from the hospitals of the metropolis. Mr. Pollock, of St. George's Hospital, details his experience of amputation at the knee-joint, and also adds that of other surgeons who have practised it. Appended to his paper are two tables comprising notices of ninety-three cases, and the general inference is, that amputation at the knee-joint for lesions of the leg is more successful than amputation above the joint.

Dr. W. Stokes, jun., on the contrary, appears to give the preference to supra-condyloid amputation of the thigh, on which subject he communicated a paper to the Society. If he be held to demonstrate the superiority of this mode of amputation over that at a higher part of the thigh, he fails to indicate its advantages over amputation at the joint, and few surgeons will, we apprehend, be induced to substitute it in place of the latter.

Mr. Poland has very well brought together all the available information touching compound fracture of the patella, and has tabulated no less than sixty-nine examples of that injury. Mr. Gant has added to the records of excision twenty cases, in which the operation was performed on one or other of the three joints, knee, hip and elbow. His experience is in favour of the operation.

Lithotrity is illustrated by notes of 184 cases operated on by Sir H. Thompson. The notes are preceded by a brief general analysis. This history of so large a collection of cases will greatly aid surgeons in arriving at an estimate of the value of the operation. Sir H. Thompson enters on each of the three following inquiries :—" first, what is the rate of recovery after the operation? secondly, what is the general condition of the patient after it? and, thirdly, in how many instances is there a return of the malady?"

A remarkable case is related by Mr. Louis S. Little, in which a plate with artificial teeth was swallowed, detected in the stomach, and extracted.

Mr. Barker, surgeon to the Melbourne Hospital, communicates a case of extroversion of the bladder in a female treated by operation, and Dr. H. Meyer, of Copenhagen, an important paper on adenoid vegetations in the naso-pharyngeal cavity,

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[1] *Medico-Chirurgical Transactions.* Published by the Royal Medical and Chirurgical Society of London. Vol. liii. Pp. 305. London, 1870.

their pathology, diagnosis and treatment. This essay will call attention to a little studied lesion, which is here, however, put before us in a very clear light and in all its bearings. Nasal polypi are familiar growths to surgeons, but it is an advantage to have a particular form well characterised, and its surgery well elucidated.

Dr. Hilton Fagge gives an interesting account of the anatomy of a case of Molluscum fibrosum. Of the papers that address themselves more particularly to the physician are: 1. Experiments on the action of certain diuretics, by Dr. F. B. Nunneley; 2. On certain changes in the nervous system associated with diabetes, by Dr. W. H. Dickinson; and 3. Cases illustrating the physiology and pathology of the sense of smell, by Dr. W. Ogle.

Dr. Nunneley examines the effects of citrate and acetate of potash, spiritus ætheris nitrosi and oil of juniper, on persons in health. The general results arrived at are summed up in the following paragraph:—" Of these four medicines, citrate and acetate of potash and nitrous ether actually *reduce* the urinary solids, whilst they slightly increase the water; and oil of juniper *increases* the solids, whilst it slightly lessens the water."

The two other essays named are of considerable length and of much value. The latter must be read through to be appreciated. Dr. Dickinson has carefully examined the cerebro-spinal axis in several cases of diabetes, and arrives at the conclusion that a definite lesion in certain portions of that axis is the *fons et origo* of the disease. If his general inference is not admitted, there is evidence enough of a remarkable concurrence of cerebro-spinal lesion with diabetes.

Dr. W. Ogle's paper on " anosmia " is a most valuable contribution to the physiology and pathology of the senses of smell and taste. He well illustrates the relations in which those two senses stand to each other, and brings to light a connection between pigment cells and the exercise of the functions of smell and taste, and not only of these senses, but also of those of sight and hearing. If this relation be established it will be without doubt a fruitful fact in physiology.

The only remaining paper consists of the Report of a Committee of the Society to investigate Bain's and Pacini's methods of restoring suspended animation. In the course of their experiments they also compared Dr. Silvester's plan with the other two. The practical conclusion is, that by either plan a sufficiently large quantity of air is without difficulty introduced; and, on an average, more air is changed than in the act of ordinary tranquil respiration.

The tables show that, by Dr. Bain's plan, the average number of cubic inches inspired and expired, exceeds that obtained by

either of the two other methods. However, Dr. Bain's plan is simply a modification of Dr. Silvester's, and involves no new principle of action.

Transactions of Clinical Society.[1]—This volume contains forty-four histories of cases, several reports from special committees and referees on papers read, and the president's address, together with the usual list of members and officers of the society. Hitherto the records of this society have not much served the advancement of rational therapeutics—an object that the first president particularly commended to the attention of the members. Indeed, speaking generally of the papers submitted to the society, there is no special feature in them distinguishing them from the communications commonly made to the older medical societies, to the volumes of hospital reports, and to the pages of the medical periodicals. This we say without any wish to detract from the merit and scientific value of the memoirs placed before the society. The impression we wish to convey is, that the Clinical Society has as yet established no special reason for its separate existence, *i.e.* considered as a scientific association.

This impression would appear, from his address, to have haunted the president's mind; for Mr. Paget urges the members to real clinical work among the living, and challenges for clinical science a self-sufficiency equal to that possessed by any other science ; and he proceeds, in his very able and suggestive discourse, to point out the sort of work to be done by the society, the need of accepting clinical facts as certain as any-thing in biology, and the necessity of not marring them and their teachings by the influence of the current doctrines in phy-siology and anatomical pathology.

We cannot here attempt to detail Mr. Paget's excellent in-structions for the profitable pursuit of clinical science, but commend his address to the patient study of all our readers; and, in concluding this notice, it is our agreeable duty to re-commend to them also this volume of clinical records as replete with valuable observations.

Sydenham Society's Publications.—The members of the Syden-ham Society must be well content with the works supplied them for their subscription. Those issued of late are of peculiarly solid and lasting value. We have now three before us, which, besides the recommendation of intrinsic scientific value, have that of high practical utility. We refer to Trousseau's ' Clinical Medicine,' Niemeyer's ' Lectures on Pulmonary Consumption,'

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[1] *Transactions of the Clinical Society.* Vol. iii. London, 1870. Pp. 255.

and Stricker's 'Manual of Human and Comparative Histology.'

We have heretofore called attention to the sterling character of Trousseau's teaching. The third volume of his lectures, last issued, is in this respect on a par with those that have preceded it. It contains lectures on the specific element in disease, on contagion, on ozœna, on laryngeal, pulmonary, and cardiac diseases, on alcoholism, spermatorrhœa, incontinence of urine, diabetes, and vertigo from gastric disorder.

A fourth volume is in preparation.

Niemeyer's doctrines on the pathology of pulmonary consumption were examined in the April number (1870) of this Review, and will be familiar to our readers. The account then given will afford them increased satisfaction at having the entire treatise of that eminent teacher placed within their reach, translated into English. His views of the inflammatory origin of most cases of pulmonary phthisis have rapidly made their way in opposition to those of Laennec, which have held sway for many years.

The translator, Dr. Bæumler, has done justice to our countryman, Dr. Thomas Addison, by noting " that, at a period when Laennec's teaching had just commenced to dominate over the pathology of lung diseases," this independent observer arrived at and firmly held the opinion which has in more recent times been established by Reinhardt and Virchow and their disciples, and which forms the keynote of these lectures (on consumption), namely, that, to use Addison's own words, " inflammation constitutes the great instrument of destruction in every form of phthisis."

The other chief point of Niemeyer's teaching is, the relationship between miliary tubercle and cheesy products—a circumstance that has been largely investigated by several English observers, and now may be held as substantiated.

The third volume referred to, issued to the members of the Sydenham Society, viz. Stricker's 'Human and Comparative Histology,' contains 600 pages, and, as its subject indeed needed, is illustrated by numerous engravings on wood, which very well convey the information required, although not praiseworthy artistically. A comparison of the woodcuts with those in the German edition shows that they are very faithfully reproduced from the latter, but look coarser work and are printed harder and blacker, and in these respects are therefore inferior.

The translation is made by a most competent man, Mr. H. Power; competent both by his knowledge of the language, and more especially by a minute acquaintance with the subject matter of the treatise; the reputation of Mr. Power as a writer on physiology being heretofore well established by the editorial

work he has gone through in preparing the later editions of Carpenter's ' Physiology,' and also, we may add, by the work he has done in connexion with this review for several years as the chronicler of the progress of physiology.

The present volume embraces the contents of the first two, and a small portion of the third division of the German issue, and contains articles on the general methods of histological research on cells and connective tissue, on muscular and nerve tissue, on the heart and vascular system and blood, on the thymus, thyroid, and salivary glands, on the teeth, and on the alimentary canal and its vascular apparatus.

The articles are by various writers, each of whom, for the most part, has himself made the subject he has taken in hand a more special object of research. The general editor is Professor S. Stricker, who has likewise been a contributor of papers on several subjects. The examination we have made shows that the history of discovery in connexion with the histological matters considered has been but indifferently attended to, and the impression of the reader not conversant with facts would be, that almost all the knowledge now in our possession is of German origin. The references to French and English investigators are comparatively very few, and particularly in the case of some articles or chapters. Instead, however, of seeking for short-comings, it is much more pleasing to recognise the merits of the work as a whole; and it is gratifying to us to congratulate the members of the Sydenham Society on the possession of a very complete work on ' Human and Comparative Histology,' representing very fairly the present state of knowledge of the subject.

American Medical Periodicals.[1]—There is a marked advance both in the number and value of the medical periodicals issued in the United States. ' The American Journal of the Medical Sciences,' published quarterly, yields to none in the amount of original and borrowed matter it contains, and has established for itself a reputation in every country where medicine is cultivated as a science. But besides this old-established favorite, there are several others, weekly, monthly, and quarterly in appearance; among such may be named ' The Medical Gazette' and the ' Medical Record ' of New York, the ' New York Medical Journal;' the ' American Journal of Obstetrics,' the ' California

[1] *The American Practitioner.* A Monthly Journal of Medicine and Surgery. Edited by D. W. YANDELL, M.D., and THEO. PARVIN, M.D., Louisville, Kentucky.
The New Orleans Journal of Medicine. Edited by Dr. S. M. BEMISS and Dr. W. S. MITCHELL. New Orleans.
Half-yearly Compendium of Medical Science. Edited by Drs. BUTLER, BRINTON, and NAPHEYS.

Medical Gazette,' the 'Journal of Psychological Medicine,' the 'Journal of the Gynæological Society of Boston,' the 'American Journal of Syphilography and Dermatology,' the 'Archives of Ophthalmology and Otology,' and the 'Pharmacist and Chemical Record;' to these we have to add the three publications whose titles are appended to this notice.

This collection of American periodical medical literature certainly furnishes very sufficient material for judging of the state and progress of medicine in the United States, and we take advantage of its possession by using it, especially in the preparation of the quarterly periscope of each of the chief departments of professional knowledge.

'The American Practitioner' is an older journal—the 'Western Journal of Medicine'—under a new name and in an improved form, evidently borrowed from our able contemporary 'The Practitioner.' The manner in which it is brought out does credit to the typographic art of the great western state of Kentucky. It is especially the child of the University of Louisville, and is edited by two of the professors of that university. Its first purpose is to produce original articles on medicine and surgery " from the leading medical writers of the country," but it also undertakes brief reviews of books, and has a third portion, termed the " Clinic of the Month," consisting of extracts taken from various medical journals. A few pages of notes and queries, with the titles of newly published books, are appended.

In the numbers yet produced, the editors have succeeded in obtaining contributions from some of the best known men in the States, of a most useful and practical character. The first number opens with a short paper by Dr. Austin Flint on the use of bromide of potassium in saccharine diabetes; this is followed by a longer one, illustrated, on the treatment of urethral stricture by internal urethrotomy and rupture, by Dr. F. J. Bumstead, of New York. The third is on morbid states of the colon, with remarks on treatment, and especially on the use of belladonna, by Dr. Armor, of Brooklyn; and the concluding original article, and the longest, is on exsection of the head and upper third of the humerus for bony tumours, by Dr. Blackman, of Ohio.

In the second number Dr. Parvin, one of the editors, insists in a short paper on rest as a primary element in uterine therapeutics; Dr. J. W. Moorman reviews, rather too cursorily, the different modes of treating acute rheumatism; Dr. L. P. Yandell adds to existing evidence of the value of bromide of potassium in epilepsy, and proposes the drug as a remedy for headache; and lastly, Dr. J. T. Whittaker enlarges on the value of external manipulation in rectifying fœtal position, and in the course of

his essay awards the merit of first recommending combined external and internal version to a Dr. Wright, who practised the plan ten years before Dr. Hicks advocated it.

These specimens of contents will suffice to exhibit the character of the journal, which it is the aim of the editors to conduct " in the exclusive interest of the busy practitioner." The last-named individual has every reason to be contented with the material placed before him.

The ' New Orleans Journal of Medicine' is a quarterly publication, containing 200 pages. It is no new venture, having already reached its twenty-third volume. Original communications take rank as its first department, and a copious selection from the medical press of the day in matters of surgery, medicine, obstetrics, aural and ophthalmic medicine, and of anatomy and physiology, constitutes the other section of this large and valuable medical quarterly. Some concluding pages are devoted to a " clinical record," medical news, and editorial and miscellaneous remarks.

We would call the attention of our sanitarians to the code of laws for regulating sanitary matters in New Orleans. Dr. Bemiss, one of the editors, has collected the existing laws, and accompanies them with a running commentary upon their defects and intentions. We cannot here examine the many " original communications," or even enumerate their titles, although many of them might well bear transference to these pages for their worth. Yet before dismissing the journal from notice we will quote some racy editorial remarks on female practitioners of medicine. The writer disclaims for the occasion the intention of discussing the fitness of women for medical duties, or the propriety of their abandoning the privacy of domestic life, or the consequences of abolishing the distinctions which civilisation has established in the relations and duties of the two sexes : he will take a practical view of the matter, and proceeds with the following practical illustration :

" It is nothing new nor unusual to find hens discontented with the lot which nature has assigned them—that of laying eggs and raising chickens, and aspiring to the more conspicuous rôle of crowing and fighting. Probably a desire for notoriety actuates the feathered biped, as it is undoubtedly the mainspring which impels her counterpart to figure in a public career. The plea of enlarging the sphere of woman's labour and promoting her independence is nothing but a subterfuge. Civilisation, with its refinements and luxuries, has multiplied the domestic duties of woman. . . . . Why these crowing hens and their male admirers selected medicine as the fortress most suitable for assault can only be conjectured. . . . . Nevertheless, be this as it may, women have obtained a foothold within it, and they will not be dislodged by reasoning, ridicule, nor yet by

more forcible measures. The history of popular delusions proves that they gain strength generally by opposition, and in this case such would surely be the result. Nothing short of a thorough trial will settle the question of woman's fitness for this career, and propriety might as well now be left entirely out of consideration. In fact, such is the perverseness of human nature, the greater the impropriety the more eagerness to try the experiment; we say *experiment*, because we do not yet consider the success of female practitioners an accomplished fact. Therefore, we contend, give women a *fair* trial, for trial they must have. . . . .

"On the question of mixed classes, we have only to remark that we trust a sense of simple decency will guide medical teachers to a positive refusal to give instruction in anatomy, clinical surgery, and operative midwifery to mixed classes of males and females."

The vaticinations of the writer, in conclusion, are

"That the race of female practitioners of legitimate medicine will hardly last beyond the present generation, nor become numerous enough to disturb seriously the state of our profession."

The third publication to be noticed is the 'Half-yearly Compendium of Medical Science,' of which the fifth part appeared in January, 1870. It is of considerable magnitude, containing some 300 pages and an index. Each division of medical science has its own department, which "is paged separately, so that after a few years the work can be broken up and bound into separate volumes on each department, for which title pages and indexes will be prepared." But besides this departmental numbering of pages, there is a running paging of the work as it stands in print, at the bottom of the pages, so that it is easy to find out the place of any article from a list of contents supplied with each number.

The departments instituted are: (1) Anatomy, Physiology and Pathology; (2) Physics, Botany, Chemistry and Toxicology; (3) Materia Medica and Therapeutics; (4) General Medicine; (5) Clinical Medicine; (6) Obstetrics and Diseases of Women and Children; and (7) Surgery. These general departments are subdivided for further convenience of arrangement.

The "list of authorities" cited is a very long one, and includes all the principal periodicals of Great Britain, France, Germany and North America, along with the Swedish 'Hygieia' and the Netherlands Archiv. Our English writers have every reason to be satisfied with the extent of references to their works as reported in the journals; but German and French authors have likewise a fair share of attention.

The selection of subjects appears good, calculated to serve the active practitioner in search of information to aid him in his daily work. Lastly, the manner in which the Compendium

is issued by the publishers is highly creditable, the type being large and clear, so as to suit well-worn eyes—a condition too often overlooked in many productions of the press addressed to readers of mature years.

American Psychological Journal.[1]—This valuable Journal has now completed the fourth year of its existence, and, thanks to the energy and talent of its distinguished editor, each annual volume has exceeded its predecessors in the richness and variety of its contents. The index to the volume now before us shows that it contains no less than twenty-six original communications contributed by well-known American physicians, besides a large number of reviews, and a chronicle devoted to the consideration of (1) The Physiology and Pathology of the Brain and Nervous System; (2) Medical Jurisprudence; (3) Miscellaneous Subjects; and (4) Anthropology.

Many of the original communications are extremely valuable, and we may single out, as especially deserving of perusal, " Idiocy, as the effect of Social Evils," by Dr. Seguin; " Hereditary Influence to Mental Disease," and " The Plea of Insanity in Criminal Cases," by Dr. O'Dea; " Spinal Irritations," and " A Medico-Legal Study of the Case of Daniel McFarland," by the Editor; " Medico-Legal Contributions," by Dr. Porter; " Some Points in Regard to the Development of the Nervous System and of Vision," by Dr. Edwards Clark; " Notes on Ecstasy and other Dramatic Disorders of the Nervous System," by Dr. Clymer; " A Medico-legal Opinion relative to the Sanity of Carlton Gates," by Dr. Lee (very valuable in its legal bearings on the validity of wills); and " Physical Degeneracy," by Dr. Nathan Allen.

The " Chronicle," which in the last number of the Journal was prepared by Dr. D. F. Lincoln, of Boston, consists in a great measure of translations of important papers from French and German periodicals. Amongst the most valuable of these translations may be mentioned " A Lecture on Microcephalia," by Carl Vogt, and papers on " Inverted Sexual Feeling," by Professor Westphal, and " A Case of the Delusion of Double Personality," by Dr. Joffe.

The July number of the Journal contains some excellent remarks by Dr. Hammond and Dr. Robertson, on the subject of fees to medical experts, which may be read with much advantage on this side the Atlantic. They were elicited by

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[1] *The Journal of Psychological Medicine.* A Quarterly Review of Diseases of the Nervous System, Medical Jurisprudence, and Anthropology. Edited by WILLIAM A. HAMMOND, M.D., &c. Vol. iv. 1870. New York and London.

the attacks made upon the former of these physicians, in the 'Tribune' and other newspapers, for the evidence that he gave in the celebrated McFarland case, and for the large fee which he was untruly stated to have received. It is needless to add that Dr. Hammond triumphantly refutes the calumnious charges brought against him by the free and enlightened press of his native country.

The Half-yearly Retrospects of Medicine.[1]—The volumes of the English abstracts for the second six months of the past year present their usual character, and offer a vast mass of useful matter culled from numerous sources, and fairly representative of what has been accomplished in the several principal departments of medical science. They are addressed doubtless primarily to the large body of medical men engaged in general practice; and in this circumstance may be found a reason for the comparatively small amount of attention directed to the more recondite questions in pathology. But there is another feature which we consider capable of improvement. They very indifferently represent progress of medicine abroad. Braithwaite's Retrospect has always been a review especially of British medicine, and has aimed in a very limited extent to mirror forth the doctrines and practice of the Continent. In Ranking's Abstract, now edited by Dr. W. D. Stone, we have been accustomed to look for a wider range of retrospective research, but we are disappointed at the inadequate notice of French medicine, and at the still more meagre references to German pathology and practice; and even these scanty references come to us through the medium of the French journals. Scandinavian and Italian medicine does not figure in the abstracts, or if at all, only at second hand. The profession made for this half-yearly abstract in the title page, that it contains a digest of "Continental Medicine," is not sanctioned by the contents. The divergence between the statement in the title page of Braithwaite's Retrospect and the character of the contents is even greater; for, as notices of work done on the Continent generally and in America are well-nigh absent, it cannot be rightly affirmed of it that it contains "a retrospective view of every discovery and practical improvement in the medical sciences."

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[1] *The Half-yearly Abstract of the Medical Sciences.* Edited by W. DOMMETT STONE, M.D., &c. Vol. lii, July—December, 1870. Pp. 372. London, 1871.

The Retrospect of Medicine. Edited by Drs. W. and J. BRAITHWAITE. Vol. lxii, July—December, 1870. Pp. 408. London, 1871.

Savage on Surgery of the Pelvis.[1]—This quarto should find a welcome place in the library of all who are interested in the study of the diseases and of the anatomy of the female pelvic organs.

It contains sixteen chromo-lithograph plates with explanatory exegetical text. As the first edition has been before the public since 1863 we shall only call attention to what is new in the present edition, which also we regard as far superior to the former.

The text has been wholly rewritten and much enlarged, while certain redundancies in the first edition have been carefully pruned away. Five new plates are introduced. Of these, Nos. I and VII are the most important. Plates XIV and XV are simply pictures of various stages in the operation for the cure of vesico-vaginal fistula, and of the instruments used by Marion Sims. Dr. Savage wishes specially to exemplify the semi-prone position of the patient so much enforced by Sims, but nothing is said as to its impossibility when chloroform is required. The vivication of the surfaces is also only represented as made with scissors, though frequently the long-handled knife is a more convenient instrument. Plate XVI similarly represents gastrotomy. We think the whole work would have been as acceptable and useful if these plates and their necessary expense had been omitted.

Plate I, fig. 1, exhibits the superficial muscles of the " anterior and posterior perineal spaces ;" figs. 2 and 3, " front and posterior views of the perineal septum." Dr. Savage divides the levator ani into separate muscles, according to its attachments, under the names of pubo- and obturator-coccygeus ; and the muscle usually known as coccygeus he names ischio-coccygeus.

Plate VII, fig. 1, shows the dissection of the levator ani and coccygeus, exhibiting their relations to the bladder, vagina, and rectum. Fig 2 exhibits the relations of the muscular floor of the pelvis to the presentation at the last stage of parturition, the dilatation of the " perineal body," and the direction taken by the transversus perinei muscle. In figs 3, 4, and 5 are respectively delineated the vesico-vaginal septum with base of bladder, uterus, tube, and ovary, and the uterine vascular plexus.

A drawing is also given of a duck-bill speculum, called Foveaux's retractor, which by means of a sacral fenestrated piece connected by screws retains itself *in sitú*, and " thus enables the operator to dispense with the assistant." The instrument was

[1] *The Surgery, Surgical Pathology, and Surgical Anatomy of the Female Pelvis.* By HENRY SAVAGE, M.D. Lond. Second Edition.

constructed by M. Foveaux, of the firm of Weiss and Son, under Dr. Savage's directions.

The anatomical portion of the work merits great praise. There is less picturesque exaggeration than is common in French anatomical drawings, though some of the figures are rather diagrams than exact drawings to scale.

The text is accurate, and in some places corrects the ordinary text-books. Thus Dr. Savage describes the vagina as possessing neither glands nor follicles, in contradiction to Quain and Gray; an important fact in relation to leucorrhœa, which, according to Tyler Smith's views, in its ordinary form is a product of the cervix, or of the uterus, whilst true vaginal leucorrhœa is a result of inflammation, and accompanied by desquamation. The evil of the blind use of injections, and the great mischief they may cause, is thus anatomically evident.

The portion of the work on surgery and surgical pathology consists of somewhat disjointed notes appended to the anatomical descriptions, while " the cases," of which there is a considerable number, are quoted without any reference as to where the original details may be found.

We hope that Dr. Savage will at some future time present us with a more complete treatise on the surgical diseases of the pelvis, as the result of his experience and study.

Sedillot and Legouest on Operative Medicine.[1]—The third edition of this well-known work was criticised in this Review at some length in October, 1867, so that we need not dwell long upon the present issue. The work retains the same form as before; but a good deal of fresh matter has been incorporated with it, and it has been made in many respects more perfect than it was.

M. Sédillot, who has spent a long life in the study and practice of surgery, has found it desirable, in the preparation of this new edition, to call to his assistance M. Legouest, who is also an army surgeon of well-known reputation, and a professor at the military school of Val-de-Grâce. The latter is, therefore, well qualified, both by experience and by position, to keep this great work up to the level of modern surgery. The labours of two such men concur to make it the most perfect treatise upon operative surgery in the French language. In its present form it is alike creditable to the authors and to the school of medicine at Strasbourg, from which it emanates.

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[1] *Traité de Médecine Opératoire, Bandages et Appareils.* Par CH. SÉDILLOT, Professeur de Clinique Chirurgicale, Strasbourg, &c., et L. LEGOUEST, Professeur de Clinique Chirurgicale à l'Ecole du Val-de-Grâce, &c. Quatrième Edition. Paris, 1870.

In our notice of the last edition we pointed out two or three important operations in English surgery and points of practice, which deserved notice, had been omitted altogether. These omissions, we regret to see, are still unsupplied; and, what is more regrettable, no allusion is made to the antiseptic system of dressing wounds, which has been attended with so great success in Mr. Lister's hands, and has given rise to so much discussion in this country.

We notice with pleasure that M. Sédillot has entered fully into the superficial diseases of the eye and of the lachrymal apparatus, but has not attempted to deal with the deeper diseases revealed by the ophthalmoscope, nor with the anomalies of refraction which the eye presents. Herein we think he has hit the right line of demarcation. It is vain for a treatise on general surgery to discuss at length all the details of "ophthalmology," which have increased so rapidly of late years, that they have called into existence a special department of our art. Nevertheless, every work on general surgery ought to give such information about the subject as shall enable the learner to deal with the ordinary and superficial affections.

The way in which M. Sédillot's work is printed is highly creditable to the publishers; and we must again bestow a passing word of praise upon the woodcuts. They are excellent, and those in which the vessels are tinted are some of the cleverest and most effective applications of colour to surgical illustrations that we have seen.

Spence's Lectures on Surgery.[1]—The first part of Professor Spence's lectures on surgery has been already noticed in this Review; the present one is nearly twice as large, and is devoted to the diseases and injuries of special structures. It includes, therefore, some of the most important practical subjects in surgery, as fractures and dislocations, bone diseases, joint diseases, hœmostatics, aneurism, &c. Mr. Spence is an accomplished surgeon and an excellent operator, and the post which he holds in the University of Edinburgh gives him the opportunity of dealing with the most important cases in surgery, and consequently of giving point and weight to his opinions. We may therefore expect that, when the treatise is completed, it will take a high place among the current works upon general surgery; in the meanwhile we may touch upon one or two points in the arrangement of the book, which seem to require notice.

The volume opens with the diseases of bone; and thence by

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[1] *Lectures on Surgery.* By JAMES SPENCE, F.R.S.E., Surgeon to the Queen in Scotland, Professor of Surgery in the University of Edinburgh, &c. &c. Part II. Edinburgh, 1869. Pp. 633.

an easy transition the reader is carried on to the consideration of of the diseases of cartilage and joints. Fractures are treated at some length, and after fractures dislocations. The tendons next occupy the author's attention, but he does not linger long upon them, for he is anxious to get on to the much more important subject of blood-vessels. The essay upon hæmostatics is very complete; indeed it is quite a monograph upon the subject, and tells the student all that it is needful for him to know for practical purposes. Aneurisms, in all their varieties, are fully discussed and illustrated by some very apposite cases.

We venture to think it a mistake on the part of Mr. Spence to drop the term " Collis's fracture," for a name of this kind is very convenient. It expresses in a couple of words a complicated injury of the lower end of the radius, which would otherwise require several sentences to indicate; moreover, the name is so incorporated in surgical nomenclature and in surgical works, that it would be well, were it only for the assistance of the student, to mention it. And it is clear that the author has no objection to such names, for, in speaking of the injuries of the lower extremity, he refers to " Pott's fracture."

In our examination of the first part we remarked the want of a preface to explain the scope of the work; in this second part we have felt the need of an index. Both these omissions are attributable to the method of publication in parts, which Mr. Spence has adopted; but we hope they will be remedied when the work is completed.

Whether the author intends to go fully into the diseases of the eye or not does not appear; probably he does not, as ophthalmology is now such a large and complex field that it can hardly be embraced in a treatise on general surgery. If this be so, is it wise to include squint under the head of myotomy? True the essence of the operation consists in the division of a muscle, but the question of where an operation is advisable, what particular operation should be undertaken and so forth, are matters in which an intimate knowledge of the diseases of the eye is often necessary. But if he proposes to describe diseases of the eye, it would surely be the proper place to treat of strabismus in connection with them, and then he might well explain its nature and peculiarities at greater length than he has done, when regarding it as merely an example of the unnatural contraction a muscle and its tendon.

Mr. Spence takes occasion, when speaking of morbid contractions of muscles, to express his opinion upon specialities in general, and upon orthopœdic surgery in particular. He says—

" Whilst I admit that the attention given to this department by gentlemen who have devoted themselves specially to the treatment

of such deformities has done much to improve our methods of treatment, I yet doubt whether the benefit derived from such specialisms is not more than counterbalanced by the tendency to make too much of the subject. Leading to the invention of highly ingenious, but useless machines for rectifying deformities, to the exclusion of simple and more efficacious apparatus, and to promising too much in cases where little good can be expected, and where the apparatus often does harm. I fear, also, that they often lead to the proposal of operations or the application of apparatus where no such measures are required."

In this view of the case there is, no doubt, much truth. We are well aware that the multiplication of special branches of surgery has led to the evils of which our author complains. There has been a tendency to exaggerate the importance of certain cases—expensive and complex apparatus has been deemed necessary where simple methods might have sufficed, and what is worst of all, the local and special symptoms have often been treated to the neglect of the general health. But, notwithstanding these drawbacks, we cannot doubt that the subdivision of labour, which the rapid growth of knowledge has made necessary, has tended largely to the advancement of surgical science, and to the relief of suffering humanity.

Mr. Spence's position in Edinburgh is such that his opinions cannot fail to be of interest to surgeons in general ; and with that large body of medical men who look to the northern metropolis as their *alma mater*, they will certainly carry great weight.

The illustrations in this part do not please us so well as those in the former one. Some of them are executed in chromolithography, and certainly have the advantage of colour ; but the colour is put on so broadly and coarsely that the drawings would be almost better without it. The representations of compound fractures in Plate XIV make one sigh for the clear, sharp woodcuts with which Liston's treatises were illustrated forty years ago. And some of the uncoloured drawings are equally unsatisfactory. Thus, in Plate XIII there are two or three which are so wanting in definition that they add very little to the author's verbal description ; they do not speak for themselves, and tell their own tale, as good sketches ought to do. In reviewing the literature of the present day, there are few things which strike one more than the number, beauty, and finish of the engravings with which even our cheap serials are enriched. But if we had to form an opinion only from the examples presented in Mr. Spence's work, we should conclude that the art of illustrating books had been well nigh at a standstill during the last half century.

F. Jordan on the Treatment of Surgical Inflammations.[1]—The author thus describes the new method he calls attention to:

" Putting aside specific inflammations, I know no drug or combination of drugs that can cure an inflammation. Counter-irritation can unquestionably cure inflammation. Let me cite one fact among many. An inflamed patellar bursa, before chronic inflammation sets in, can be most certainly cured by a ring of blister placed around it, when every other remedy fails. Seeing that counter-irritation could do what no other remedy could, I put a ring of counter-irritation around abscesses, carbuncles, cellulitis, and other inflammations, and discovered striking and rapid results.

" I next sought to find out the most favorable localities for counter-irritation in *every* inflammation. It appeared to me that it should always be established over the next or another vessel or vascular territory."

An elaborate series of diagrams is given, showing the best localities, the extent and configuration of the area for the application of the counter-irritation. The work is concluded by a selection of 133 cases in which this treatment has been carried out successfully.

Mr. Jordan, however, does not seem to confine himself entirely to this method, for at p. 12 he says—

" That he takes care to remove the cause, where it could be removed, and to secure rest by appropriate means, and that he combines pressure in accessible inflammations and elevation where practicable."

And again, at p. 13, he remarks, " In all inflammations I gave iron. Often as the great ' rester ' I found opium invaluable."

We were somewhat surprised at the application of his method in the treatment of gonorrhœa in acute urethritis. Mr. Jordan writes :

" In reference to a first attack of simple inflammation of the urethra, no matter how acute it may be, it may almost invariably be cured in two or three days by counter-irritation. Acetum lyttæ should be applied over both femorals, and with this should be combined a disc or broad zone of iodine liniment, applied daily. The diet should be free from stimulants, and an alkaline drink may be taken before meals."

Altogether, this treatise may be pronounced a *bonâ fide* attempt to promote the advancement of surgical treatment, and we anticipate its exercising a good effect on surgical practice. The work is essentially practical, and the cases recorded fully substantiate the views of the author.

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[1] *The Treatment of Surgical Inflammations by a New Method, which greatly shortens their Duration.* By FOURNEAUX JORDAN, F.R.C.S. Eng.

Wilson on the Ophthalmoscope.[1]—It is somewhat late to review, in the beginning of 1871, a work published so long ago as at the commencement of 1868, and we much regret we have not had an opportunity of previously noticing Mr. Wilson's work. During the past three years several important essays have been published, which require to be incorporated with that before us to render it a complete reflex of our present knowledge. Notably, Knapp's treatise on ' Intraocular Tumours,' Couper's ' Observations on Astigmatism,' and those of Clifford Allbutt, and others, on ' Optic Neuritis of Cerebral Origin.'

The object of such a work as that before us is, we apprehend, to furnish the student with an intelligible account of the construction of the instruments by which the interior of the eye is explored, the proper mode of applying them, the appearances presented in health, and the changes effected in the different tissues by disease. On reading through Mr. Wilson's work we think these objects are fairly attained, and the learner may take it as a trustworthy guide in his efforts to master a subject that is confessedly somewhat difficult.

The first treatise is divided into twelve chapters, four being devoted to the theory of the instrument and its different forms and the mode of using it ; the remaining eight to the appearances presented by the fundus in health and disease.

The account of the natural appearances, as seen in the inverted image, is good ; but we think something more should have been said, in respect to the mode of examination by the direct method, than is found in the short notice on p. 17. The anomalies of refraction are very briefly but clearly treated, and at quite sufficient length for the ordinary student, who is not desirous or is incapable of following mathematical formulæ. In the chapter on the optic nerve Dr. Wilson alludes to tobacco amaurosis, in terms in which we fully concur. He remarks that he has no doubt of the occurrence of this form of blindness, but that he is not persuaded as to its great frequency. It is singular that amongst the thousands or millions of smokers blindness can be so comparatively seldom attributed to the poisonous influence of tobacco. The various forms of retinitis are well described. The subject of glaucoma is cleverly treated, and no point of importance is omitted.

We hope that by this time the present edition has been nearly exhausted, and have no doubt but that in a new one all recent advances will be duly recorded. The plates in particular are capable of improvement.

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[1] *Lectures on the Theory and Practice of the Ophthalmoscope.* By HENRY WILSON, F.R.C.S., Assistant-Surgeon to St. Mark's Ophthalmic Hospital, &c. Dublin, 1868. Pp. 146. 2 plates.

Salomons on Diseases of the Eye.[1]—The little work of Dr. Salomons forms a very good introduction to the study of diseases of the eye, and is well adapted for students who, before attending the ophthalmic wards of a hospital, are desirous of obtaining some accurate knowledge of the broad outlines of these affections. In the compass of 108 pages it is obviously impossible that more can be done than this, and the reviewer's duty is simply to note whether these outlines have been accurately drawn. The book is divided into two parts, the first includes the pathology and treatment of eye diseases, and the second operative surgery of the eye. A short section on the instruments in ordinary use, and another on the anatomy of the eye in our opinion, might have been, in so short a treatise, advantageously omitted from the introduction. The section devoted to the pathology and treatment of the various diseases seems to us, though extremely condensed, yet given with sufficient correctness; many of the diseases named, however, need not have been noticed in so elementary a book, and the space their description occupies might have been usefully taken up by enlarging the account of the more important diseases; for example, what is the use of even mentioning ablepharon, or epicanthus, or xerophthalmos. How often do such diseases present themselves in the course of ten years even at a large hospital? In a work professing to be a complete treatise on ophthalmic medicine and surgery they should doubtless be included, but it would have been better to have left them out and expanded the account of glaucoma or the treatment of iritis, which are both indifferently, though not inaccurately given. We add an example of the mode in which Dr. Salomons deals with his subject, and select his account of lachrymal abscess:—

"*Dacryocystitis Phlegmonosa.*—Phlegmonous inflammation of the lachrymal duct commences as a painful and hard swelling at the inner angle of the eye.

"When the inflammation advances the skin is deep red and tense; and the swelling extends to the eyelid, which often becomes œdematous, while the conjunctiva may also become affected.

"By pressure on the swelling nothing is evacuated on account of the occlusion of the opening of the lachrymal sac. Fever is not uncommon in the acme of this disease.

"If the inflammation do not subside, suppuration takes place, and the abscess subsequently opens; after this the inflammation disappears, and the swelling may subside. Sometimes this process gives rise to fistula lachrymalis.

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[1] *Handbook of the Diseases of the Eye: their Pathology and Treatment.* By A. SALOMONS, M.D., Fellow of the Massachusetts Medical Society; formerly Oculist in Government Service at Veenhvizen, Holland, &c. London.

" *Treatment.*—We must endeavour to limit the inflammation by an antiphlogistic treatment. Painting of the region with a concentrated solution of nitrate of silver has proved beneficial. If suppuration cannot be prevented apply a poultice, and subsequently open the abscess in the lower lachrymal point, if possible. After all treatment, should a fistula of the lachrymal duct remain, the normal passage must be kept open, if possible, by probing, and the fistula induced to heal."

Dr. Salomon's work, as it now stands, will probably form the nucleus of a larger one that we hope to see at some future period.

Guy on Public Health.[1]—We gladly welcome this " attractive" little volume as containing an earnest of what we may expect from Dr. Guy in the discharge of his duties in his new office of Professor of Hygiène in King's College, London. In this his first course of lectures he has endeavoured (and in our opinion, successfully) " to combine a scientific with a popular treatment of his subject," which is " a history of the prevalent and fatal diseases of the English population from the earliest times to the end of the eighteenth century." We need not give a more detailed account of the contents of the volume, neither are we called upon to discuss the numerous and miscellaneous topics of which it treats. It is not for the most part a book of original research, but we are quite prepared to believe that " the chief sources of information" on each subject have been diligently consulted and fairly used. On this point, however, we cannot pronounce positively, on account of the general absence of references to the authorities for the statements in the text, which we consider to be a great defect in any work, and especially in one of this nature. Dr. Guy is apparently prepared for this objection being brought forward, as in his preface he " states that, in omitting minute references to authorities, he has been solely influenced by the wish to fit his work for continuous uninterrupted reading." Probably few persons will acknowledge the force of this reason, inasmuch as the references (1) need not be inserted in the text, and (2) if they were placed at the bottom of the page, no one who did not want them would be obliged to look at them. Perhaps a greater obstacle in the way of " continuous uninterrupted reading" of a book which is not meant to be purely statistical, or even purely scientific, will be found in the multitude of figures with which the pages are overloaded, for which Dr. Guy himself offers a sort of apology (p. 25). We are far from objecting to the use of figures, and indeed we consider that, in basing great part of his work on

[1] *Public Health : a Popular Introduction to Sanitary Science.* By W. A. GUY, M.B., F.R.S., &c. Pp. 216. 1870.

the London Bills of Mortality, Dr. Guy has shown great skill and judgment; but surely in a course of Lectures such as these, it is better to give merely the results in the text (which may be supposed to reproduce exactly what was laid before the class), and to reserve the actual figures for notes, either at the foot of the page or in an appendix. But these are matters of comparatively little consequence, and do not seriously interfere with the general usefulness of the book. In connection with the Black Death and the state of the public health of England during the fourteenth century, it might be noticed that " the destructive epidemics with which this country, as well as many other parts of Europe, were visited during the reign of Edward III were so memorable, that they became epochs, from which charters and other instruments were sometimes dated." Accordingly the date assigned to the Black Death (called " Pestilentia prima et magna ") was " Anno Domini 1349, a festo Stæ. Petronillæ usque ad festum Sti. Michaëlis," *i.e.* from May 31st to September 29th. (Sir Harris Nicolas, ' Chronology of History,' p. 389.)

When it is mentioned (p. 51) that in London " in one burial ground alone there were interred upwards of 50,000 corpses, arranged in layers, in large pits," it would be interesting to add that this spot was the present Charter-house Square, which had been purchased in the previous year by the " noble Knight," Sir Walter Manny, as a public burial ground in anticipation of the mortality from pestilence which so soon occurred.

From his diligent examination of the London Bills of Mortality with special reference to the Great Plague of 1666, Dr. Guy is enabled to correct one, if not two, popular misapprehensions. He considers, that, " except in years when plague was epidemic, the city [of London] within the walls was very nearly plague-proof " (p. 115), even before the Great Fire, it being " the out-lying parishes in which the plague had always proved most fatal and lingered longest " (p. 116); and that, therefore, the beneficial effects of the fire upon the plague have been much exaggerated. He also shows that the Great Fire did not give the *coup de grace* to the plague, which in the next twelve years destroyed no less than eighty-two persons (p. 115). And lastly, from a comparison of the deaths caused by different diseases, he shows that, while some were less fatal towards the end of the seventeenth century than they had previously been, others were more fatal, so that, " on the whole, the health of London experienced no change for the better during this century, except in the relief obtained from the incursions of the plague " (p. 119).

At a time when opposition to vaccination has been causing

some difficulty in carrying out the enactments of the Compulsory Vaccination Act, it may be useful to take all legitimate opportunities of stating that, whereas in the ten years ending 1770 the deaths from smallpox in London amounted to 108 per thousand, they were gradually reduced to 11 per thousand in the ten years ending 1860. "These are remarkable figures; but they are not such as would have satisfied the aspirations of Jenner, nor should they content us. We ought not to count our work done while anything remains to be accomplished" (p. 212).

We had marked some more passages for special notice, but our space will not allow us to continue our observations. We will therefore conclude by recommending the volume to our readers, and expressing our hope that the author may be able in the current year to continue his Lectures, and to carry out his intention "to treat of the diseases and sanitary discoveries and reforms of this nineteenth century" (p. 26), in doing which his own labours in the cause of sanitary improvement will enable him to speak with no inconsiderable amount of authority.

Leipzig Physiological Researches.[1]—The present part of this publication contains six articles—1, on the pancreatic secretion, by N. O. Bernstein; 2, on the respiratory process in the lungs, by J. J. Müller; 3, on the circulation in active, quiescent, and exhausted muscle; 4, on the action of nitrate of amyl-oxide on the circulation, by T. Lauder Brunton; 5, on the matrix and cells of the cornea, by F. Schweigger Seidel; and 6, on the action of the pneumogastric nerves upon the heart, by Dr. J. Coats. We shall briefly indicate the gist of two or three of these several papers.

Dr. Bernstein forms a permanent fistula in one of the pancreatic ducts of the dog, and believes that, when the animal is restored to health, perfectly normal juice may be obtained from it, since it can convert starch into sugar, oily substances into an emulsion, and albuminous substances into peptones. He finds that the action of the gland stands in direct relation to the ingestion of food, increasing immediately after a meal and attaining its maximum about three hours after. It then diminishes for about two hours, increasing slightly about the seventh hour, from which time it gradually falls to zero at the fifteenth hour. In regard to the influence of the nerves, it is remarkable that the production of nausea, by any means, greatly diminishes the flow of the secretion, whilst vomiting almost entirely arrests it. This led him to investigate the action of

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[1] *Arbeiten aus der Physiologischen Anstalt zu Leipzig : vierter Jahrgang.* 1869. Mittgetheilt durch C. Ludwig. 1870.

the pneumogastric upon the gland, and he found that irritation of the centripetal extremity of the cut vagus arrests the flow of the secretion, whilst irritation of the distal extremity had no effect. Placing the animal under woorara increased the flow of the secretion.

Sadler,[1] at Ludwig's instigation, undertook to investigate the conditions of the more rapid current of blood occurring in excited muscles. The experiments seem to have been conducted with great accuracy. Section of the nerve supplying the biceps femoris in dogs narcotised with morphia, produced in general an augmentation of the current. This Sadler is unable to explain; either by the excitation it produces,—for the increase of the current is much more persistent than the excitation, and even up to a certain point increases with the lapse of time after the section ;—or by regarding it as due to paralysis of the vascular nerves, since it does not set in immediately, and after it has attained its maximum, it begins again to decrease, and moreover, the excitation of the divided nerves of dogs under the influence of woorara (in which it is well known the activity of the sympathetic remains unaltered) causes no alteration in the current. Irritation of the divided nerves in animals narcotised with morphia was always followed by acceleration of the current, which was stronger when the muscle remained in a tetanic condition than when it was only thrown into clonic convulsions. The maximum acceleration occurred in tetanus, whilst actually present or shortly after its cessation. In exhausted muscles exactly the opposite conditions obtain, tetanus producing a diminished volume of the current or even a complete stoppage of it; both the diminution and the stoppage (when present) ceasing on irritation. This fact becomes, as Schmulewitsch observes, of special interest, if other peculiarities of exhausted as compared with fresh muscle be called to mind. Thus, exhausted muscle does more work with a feeble than with a stronger stimulus, and at lower than at higher temperatures : the opposite being true of fresh muscle. Sadler, having satisfied himself that the tetanic convulsions were not the true and only cause of the acceleration of the current, concluded that the muscles of the vessels are directly excited by the persistent current of arterial blood, and, in fact, by the oxygen this contains.

Seidel's paper is written to prove that the so-called connective-tissue corpuscles or " positive images," and the areas in the tissue corresponding to them, known as the negative images,

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[1] " On the Blood-Current in the Quiescent, Contracted, and Exhausted Muscles of the Living Animal," op. cit., Band iv, 1869, p. 77.

are both of them artificial products of the action of the re-agents employed. On the other hand, he has been able to inject a series of wide anastomosing canals in the cornea, the deeper side of which only is lined with flattened epithelial cells.

Tyndall on Diamagnetism.[1]—The republication, in a separate form, of these researches and essays on diamagnetism will, we trust, serve a twofold purpose. While the collection and anno-tation of a good series of experimental papers on any scientific subject is a sure way of stimulating its further elucidation, it frequently causes a thorough reform in the mode of handling the subject in popular manuals. Although Professor Tyndall has not yet brought together his numerous and important researches on heat, he has, however, himself furnished us with a popular and yet most accurate digest[2] of the chief results in this depart-ment, of his own labour and that of other physicists. On the other hand, in the case of diamagnetism, the publication of the original memoirs precedes, we may venture to hope, the appear-ance of a compact volume on the phenomena and theories of magnetism, similar to those manuals on heat and sound which our author has already given us. His lecture notes on light and on electricity are, of course, admirable and useful, so far as they go, but cannot do duty for the full, illustrated, and expanded treatment of the subjects which they embrace. Manuals of physics, such as the new editions of Ganot's and Golding Bird's treatises, are, in many directions at least, too condensed to admit of their being readily followed by students desirous of repeating for themselves the chief experiments described.

Nearly the whole of the papers in the volume under review relate to magnetism; a few, however, are concerned with thermo-electric phenomena. Diamagnetism, one of the great discoveries of Faraday, has been very thoroughly investigated by Professor Tyndall, not merely with the object of an exhaus-tive study of its phenomena, but rather to test and to develope the theories which have been started to account for them. The exquisite ingenuity and perfect adaptation to their purpose which many of Professor Tyndall's crucial experiments exhibit rival those for which his illustrious predecessor was distin-guished. Without entering into the minute details of the explanation, we may just notice one beautiful and simple ex-periment devised by Professor Tyndall, in order to show that the approach of a diamagnetic body to the poles of a magnet may really be due to repulsion, and, *vice versâ*, the recession of a

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[1] *Researches on Diamagnetism.* By J. TYNDALL, F.R.S. Pp. xix and 361. London, 1870.   [2] 'Heat as a Mode of Motion.' Third Edition.

paramagnetic body to attraction. A bar of iron, the strongest paramagnetic substance, will place itself axially between the poles of an electro-magnet; that is, it will become parallel to a line joining the poles. A bar of a diamagnetic body like bismuth will place itself in a position precisely at right angles with this, or, as it is called, equatorially. But many anomalies are observed in crystals and powdered and compressed substances, both para- and diamagnetic, the suspended substances often placing themselves exactly contrary to their proper and anticipated directions. Professor Tyndall explains his idea of a greater condensation of particles in particular directions in such substances by the following illustration, which is at once a simile and an experiment. He says—

"If we take a slice of apple, about the same size as a penny, but somewhat thicker, and pierce it through with short bits of iron wire in a direction perpendicular to its flat surface, such a disc, suspended in the magnetic field, will, on the evolution of the magnetic force, recede from the poles, and set its horizontal diameter strongly equatorial, *not* by repulsion, but by the attraction of the iron wires passing through it. If instead of iron we use bismuth wire, the disc, on exciting the magnet, will turn into the axial position, *not* by attraction, but by the repulsion of the bismuth wires passing through it."

Then our author proceeds to show that the supposition of a similar arrangement in crystals may furnish an explanation of their peculiar behaviour in the magnetic field.

While one half of the volume before us is occupied by long and important memoirs on diamagnetism and the magnetic deportment of crystals, the remainder is devoted to a series of letters, essays, and reviews, relating to magnetism and electricity. Original experiments are recorded throughout the volume in both sections of its contents; while, wherever necessary, diagrams and engravings of apparatus are introduced to make the author's meaning clear.

We sincerely trust that this volume will meet with such a cordial reception among scientific men as to induce its author and the publisher to continue the series of which it forms the first instalment.

Dr. Gordon on Army Surgeons and their Works.[1]—Dr. Gordon has, during many years, done good service in the army medical department, in which he has obtained the rank of Deputy Inspector of Hospitals, besides the dignity of C.B. In various climates he has witnessed the good work accomplished at the

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[1] *Remarks on Army Surgeons and their Works.* By C. A. GORDON, M.D., C.B., &c. &c. London, 1870. Pp. 109.

hands of the army medical officers of his own time, and, from the records of the services of those of an era earlier than his own, is impressed with the conviction that a just meed of praise has not been meted out to them. As workers together with non-military medical men in Great Britain, and in those colonies having a British population and enjoying a temperate climate, there is, indeed, not much in the work of army surgeons to single out as specially theirs in merit and value. Certainly in surgery this statement admits of some qualification, for the history of operations shows that many improved methods of operating are due to the talents of army surgeons. But when we turn to their labours in tropical climates, and amid foreign populations exposed to conditions of existence and to sources of disease unfamiliar among ourselves, there is an immense mass of medical science that has especially come to us from the experience and researches of army and navy medical officers.

But if compelled to vindicate the worth of army surgeons as contributors to medicine and surgery, Dr. Gordon feels himself stimulated to wrath when he touches on the subject of sanitary science, and the conviction enters into his soul that theorising and dillettanti sanitarians of these latter days have assumed to themselves the creation of the science, and have ignored the experience and the results arrived at by army surgeons during the last century, and reduced also by them to practice.

As the substance of this treatise has already appeared in the pages of a medical contemporary, an analysis of its contents is not here demanded; we will, however, to afford the reader the opportunity of judging of the nature of the work, give a general account of it.

The introductory chapter is occupied by a sketch of the multiform duties that devolve upon army surgeons, and is given for the purpose of remedying "the very partial and inadequate knowledge that prevails in regard to the extent, nature, and importance of their official duties." But it will also be valuable to aspirants for the army medical service by setting before such the nature of the work expected from them. A remarkable example of perverse and obtuse red-tapeism is presented in the fact, that, a Royal Commission that sat from 1859 to 1863 to inquire into the sanitary condition of the Indian army, never referred to the official medical and sanitary reports accumulated for a century in the office at Calcutta, being, it would seem, "unaware of the existence both of that office and of the records contained in it."

The first portion of the work is historical, Dr. Gordon giving a rapid but interesting outline of the rise of a class of medical men and of their increasing recognition among the successive

principal ruling powers of Europe. Following this notice of the medical art and its professors generally, he proceeds to show the development of a corps of surgeons as a special department of an army in the field, commencing as an irregular system, but resulting in an organization such as we have at the present day. In performing this task Dr. Gordon has collected a mass of historical notes and references scattered in various works, and also brought again into notice numerous British worthies who did their share in building up the framework of surgical knowledge and of military medical organization and sanitation. To the present generation of younger practitioners the names of many of these renowned surgeons of the last and of the beginning of the present century are unknown, though those of Dr. Gordon's standing will recall many of them as authorities still quoted in the professional text-books of their early days. However, there are some names that will survive as well known for future generations, and foremost amongst such is that of John Hunter. His great reputation cannot, indeed, be assigned to his connection with the army, although Dr. Gordon shows that even in that relation he rendered good service, and derived from it the experience which enabled him to write on gunshot wounds and on syphilis. Guthrie is a more recent name, and still surrounded with a halo of honour as a most eminent army surgeon, whilst the name of Sir James McGrigor will long remain a household word in the army medical department, in the improvement of which he took so prominent a part.

At the end of the treatise Dr. Gordon summarises the principal contributions made by army surgeons to the advancement of pathology and of the practice of their profession, and in the promotion of an improved hygienic and moral condition of the army. Altogether, the book will be read with pleasure and instruction, and may be especially commended to those who propose to engage in the public medical services.

Unity of Medicine.[1]—Both these volumes give a professedly impartial sketch of the history of medicine, with the intention of using it as a lamp to guide our future steps. But the value of their compendia will be considerably diminished by each having a theory to build up, and the reader is haunted by a suspicion that the facts are, if not chipped, at least coloured, to harmonise with the wall.

Dr. Davies traces the origin of the present division of the

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[1] *The Unity of Medicine.* By FREDERICK DAVIES, M.D., F.R.C.S., late Surgeon to the St. Pancras and Northern Dispensary.
The Medical Institutions of the United Kingdom. By JOHN CHAPMAN, M.D., M.R.C.P., M.R.C.S., Physician to the Farringdon Dispensary.

profession into physicians, surgeons, and general practitioners, to three definite periods of corruption in medicine. From the time of Hippocrates up to the sixth century he would appear to regard the standing of the medical profession and its relation to science and the public as perfect. Then it was taken up by the Church, and allied to universities and scholarship, which were under the Church's wing. It was " invaded by priests and monks," who substituted superstitious rites for medicine, and discarded surgery. The foundation of the College of Physicians, at the beginning of the sixteenth century, marks, in our country, the emancipation of medicine from priestcraft, but left it divorced from surgery. With that divorce is connected the second great source of corruption, namely, the alliance of the healing art with handicraft trade, as represented by the barbers. During the twelfth and thirteenth centuries these omnipresent manipulators of the human person were wise enough to take up the despised employment, and were amply rewarded by the honour and respectability which accrued to them from practising part, at least, of an ennobling profession. As the decayed Company of Barber-Surgeons in England, and as " Salassatori" up to the present day in Italy, they are held to have degraded the healing art by associating the idea of it with a meaner occupation. The foundation of the College of Surgeons, in 1745, emancipated us from this ludicrous alliance, but still did not regraft the operative department on the parent trunk of medicine. From that date we have the pure surgeon as well as the pure physician, holding himself forth as something superior to the general practitioner. The third great corruption is traced by our author to the irruption of shopkeepers into our ranks, the taking up of the neglected duty of supplying medical advice to persons of scanty means by the grocer and druggist, who thus developed into the modern apothecary—that is, a physician who also sells drugs. Dr. Davies amusingly illustrates this history by one of those river maps, in which the pure blue stream of healing, starting from Hippocrates, is shortly invaded by a mud-coloured tide of priestcraft; then by a blood-red, representing the barbers; and then by the yellow concentrated infusion of apothecaries. In England a green is the result of the mixture of the apothecary and the physician; in Ireland and Scotland the barber and the university influence (derived from priestcraft) stain the river of a strange sort of dirty purple, while in " civilised states" the occupations are all kept distinct and pure tinted. Attributing all the flaws in our polity to the action of these corruptions, Dr. Davies would apply the remedies of " purity" and " unity;" that is to say, he would purify us from the shop, and he would unite physicians and surgeons into one body, not only by a common

incorporation, but by making every one equally fit to practise both branches. " If a uniformity of education and qualification, if a single portal to the profession be insisted on, no less must a uniformity in name, in mode of practice and remuneration, follow,"—is our author's advice.

The medical man is to be debarred from supplying medicine, and the pharmacian from giving advice. The numbers of the latter are to be restricted, a strict examination enforced, and a monopoly of trade to be given them in return for a legalised moderate scale of charges. Dr. Davies is a little vague as to the exact machinery by which he proposes to effect his changes, but we gather from his commendation of the French and German systems that he contemplates a considerable amount of paternal control on the part of Government. The words "compelled" and "authority" occur very often, and legislation is the necessary prop of his scheme.

Seeing that to the institution of the Royal College of Physicians he considers that he has traced the emancipation of physic from priestcraft, and to the institution of the Royal College of Surgeons its separation from the barbers, so he naturally looks to active parliamentary interference, penal laws, and the foundation by our gracious Queen of a new "United College of Medicine," to perfect our Oceana.

The cure patronised by Dr. Davies is in itself rather startling, but it becomes more alarming still when we find that another historian of our profession, whose book we have bracketed with his, considers the proposed remedies as themselves the cause of the disease. Dr. Chapman looks upon the medical institutions of Great Britain and over-legislation as at the bottom of all our griefs. He would completely separate the medical profession from the State by the abolition of all special privileges, monopolies, exclusive and compulsory powers, now possessed by the medical corporations, the universities, and the Medical Council, so that, all hindrances being removed, the medical body may spontaneously develope and organize itself according to its own experience of its own requirements, and may thus qualify itself to supply the manifold medical needs of the numerous grades of modern society.

The danger of the first reformer's proposal is that medicine may be cramped into a Procrustean bed, which will only allow of growth in its own form, and that, after all, this new form may have its own serious faults, which past experience will not enable us to guard against. The danger of the second is that the disembodied protoplasm into which he would reduce the profession might chance to develope itself into a tumour instead of a perfect organ, and might have to be cut off in disgrace from

the body politic. We have so lately[1] given at length our views as to the reform and utilisation of existing institutions that we need not repeat them, merely saying that all the facts brought forward in these volumes strengthen the opinions then expressed.

Stratton on the Celtic Origin of Greek and Latin.[2]—Medical men are prolific writers on natural history subjects, but Dr. Stratton is one among the very few who have directed their attention to philology; and although we cannot assign much value to the work he has produced, yet we are pleased to find him employing his leisure on a science which promises to considerably enlighten us respecting the early ethnology of our globe, and to create historical knowledge where no written history is obtainable.

Dr. Stratton has doubtless spent much labour on his little book, but we fear that the scientific philologists of the present day will recognise in it little in furtherance of their researches; for the derivations of Greek and Latin words suggested appear to be based on no recognised principle,—on no admitted laws. The author has unfortunately contented himself with seizing on some general relations of sound or of orthography, after the manner of the older etymologists; and consequently, although he has hit upon not a few correct derivations, has indulged in a good many fancy ones. He has not anywhere shown his acquaintance with Grimm's laws of speech, as accepted, with emendations and extensions, by all the distinguished philologists of the day, nor with the accepted families of languages and their relations and affinities.

Thus, he assumes, first, on the authority of an old book written in 1828, before the scientific base of philology had been laid, that no affinity exists between the Gaelic and Latin; and in the next place, that Gaelic is the older language, and that both Latin and Greek are more or less derivatives from it. Both these assumptions are negatived by modern research. The Gaelic, as a dialect of the Celtic, has a distinct affinity with the languages of Greece and Rome, and with them belongs to the great Aryan division. The word " brathair" (brother) is quoted by the author as a Gaelic word, and source of the Latin *frater;* whereas all three together are traceable through the whole of the languages belonging to the Aryan tribe; and Dr. Stratton would find the words father and mother and many others all referrible to a common source, now represented by the Sanscrit.

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[1] See 'Brit. & For. Med-Chir. Rev.,' No. 89, January, 1870.

[2] *The Celtic Origin of a great part of the Greek and Latin Languages and of many Classical Proper Names, &c.* By THOMAS STRATTON, M.D., Deputy Inspector-General, Royal Navy. Second Edition. Edinburgh, 1870. Pp. 100.

It would be easy to point out many words in the published list in which the author is completely at fault in his derivations; and to save him from further waste of ingenuity we would commend him to the study of the works of modern philologists, and particularly to those of Max Müller, which possess the advantage of being written in English.

The Medical Directory, 1871.[1]—The Directory now ranks among the established institutions of the profession, and has made itself a necessity to the library of every medical man. One reads in its pages a history of what the profession now is, and, to a considerable extent, of the work it has accomplished, and of that which it has in hand.

We took occasion, in a notice of it for 1870, to suggest some amendments calculated to eliminate from its pages much superfluous matter and to obviate a threatened too rapid development in the bulk of the volume. If in some measure our suggestions have been accepted, there is still scope for deleting many entries of appointments, past and present, which add nought to the honour and glory of those who return them, and only uselessly encumber the pages. We trust the editors will wax bold enough to cancel such, relying on the good sense and general countenance of the profession in so doing.

It occurs to us that an abstract of Parliamentary legislative measures, of orders of Privy Council, of the Poor Law and of other Government boards and commissions, affecting the status, the interests, or the work of the profession, would be a valuable addition to the contents of the Directory. In some Diaries, such as Letts's, such an abstract is annually presented of the several acts of Parliament passed in the course of the session prior to their publication. The information to which we allude is a desideratum in these days of profuse legislation and of board-made law.

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[1] *The Medical Directory for* 1871, *and General Medical Register.*   London.

Original Communications.

I.— The Army in Relation to Public Health. — By CHARLES
ALEXANDER GORDON, M.D., C.B., Deputy Inspector-General,
Army Medical Department.

(Continued from page 172.)

Venereal diseases.—So much has lately been said and written
on the subject of venereal diseases in connection with the army, that
I scarcely know in what manner to present it now in a new aspect.
I may, however, observe that, in the following remarks I purpose
when discussing " venereal diseases" as a whole, to include syphilis
in its various forms and gonorrhœa, special reference to each of
these being made when it becomes necessary to describe them sepa-
rately ; but it is also necessary to remark that in some of the works
and reports from which I have gathered my data, no sufficient dis-
tinction is made between the two most prevalent forms, so that the
figures which I shall give must only be considered as approximations
to the truth, not as absolutely correct.

The prevalence of venereal diseases among the civil population.—
It will be immediately seen that nothing more exact than a general
estimation can be formed of the extent to which the mass of the
population is tainted with venereal poison ; yet a few particulars on
this subject may be given.   Thus, for example, we learn that 43 per
cent. of all the out-patients at Guy's Hospital who apply for relief
are affected with venereal in some form or other : that at the Hos-
pital for Sick Children, 174 children were affected with syphilis out
of 1007 surgical cases seen, or about one fifth, and nearly a similar
proportion has been observed at other hospitals where inquiries have
been instituted.   In the third report of the Association for Extending
the Contagious Diseases Acts, from which I have just quoted, the
reply of Mr. Paget of St. Bartholomew's Hospital is given to the
effect that " it would be very difficult to over-estimate the amount of
damage that syphilis does to the population."   Mr. Skey, C.B., in
drawing up the report of the Committee on Venereal Diseases in the
Army in 1865, observed that " the committee testified to the preva-
lence of the disease among all classes of society, to its insidious
nature, to the frequent failure of all but men of great experience to
recognise it."

From the remarks elsewhere made on this subject it may be readily gathered how prevalent this class of disease is among that portion of the population who furnish the great body of men to form our army. I may, however, observe that the results of statistics for the three years already stated, namely, 1864 to 1866, indicate that among the many men who presented themselves as recruits, the rejections for venereal disease and for affections more or less directly following it by hereditary descent, such as scrofula, skin affections, phthisis, malformations, &c., amounted to 91 per 1000 of all rejected. To test, therefore, the actual proportion of disease in the civil and military population, it will be necessary to ascertain the number of men invalided from the service. Singularly enough, the blue-books fail to supply us with the disabilities of men returned as invalids on home service, but we are furnished with the returns from foreign stations, and from these it appears that in 1864 the average number of men invalided from this contagious disease, or from diseases resulting therefrom, was 53 per 1000 ; in 1865, 90 per 1000 ; and 1866, 72 per 1000 ; the average of three years being about 72 per 1000. It would thus appear that in the recruits, civilians under the age of twenty-two, the average amount of contagious disease or its consequences was 91 per 1000 ; while among the military, men of various ages under forty-four, the average was only 72 per 1000, showing an excess of 19 per 1000 on the side of the recruits. With facts such as these, showing the presence in our midst of a secret enemy whose insidious ravages lead to such deplorable results, it was surely the duty of the Government to take some steps for the protection of those more immediately beneath their control.

Gonorrhœa.—Although this form of venereal disease is not to be compared with syphilis in the permanent results induced in the subjects of it and in their offspring, it, nevertheless, is fraught with many dangers, and is in its turn followed by many consequences which tend to lower the health standard of the mass considerably. As an illustration, I would again quote from the third report of the Association for Extending the Contagious Diseases Acts. Of 1289 cases of gonorrhœa in men treated at the Lock Hospital in 1869, the affection appeared as the simple form in 595 ; severe pain and disablement for weeks occurred in 395 ; the disease was of long duration and caused much pecuniary loss in wages in 239, and was followed by stricture in 60. As consequences of gonorrhœa, the opinion of Mr. Prescott Hewett is also quoted to the effect that rheumatic inflammation of the joints is far more frequent than is generally supposed, that anchylosis sometimes happens, and he adds that he has even met with cases of pyæmia from that disease.

Syphilis.—That the presence of syphilis among our troops is one of the most constant and prevalent causes of sickness and non-efficiency in the army is now a generally acknowledged fact. The dis-

covery is not a new one, however; but as with many other questions that concern the military, so the prevalence of this disease had ceased for many years to attract attention beyond the service, until recent agitation on the subject of preventive measures among the civil population brought it up anew as it affects the army. History records that the ravages of the disease first acquired that degree of virulence which attracted public attention among the French troops engaged at the siege of Naples about the year 1495; we learn also that the extent of inefficiency in the ranks occasioned by this disease was so well understood in the time of Henry the Fifth of England, that that monarch instituted measures of a very stringent and penal nature against the admission of *loose* women among his forces employed in France. In a code of articles and ordinances of war published at Edinburgh soon afterwards, equally severe measures were enacted. Nay, if we are correctly informed, among the measures adopted by our enemy to destroy the efficiency of our army and its officers, even during the Peninsular war, was that of disseminating the disease among them by means of women selected for the purpose. Luckily the measure, if adopted, failed.

Some attempt has been made to form a comparison between the rate of prevalence of venereal diseases in the British army with that of various continental services; such a comparison is by no means easy in consequence of the different manner in which patients are treated and statistics kept in the respective services; but the following approximation is believed to be near the truth. In the British army at home from 1860 to 1867 the ratio of men per 1000 of strength constantly off duty from venereal diseases was 20·43; in 1869, the same ratio in the protected garrisons was 12·61; in the French army of the interior in 1862 the proportion was 11·11.

But virulent as is the disease, and extensive its ravages among our troops on home service, there is every reason to believe that they are still more so at many of our foreign stations. In *India*, for example, 20 to 30 per cent. of all admissions are caused by venereal affections, the precise ratio varying at different stations. We learn also that, although Lock hospitals were instituted in that country many years ago, and other measures taken with a view to check the prevalence of disease, they have not in all cases had the success that was desired. This result has, in a great measure, arisen from the generally untrustworthy character of the natives, which has rendered it impracticable for our improvements to be completely carried out by the natives employed for the purpose; and also from the fact that much of the disease is disseminated, not by known prostitutes, but by those employed as *coolies* and in other ways about the barracks.

Lesions of the organs of circulation are for military men the most important results of constitutional syphilis; among the chief changes

in the inner coat of the aorta produced by this cause being : 1, atheromatous collections of a granular nature and whitish colour ; 2, white or semi-cartilaginous patches ; 3, a contraction or wrinkling of the inner coat. These morbid changes impair the elasticity of the artery and are often forerunners of dilatation, bulging and aneurism. Syphilis is, moreover, said to cause degeneration in the endocardium, especially of the cardiac valves, either in the form of excrescences or puncturing, and to produce *gummata* as minute deposits of yellow cheese-like matter in the muscular tissue of the ventricles, some of these points being found to open into the pericardium. To the foregoing it is objected that with the exception of *gummata* there is no other established syphilitic disease of the heart, and of this, according to Dr. Aitken, only two specimens exist in the Netley Museum. That diseases of the heart are found in connection with syphilis is well known to be the case; what seems to be argued is, that the precise connection existing between them has yet to be determined. Morgagni noticed the influence of syphilis in producing structural changes in the aortic coats. Virchow does not speak very precisely, but Hope expresses his belief that syphilitic cachexia gives rise to impaired elasticity of the vessels and thus leads to aneurism. Of 1635 cases of disease of the heart recorded by Dr. M'Lean, a history of syphilis was traceable in only 22. According to Dr. Davidson, on the other hand ('Blue Book,' vol. v), the following results were found in 114 post-mortem examinations : atheroma of the inner arterial coats existed in 22 patients; in 78 cases no syphilitic history could be traced, and among these atheroma was found in 4 ; also in 8 others with a doubtful syphilitic history, atheroma existed in 1; while among 28 with a distinct syphilitic history, atheroma existed in 17. However, as, in all probability, syphilis does not prevail to a greater extent in the army than among civilians, it alone cannot be considered to account for the larger amount of diseases of the heart and blood-vessels in the former than in the latter.

The Contagious Diseases Acts.—So far as we can form an opinion from the results already obtained of the working of the Contagious Diseases Acts, they are calculated to have a very important effect in diminishing the prevalence of venereal diseases not only in the army but in civil life. In some of our more distant stations, such as India, attempts have been made from time to time to enforce similar regulations, though from a variety of circumstances they have hitherto not obtained the expected success, for the reason already stated. But the partial failure there forms no ground for fearing that similarly negative results would follow a really careful administration ; on the contrary, we know that in places where the Act has been effectually worked the disease has been all but extirpated ; and in those stations in the United Kingdom where it is in force the results have been quite successful in producing a decrease of the disease.

This success will be best shown by a Table, which I extract from the Third Report of the Association for Extending those Acts, namely :

REPORT OF THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON OPERATIONS OF CONTAGIOUS DISEASES ACTS, July 8, 1869.				QUARTERLY RETURNS OF POLICE.	
Station.	Average entry, 1860-1868.	Entry in 1867.	Entry in 1868.	Entry in 1869.	Act set in force.
Devonport & Plymouth	354	312	280	211	Oct. 10, 1866
Portsmouth	388	378	348	231	„ 8, 1866
Chatham & Sheerness	301	277	275	181	Nov. 6, 1866
Woolwich .	291	255	191	186	„ 6, 1866
Aldershot .	300	261	237	188	April 12, 1867
Shorncliffe	260	215	297	169	July 24, 1868
Colchester	435	500	537	244	Jan. 27, 1869

Referring especially to the results of the Acts at Portsmouth, where I am stationed while writing these remarks, we learn the following particulars from the ' Hampshire Telegraph :'

" That whereas in 1864, the year in which the Act was brought into operation in Portsmouth, the number of soldiers admitted to the hospital in this garrison suffering from those diseases which are the immediate result of immorality was 1109, or 259 per thousand of the troops; in 1869 it had fallen to 796, or 178 per thousand; that during a week in May, 1870 (and we have no more recent statistics), the number of fresh cases of contagious disease in the 12,666 men belonging to the army and navy stationed in Portsmouth was 17, while in the corresponding period prior to the introduction of the Act the number was no less than 60 ; that there was a decrease last year in the number of prostitutes in this town of 67 ; that the character of the disease has been modified, as is shown by the average number of days during which the patients are under treatment, and the decrease in the proportion of primary and secondary cases ; that about 30 per cent. of these women are now rescued from a life of shame to one of chastity and virtue; that the general appearance of the women who still pursue this calling has greatly improved ; that the dread of the liability to be summoned for medical examination prevents many young girls from taking the first fatal downward step which they otherwise would, if the Act were not in operation, and many women are thus stopped at the commencement of a dissipated career; that several houses of a character to which we will not further allude have been closed, while the places to which the women now resort have undergone a change for the better ; and that when worked with energy, and with means proportionate to the enormity of the evil with which we have to grapple, the advantages accruing from the Acts are unequivocal."

But it is not alone by the influence which the Acts exert upon soldiers that good results are expected to arise from their more extended operation. It is no doubt a great gain to the health standard of the population that the disease diminishes numerically and in severity among our soldiers and sailors. We may still further safely infer that a like decrease is in progress among the civil population. Beyond these sanitary benefits, Mrs. Colebrooke, the matron of the Home at Portsmouth, has shown that improvements in other ways have directly resulted from the Acts. That lady is an advocate of the Acts, and bases her support upon the following facts, namely :

"That 374 young women have either been reclaimed or sent to their homes; that women are properly treated in the hospital, and religious instruction afforded and readily received; that many girls are prevented from becoming abandoned women through the warning of the police; that even the keepers of houses of ill-fame admit that the Acts are 'ruining their trade,' and are, therefore, opposed to them; and that the operation of the Acts has decreased the number of prostitutes. It appears that at the commencement of the year 1869 there were 1114 prostitutes in Portsmouth, that during the year 161 left the district, 94 are now living with their friends, 43 have married, 30 have entered the "Home," 10 are in service, 24 are in the workhouse, 12 have died, 10 have returned to their husbands, leaving 730 prostitutes still in the town, or 384 less than last year. Mrs. Colebrooke urges that none but prostitutes are examined; that music-halls are visited by the police, and young girls warned not to frequent these places; and that any girl is freed from the operation of the Acts on her making a declaration that she desired to leave her life of shame."

This is hardly an appropriate place to enter fully into a discussion regarding the propriety, or otherwise, of extending the Acts in question to the civil population. I may observe, however, that it appears to me much harm has arisen from the particular manner in which the general question has been discussed. Points that have reference only to moral questions and to sentiment have been mixed up and made one with those that aim at results dictated by sanitation and expediency. By all means let every possible effort be made to elevate the moral tone of the masses, and by every practicable measure to remove the conditions, whether moral or physical, which lead to the existence of prostitution; but let us at the same time apply such restrictions to individuals engaged in the active propagation of the disease as will protect society against this subtle poison. Let us, in fact, adopt our means to the desired end, as we should do against any other evil with which, for the good of the masses, we make up our minds to contend.

Rheumatism.—The extent to which rheumatism prevails in the army depends upon various causes. Many cases of this disease,

whether in its acute or chronic form, are directly induced by exposure to the elements and alternations of climate or temperature; others arise from malaria and tropical fevers; but there is every reason to consider that a large proportion are induced by venereal diseases, either in the form of syphilis or gonorrhœa. Some of those circumstances, it will be observed, apply only to soldiers; others, particularly those including night duties and exposure, apply to the civil population as much as to the military. Boatmen, for example, and certain kinds of labourers, are more exposed at night, and to all kinds of weather, than soldiers, and probably suffer more from rheumatism than the military, although statistics on the point must necessarily be imperfect.

Contrary to what might at first sight be looked for, the disease is of frequent occurrence in India, where, besides the circumstances above enumerated, there are additional causes connected with barracks erected in low and undrained positions, and also the exposure of the men during the long marches which in that country are unavoidable.

According to Drs. Watson and Latham two thirds of the persons affected with acute rheumatism become the subjects of heart disease; endocarditis being a more frequent sequel than pericarditis in the proportion of nine to one. Dr. Fuller, on the other hand, asserts that pericarditis occurs in every 5·97 cases of acute rheumatism. According to another set of statistics given it would appear that in 151 cases of heart disease recorded by Dr. McLean, a history of rheumatism could only be obtained in six, and in these six the subjects were all men under thirty years of age; yet the fact is generally acknowledged that rheumatism in its acute form, or rheumatic fever as the affection is then named, has a remarkable affinity for the heart, more especially in early life. According to the statement of another writer, disease of the heart was found to occur in seventeen cases out of ninety-four in which patients had been affected with rheumatism; but it is suggested that, under particular conditions, the heart may be the primary seat of rheumatism, like any other muscle, or the tissues of the eye, while the experiments of injecting lactic acid into the system by Dr. Richardson seem to indicate that endocarditis may be set up, and prove fatal without the occurrence of anything approaching metastasis of rheumatism to that organ.

According to Dr. Chevers, pericarditis or endocarditis is comparatively rare in India and the tropics generally, as a sequence of rheumatism; while, on the other hand, Moorhead asserts that a connection between them was traceable in twenty-nine out of fifty cases examined, the subjects being for the most part young. Again, according to Dr. McLean, of 1635 cases of disease of the heart, only twenty-two had been preceded by acute rheumatism, and one by gouty diathesis.

He records thirty-six others, in five of which there was a history of rheumatism, and in three of syphilis. From these statements it therefore appears that the precise extent to which rheumatism is directly concerned in the causation of affections of the heart is yet to be decided. That such connection does in a great many cases exist is beyond doubt; so is also the fact that few soldiers who once become the subjects of confirmed rheumatism are ever afterwards efficient in the ranks. They have, therefore, sooner or later, to be discharged, and take their chance of earning a livelihood in civil life, or entering into hospitals or poorhouses, the sad fate of many a man who has done good work for his country.

With a view to decrease the prevalence of this disease, it is considered that in stations that do not admit of sufficient drainage, the introduction of elevated barracks on the improved style will enable the troops to sleep and reside at a level higher than that to which paludal emanations usually reach. The introduction of Mr. Gwire's hammocks has been recommended, and the regulation sanctioned by Government of giving an allowance of straw for each man while on the line of march, will doubtless tend to diminish the evil.

Conditions which affect the health standard of the army.—The subject indicated by this heading opens a very wide field for inquiry, a field so wide as to embrace the whole hygiene of the army. I intend to be brief, however, and to consider very shortly only those conditions which refer in a special manner to our military service, as distinguished from other classes of the community. These are found to include the following, namely : 1. The selection of unsuitable recruits. 2. A system of drilling recruits which takes no account of individual conditions and peculiarities. 3. The system of dress in use for the soldier. 4. The use of the knapsack and other accoutrements during marches and exercises. 5. The frequent recurrence of night duties. 6. The prevalence of the vice of drunkenness. 7. The prevalence in the army of venereal disease. 8. The circumstance of soldiers being exposed to service in unhealthy climates, and to the influences of malaria. In these remarks I shall refer to each in turn, and also allude to some others of which the action is, perhaps, not so direct or definite, although undoubtedly present to some extent.

Recruiting.—With reference to the general question of recruiting it is to be observed, in the first place, that the army consists of what may be designated picked lives, for the rules laid down for the medical examination of recruits are so strict that if acted up to, none but the most robust of those who present themselves pass the ordeal. I will give a bare enumeration of the disabilities which are to be sought for, and which when found are to constitute causes of rejection,—namely, feeble or unsound health,

indications of former disease, weak or disordered intellect, skin affections, injuries of the bones of the head, impaired vision, diseases of the eyes or eyelids, deafness or disease of the ears, impediment of speech, want of a certain capacity in the chest, indications of pulmonic disease, deformities, weakness or old injuries of the limbs, curvature of the spine, hernia, or a tendency to it, varicose veins, fistula, ulcers, whether of old date or recent, and any disease for which surgical treatment is necessary at the time of inspection. With a view to indicate the manner in which an observance of these tests is sure to affect the health of the public, I solicit attention to a few statistics having reference to periods in which this country being at peace with all others, no unusual drain on the population was opened for the requirements of the army.

1. The subjoined table, extracted from the work by Marshall, shows the number of recruits examined and rejected in the years 1817, 1818, and 1819; that is, immediately subsequent to the peace after the battle of Waterloo, viz.:

Years.	IRELAND.			SCOTLAND.			ENGLAND.		
	Ex-amined.	Re-jected.	Ratio rejected per 1000.	Ex-amined.	Re-jected.	Ratio rejected per 1000.	Ex-amined.	Re-jected.	Ratio rejected per 1000.
1817	1426	437	306·0	1274	247	193·9			
1818	1801	711	395·0	1207	281	232·8	No returns available.		
1819	2783	754	274·0	1402	276	196·8			
Totals	6010	1902	316·4	3883	804	207·1			.

The general results of the above are to the effect that during the three years embraced there are records of 9893 recruits who were medically examined, of whom 2706 were rejected, or a proportion of 273·5 per 1000, this being at a time when, as first observed, our war establishments had just been reduced. Unfortunately, the tables only contain records of young men enlisted in Ireland and Scotland, but in so far as they were concerned, the average number examined in each of the years noted was 3297, that rejected 902, equal to a ratio of 273 per 1000.

2. Let us now refer to a period of profound peace, when the requirements of the army were comparatively small, and which had for a considerable time been preceded by a state of tranquillity. The three years from 1835 to 1837 inclusive, were such a period, and the following table indicates the numbers of recruits examined and rejected during it.

Years.	IRELAND.			SCOTLAND.			ENGLAND.		
	Ex-amined.	Re-jected.	Ratio rejected per 1000.	Ex-amined.	Re-jected.	Ratio rejected per 1000.	Ex-amined.	Re-jected.	Ratio rejected per 1000.
1835	1752	561	320·2	1180	415	351·7	3935	1361	345·8
1836	2677	400	149·4	1878	671	357·3	6353	1934	304·4
1837	3274	992	308·9	2001	742	370·8	7457	3401	321·9
Totals	7703	1953	253·5	5059	1828	359·3	17745	5696	326·9

From these figures we learn that in a total number of 30,507 recruits examined, 9477 were rejected, being a ratio of 310 per 1000; the yearly average being 10,169 examined, and 3159 rejected, or a proportion of 310 per 1000.

3. In the subsequent tables I am unable to separate the statistics of recruiting in each of the divisions of the kingdom; I note, however, that the third period, to which I solicit attention, is that of the Crimean war, including the years 1854 to 1856 inclusive, when the exigencies of the service demanded a great drain upon the recruit-giving portion of the community.

4. This was the case also in the three years of the Indian Mutiny, from 1857 to 1859.

5. In this period, from 1864 to 1866 inclusive, there was profound peace and plenty at home, when work was abundant, and when the condition of the lower orders may be said to have been very favorable.

Let me now give the following table, which is intended to indicate the state of recruiting and of rejections during each of these periods. (See opposite page.)

From these figures we learn several important particulars, not the least of which is the circumstance that although, as might have been anticipated, the ratios of rejections among recruits examined is considerably greater during times of peace than when war is in progress, this ratio has been very considerably greater in the fifth period than it was in either the first or second. This will be rendered more apparent by a recapitulation of the ratios rejected in each of the different periods enumerated, viz. :

1st period, 1817 to 1819 = 273·5 per 1000.
2nd   „   1835 „ 1837 = 310·74   „
3rd   „   1854 „ 1856 = 243·18   „
4th   „   1857 „ 1859 = 242·04   „
5th   „   1864 „ 1866 = 387·20   „

PERIODS.	Years.	Number of recruits examined.	Number rejected.	Ratio rejected per 1000 examined.
1st period . . . {	1817 1818 1819	2,700 3,008 4,185	684 992 1,030	253·33 329·78 246·11
Totals of the period . Yearly average . .	... ...	9,893 3,297	2,706 902	} 273·5
2nd period. . . {	1835 1836 1837	6,867 10,908 12,732	2,337 3,005 4,135	340·32 275·48 324·77
Totals of the period . Yearly average . .	... ...	30,507 10,169	9,477 3,159	} 310·74
3rd period . . . {	1854 1855 1856	41,610 52,585 10,430	9,053 12,545 3,846	217·56 238·56 368·74
Totals of the period . Yearly average . .	... ...	104,625 34,875	25,444 8,481	} 243·18
4th period . . . {	1857 1858 1859	57,554 50,084 27,843	14,745 11,820 6,223	256·19 236·50 223·50
Totals of the period . Yearly average . .	... ...	135,481 45,160	32,788 10,929	} 242·04
5th period . . . {	1864 1865 1866	27,754 24,891 20,410	12,445 10,598 7,761	448·40 425·77 380·25
Totals of the period . Yearly average . .	... ...	73,055 26,518	30,804 10,268	} 387·20

I would point out also, that a remarkable approximation is observable between the ratios of rejections in each of the periods when the Crimean war and Indian mutiny caused their drain upon the population. Before passing to an examination of the causes of rejection, it may be remarked that the recruits are themselves roughly selected by the recruiting sergeant before they undergo the doctor's scrutiny,

hence they form a favorable sample of the physical state of the civil population.

If we now consider the precise nature of the disabilities on account of which recruits are for the most part rejected, they are found represented in the subjoined table, which, although restricted to the three years from 1864 to 1866 inclusive, is sufficient for our present purpose, namely :

	1864.		1865.		1866.	
Recruits inspected	27,754		24,891		20,410	
,, rejected .	12,445		10,598		7,761	
Disabilities of those rejected.	Number.	Ratio per 1000.	Number.	Ratio per 1000.	Number.	Ratio per 1000.
Syphilis . .	468	16·86	390	15·67	338	16·56
Scrofula . .	361	13·00	267	10·73	201	9·85
Phthisis . .	153	5·51	167	6·71	125	6·12
Other constitutional disease . .	92	3·31	199	7·99	102	5·00
Disease of eyes and eyelids . .	1,371	49·40	1,208	48·53	882	43·22
Disease of heart .	549	19·78	553	22·22	513	25·13
Malformed chest and spine .	1,071	38·60	774	31·10	723	35·43
Hernia . . .	451	16·25	346	13·90	295	14·45
Tendency to hernia	290	10·59	256	10·29	183	8·97
Fract. and disloc.—						
Upper limbs .	289	10·41	222	8·92	187	9·16
Lower ,, .	1,091	39·31	915	36·76	604	29·60
Skin diseases .	204	7·35	133	5·34	162	7·96
Unsound health .	556	20·03	702	28·20	414	20·28
By the above causes	6,946	...	6,132	...	4,729	...
By other causes .	5,499	...	4,466	...	3,032	...
Totals rejected	12,445	...	10,598	...	7,761	...

Here, then, by this and the preceding table, we learn the ratio of men rejected from the army and thrown back upon civil life, and also the disabilities on account of which they are so thrown back. We learn, for example, that in the three years last enumerated an annual average number of 26,518 recruits were examined, of whom 10,268 were rejected for physical disabilities ; in other words, a proportion equal to 387·20 per 1000 inspected laboured under some form of disease, on account of which they were thrown back upon the general population, thus, I venture to think, indicating an extent of bodily imperfection and actual disease among the young

men of the United Kingdom of which few readers are aware. I will not stop to give in detail the causes of all those rejections. I will, however, indicate the more important of them, especially such as permanently unfit their subjects from earning their living, and giving them the ordinary means of providing against disease and want, and those that are directly or indirectly calculated to impair the health standard of the masses. Out of every thousand lads who are rejected, 38 are so on account of syphilis, 26 by scrofula, 14 by pulmonary consumption, 111 by defective sight and affections of the eyes and eyelids, 83 by malformed chest and spine, 57 by rupture and tendency to that disease, 104 by fractures and contractions, 16 by skin diseases, and 52 by general unsoundness of health. Thus we account for 601 of the thousand, leaving the remainder, namely, 399, to be made up by miscellaneous diseases and disabilities. Doubtless a certain proportion of these men do obtain employment in civil life. It is a matter of great difficulty to trace the career of many ; but it may, I think, be assumed that, considering the competition for employment which exists in these islands, the weak and incapable must be left behind in the process of selection thus created, and being so left behind must fall into conditions of actual disease, propagating it in many instances among others, equally unfortunate as themselves, and finally becoming units in the hospital or pauper population, or in some cases sinking into the criminal classes.

I would, in the next place, select a few statistics from the table just given, in order the better to indicate the ratio of rejections on account of affections of the heart and blood-vessels, more especially by aneurism and disease of the heart, namely :

Years.			Recruits examined.				Rejected on account of disease of heart.				Ratio of rejections per 1000.
1864	.	.	27,754	.	.	.	549	.	.	.	19·78
1865	.	.	24,891	.	.	.	553	.	.	.	22·22
1866	.	.	20,410	.	.	.	513	.	.	.	25·13

Thus it will be seen that a very considerable amount of dross in the shape of disease is thus left in the mass of the population, filtered, as it were, from the army.

Permit me now briefly to refer to some statistics of recruiting during two periods of sanguinary war, and when the losses of our troops by disease were very great. The first includes the years 1854, 1855, and 1856, or that of the Crimean war; the second embraces 1857, 1858, and 1859, namely, that of the Indian mutiny. In the first of these the average annual number of recruits examined was 34,875, of whom were rejected a ratio of 8481, = 243 per 1000 ; the entire number of men enlisted during that eventful time being 104,625, of whom were rejected 25,444. In the next three years, namely, those of the mutiny, the average annual number of recruits inspected was 45,160, of whom were rejected a ratio of 10,929,=242 per 1,000, the total number examined in the period being 135,481,

that rejected 32,788.   Of the two classes passed into the army or returned to civil life, I may observe that the one set indicates the manhood and physical force withdrawn from the population, the other the refuse, as it were, the dross left behind in this smelting process.   I may remind you what has been the proportion which this dross has borne to the *ore* in each of the periods to which I have alluded.   In 1817 to 1819 it was 273 to 1000; in 1835 to 1837, 310; 1854 to 1856, 243; in 1857 to 1859, 242; and in 1864 to 1866, 420. The teachings of these ratios are, I think, very important, and at the same time very sad.   They unmistakeably indicate, I fear, that the rejections among recruits on account of physical disability are much more numerous now-a-days than they were in the long interval of peace that separated the Peninsular war from the Crimean.   There is nothing to lead us to suppose that greater care has of late years been bestowed on the inspection of candidates for the ranks of the army than was practised then.   We must, therefore, only conclude that the health standard of the masses has decreased.   I do not say this hastily, or without due consideration, but rather from a conviction that such is the case, and you will doubtless observe the important bearing which the point has upon social as well as political economy.   We are all aware of the evils in the shape of disease, and in other forms that befall over-densely peopled countries, and, moreover, that in regard to the United Kingdom the army does not directly produce the disabilities alluded to as unfitting much of our manhood for military service.   The army merely leaves them out ; and although they add to the mass of inefficiency in civil life, that is no fault of the army, except in a very remote and indirect manner.   A similar remark may be made in regard to the navy, both royal and mercantile; while emigration, which withdraws annually treble and quadruple the amount of manhood that both the public services do, is confined not only to the bodily robust and active, but also the more intelligent and energetic, leaving the weakly, the improvident, and less useful to propagate their kind in civil life. But I must not omit to notice the possibility that, with the outlets and means available for employing the more active and robust of our manhood, we may doubt if candidates for the ranks of the army do really represent the physical development of the masses.   Education, by its extension to the ordinary recruit-yielding classes, has also in some measure tended to the lowering of the physique of recruits ; thus young men are now able to obtain sufficient knowledge to fit them for other positions than that of an ordinary soldier, so that the improvident and those who are incapable of pushing their way in civil life chiefly furnish the raw material for the ranks.

I am fully aware that these conclusions will be unwelcome to many, and that circumstances will be quoted with a view to throw doubt upon their correctness.   The opinion that a physical de-

generation has occurred and is now in progress in our population is naturally accepted with reluctance. There is, in fact, some shadow of truth in the assertions of the opponents of the theory, that the measurements of ancient clothes and armour indicate that as a people we are individually larger than our ancestors were; that the measurements of athletic feats show us to be stronger ; that the profits of insurance offices show we are longer lived, and that the diminished ravages of epidemics show that we resist disease better than was formerly the case. Such arguments as these will not, I apprehend, go far to convince those who have carefully considered the general question of public health. Stature alone is no measure of actual power ; men may be so trained to athletic feats that acts of apparent amazing power may be performed by a man far advanced in disease, as is actually the case with gymnasts ; care of the person and the appliances of our condition of civilisation often extend for years lives that formerly would speedily succumb, and that epidemics are now less prevalent and fatal than formerly may safely be placed to the credit of our system of sanitation, improved as compared to any thing in former days carried out.

Another circumstance has been alluded to as being the cause of supplying the service with unsuitable recruits, to which I reluctantly refer, as it reflects on the judgment of professional men in civil life, namely, that lads are sometimes passed by practitioners, without sufficient discrimination being exerted in their selection ; hence they break down in health in the early period of their service, and either die or have to be discharged, in the latter case adding to the mass of ill health introduced into civil life from the army. I am not prepared to state the precise extent to which this circumstance acts, but that it is not altogether inoperative is presumable from the fact that in 1867 the number of recruits ultimately rejected, who were primarily examined by army medical officers, was only in the ratio of 41 per 1000, whereas it amounted to 139 among those first inspected by private practitioners.

That the present system of enlisting young lads favours the mortality and invaliding which characterise the early years of military service is generally recognised as indisputable. The muscular and osseous tissues being imperfectly developed, and some of the viscera unequal to the work thrown upon them during training, disease occurs, and the person either succumbs or has to be discharged ; while all experience in India proves how little young men are suited to withstand the various influences that tend to cause mortality in that country. As pointed out by Dr. Aitken, the frame in the youth of eighteen is incomplete ; he is very similar in his condition to the young colt of eighteen months ; both are immature in their development and both break down in training. They are especially liable to pulmonic and to cardiac affections during the time of their initiatory drill, for the yielding thorax

is liable to suffer from impression by accoutrements in all directions except the antero-posterior, so that circulation and respiration become impeded. At this age, and up to that of 21, the heart has not attained its full size, and it is consequently incapable of performing the amount of work thrown upon it; thus, for example, its weight is only 7·61 oz., while in men of the age of 20 to 30 it amounts to 10·06 oz. ; and with regard to the osseous system, it may be observed that now the lateral pieces of the sacrum begin to grow and coalesce, the styloid process of the temporal bone grows, the base and glenoid cavity of the scapula are completed, the sternal epiphyses of the clavicles ossify, the lower epiphysis of the humerus unites with the shaft of the bone, that the head and tubercles of the ribs begin to unite, and ossification of the lower epiphysis of the fibula is complete. At 21 years of age the skeleton is much more complete, and there is a nearer approach to correlation of age, weight and development with strength.

These developments are still further advanced from twenty to twenty-four years of age; hence it is reasonable to believe that the present rate of non-efficiency of soldiers during their earlier service would be much lessened were only men of twenty-one and upwards accepted as recruits, and this is in accordance with the experience of general and other officers, whose position entitle them to speak with authority on this subject, as Napoleon I, Wellington, Sir De Lacy Evans, the Duke of Cambridge, and Lord Raglan, all of whom speak of the unsuitability of youths for war.

As a recent writer in 'Blackwood' well observes : " In Prussia, the example which we profess by our present legislation to follow, no recruit is taken under twenty years, and the utmost care is used to ascertain that he has fully attained that time of life. We, on the contrary, allow service to count from the eighteenth year of a lad's age, and it is notorious that, seeking for nothing more than his own assertion, we enlist every day as eighteen years old, boys who have not reached seventeen, and are often as young as sixteen. Now, of what use in the field would a private soldier be whose age ranged from seventeen to twenty, or even from eighteen to twenty-one? The Prussian comes to his colours with the vigour of twenty. He may take the field at twenty-one, twenty-two or twenty-three. But the English youth who begins a campaign at seventeen, eighteen or nineteen, knocks up in nine cases out of ten after a few severe marches."

There is every reason to believe that if all the evils which are connected with the system of recruiting could not be removed, some at least may, under ordinary circumstances, be considerably mitigated. If, for example, military requirements should actually demand that lads of eighteen shall be enlisted, attention should be paid to their correlation in regard to age, weight and development, as pointed out

by Drs. Parkes and Aitken; thus, a lad of that age should, as a minimum, measure sixty-two inches in height, and weigh 112 to 116 lb. All authorities are, however, agreed that under ordinary circumstances recruits of less than twenty-one years of age ought not to be taken, and that under no circumstances ought younger men than those of that age be sent to India; indeed, according to Dr. Hammond, Surgeon-General of the American Army, men selected as recruits should be between the ages of twenty and twenty-five. It is reasonable, moreover, to expect that, considering the improvements of late years effected in the conditions of the soldier, both as they concern his bodily and his intellectual welfare, an important improvement may be expected in the class of persons offering themselves as recruits. How far, however, these anticipations have been realised is yet a matter of doubt, but undoubtedly, if the extent to which they exist were more generally known, their tendency ought to be to encourage enlistment; that is, if certain counter-balancing circumstances in the condition of the soldier, to several of which I allude in the course of these remarks, were removed.

We have seen that one of the most frequent sources of disability in young lads of a few months' service arises from affections of the heart, functional and organic. It is also asserted that by means of the sphygmograph the existence of cardiac disorder may be detected long before it manifests itself by affecting the sounds or rhythm of the organ; hence it has been proposed, and the excellent suggestion has been taken up by the Director-General, to have an instrument of this nature with illustrative charts supplied to each recruiting station for use by the medical officer.

In connection with this subject I may observe that the term under which recruits are engaged for service is believed to have a considerable effect, directly and indirectly, upon the physical condition of the army, and that there are not a few medical officers who consider the new regulations introducing the system of short enlistments as calculated seriously to interfere with this condition. Various circumstances are enumerated in support of this apprehension, the chief of which are the following :

1. That as the greatest general mortality takes place in the early years of military service, the death-rate in the army may be expected to undergo a considerable rise.

2. That the numbers of men returning to civil life under the new regulations will talk among their friends of the nature of the service they have undergone, of sundry disagreeables inseparable from military life, and will thus discourage others from entering the army.

3. Because experience has proved that on actual service the trained man is worth six who are untrained, and with regard to this point a word of explanation seems to be necessary. Writers on military medical subjects make the remark that the rate of mortality, espe-

cially on foreign service, is smallest among the young soldiers, and that it increases according to age; but they seem to miss the fact, which all field service demonstrates, that non-efficiency does not necessarily imply mortality; thus, in active service against an enemy, and when continuous long marches are required, as was the case in India during the Mutiny, it was found that while the old soldier of seven, ten, and fourteen years' service was able day after day to make these long marches, the young lads were not so; they were physically unequal to the work; they *fell out* of the ranks, had to be carried, and finally sent to the rear. They did not die, however; they merely were inefficient themselves, encumbered the force of which they formed a part, and in both these ways materially impaired its strength for effecting its purpose.

4. It is asserted that the soldier should look to the army as his home, and feel that he depends upon it. In this I completely agree, but, as will be observed, the principle here enunciated is diametrically the opposite of that under which it is now intended that men shall enlist. I believe that the system of short enlistment will prove a failure should emergency arise, partly from the causes above enumerated, partly from the want of any actual *tie* to the service on the part of the men serving in it; and very much because several years of training and discipline being necessary to give a man that spirit of obedience to his superiors, and that confidence in his own powers, as well as in those of his fellow-soldiers and his officers, which alone can render him an efficient item of the military machine. Under the new scheme few, if any, men will remain sufficiently long in the ranks to acquire these very necessary qualifications.

I do not see the principle according to which we are justified in believing that in times of war recruits will offer themselves in sufficient numbers for the requirements of our country, unless they can look to the army as a profession and as a means of providing for them if disabled by wounds or sickness. We should recollect that at the beginning of this century Parliament was forced to accord a scale of pensions to soldiers in order that men might be induced to join the ranks, where they then were so much needed. Mr. Windham was, in 1806, instrumental in bringing about this very just measure, and some of the expressions employed by him when introducing the bill on this subject seem so appropriate to the present occasion that I venture to quote them:—" If," said he, " we are to have our army by voluntary enlistment, it is essentially necessary to improve the trade of a soldier, and to bring it into fair competition with a sufficient number of the trades and callings of the lower orders." " Till this is done we should be striving in vain in the hopeless task of persuading men to embrace a pursuit in opposition to those motives which usually decide them in the choice of a profession."

<center>(*To be continued.*)</center>

II.—On the Use of Santonine in Eye-Disease. By D. Dyce Brown,
    M.A., M.D., Medical Officer to the Aberdeen Dispensary; and
    Alex. Ogston, M.D., Surgeon to the Aberdeen Infirmary.

That which first suggested the possibility that santonine might be
of therapeutical value in certain diseases of the eye was the follow-
ing case, which occurred in Dr. Brown's practice:

J. B—, a pensioner, aged about fifty, came to the Dispensary on
May 19th, 1869, complaining of worms, and various symptoms
arising therefrom. He was blind, and could, on first coming to the
Dispensary, barely distinguish light from darkness. His sight began
to fail about three years before, getting gradually worse till he lapsed
into his present state. The worm he was troubled with was the tape-
worm, but, from his description at the first visit, it was supposed to
be ascaris vermicularis. He was therefore put on santonine. On
coming up a week after, he volunteered the statement that the pow-
ders were doing his sight good. He could now distinguish, he said,
certain objects, such as a large white placard on a wall, and his wife's
white jacket. On finding that it was tapeworm he was suffering
from, his treatment was for a time altered, and, when he seemed to
be free of worms, he was put on small doses of quinine twice a day,
as he was exceedingly thin, pale, weak, and with no appetite. The
santonine was again given once a day, at bedtime. This treatment
was continued for some length of time, during which his general
health and strength immensely improved. By the middle of July,
he said he could distinguish a passer-by, and even say whether it
was a man or a woman. One day, on walking to the river Don, he
could distinguish the water, and two light-coloured cows in a field.
On holding up a hand before his eyes he saw it, but could not say
how many fingers were presented. Both he and his wife remarked
repeatedly that his sight had never been so good since he had first
lost it.

Soon after the commencement of this improvement, Dr. Brown
was so struck with what seemed to be more than a mere curious co-
incidence that he requested Dr. Ogston to examine his eyes with the
ophthalmoscope. The following was the state of parts. The right
optic disc was completely atrophied, and with that eye he had no
perception of strong light. The left disc was atrophied also, but
not so completely as the right. He easily perceived light with this
eye. Nothing further than this atrophy was observed.

In order to test whether the improvement was a mere coincidence
or not, Dr. Ogston, who was then ophthalmic surgeon to the hos-
pital, agreed to try the effects of its administration in various diseases
of the eye.

The following are the results of all the cases indiscriminately in which it was administered :

	Cases treated.	Cured or improved.	Failures and unknown results.
Nervous deficiency	35	26	9

		Improved.	Failures.
Cataract	4	1	3

The results of the treatment by santonine of various cases of deficient sight depending on alterations in the retina and optic nerve, are embodied in the accompanying table. Although it is not possible from these to particularise the precise form of disease in which it answers best, the trial of the drug has left no doubt in our minds that it possesses a great power over many cases of inflammatory and atrophic alterations of the nervous elements of the eye, and is superior, in the treatment of such, to the remedies ordinarily employed.

It is not to be expected, in a tissue where inflammatory action, even slight in degree, is so invariably followed by secondary contraction of the connective and atrophy of the nervous elements, that any drug we may ever fall in with should suffice for a perfect cure or anything approaching to such. The utmost that can be expected is that the secondary atrophy should be checked, and the maximum of sight preserved.

In the treatment of such cases it is not advisable to trust to the statements of patients as to their improvement or the reverse. A slow improvement in vision is imperceptible to them, and can be demonstrated only by accurate measurement. Accordingly, to avoid being deluded by the expressions of individuals, measurement of the sight in as nearly as possible the same illumination, and at the same period of the day, was, in all our cases, resorted to at intervals of a week or more ; and, in very many, the results thus obtained did not correspond at all with the statements of the patients. The measurements were noted down in the full record kept of each case, and served for future comparison.

It has been judged unnecessary to insert at length these reports of the cases, both on account of the space they would occupy and because their main points are adduced in the table. We venture to hope that those who, on our recommendation, may be induced to employ santonine, will adopt the same plan of taking regular measurements of the vision by means of Snellen's or Jaeger's test-types, as this is the only method of ascertaining with approximate certainty, the existence of improvement or the reverse.

Santonine also seems to possess a very decided effect on hyper-æsthesia of the retina, one case in particular (No. 2, Table) improving rapidly under its use, although other medicines had previously failed totally. It does not seem, where defective colour-vision

Table of Cases treated with Santonine.

No.	Disease.	Sex.	Age.	Duration of treatment.	Improvement in vision, right.	Improvement in vision, left.	Other treatment adopted.	Remarks.
1	Atrophia retinæ, duplex, after choroiditis	M.	...	2 months	$\frac{7}{100}$ to $\frac{7}{100}$	$\frac{7}{40}$ to $\frac{7}{20}$	...	...
2	Hyperæsthesia retinæ, duplex	M.	23	Ditto	$\frac{7}{8}$,, $\frac{7}{5}$	$\frac{7}{8}$,, $\frac{7}{5}$	Iron and quinine	All remedies had failed; 4 years ill; cured.
3	Atrophia retinæ, duplex, after choroiditis	F.	26	6 months	$\frac{1}{70}$,, $\frac{1}{4}$	$\frac{1}{3}$,, 1	Slight mercurials	Permanent cure when seen 5 months later.
4	Syphilitic retino-choroiditis, duplex, old	M.	...	4 weeks	$\frac{1}{3}$,, 1	8 ,, $\frac{7}{40}$	...	Improvement was permanent 4 months after.
5	Atrophia retinæ, duplex .	M.	...	Ditto	$\frac{1}{30}$,, $\frac{1}{30}$	$\frac{1}{8}$,, $\frac{1}{12}$.	...	Failure. Incurable. Colour vision very bad. Did not return.
6	Ditto	M.	...	...	$\frac{1}{10}$,,	$\frac{13}{40}$,, $\frac{7}{20}$	...	
7	Ditto	M.	38	3 months	$\frac{7}{12}$,,	$\frac{7}{40}$,,	...	Failure, hardly any improvement.
8	Cataracta senilis, duplex .	F.	60	Ditto	$\frac{7}{100}$,, $\frac{7}{70}$	$\frac{7}{20}$,, $\frac{7}{20}$	...	
9	Atrophia retinæ, dext., after choroiditis	F.	34	2 months	$\frac{7}{40}$,, $\frac{7}{12}$	...	Small doses of corros. sublim.	...
10	Cataracta mollis, sinist. .	M.	...	1 month	... ,,	$\frac{6}{1000}$	...	Failure.
11	Hyperæsthesia retinæ, duplex	M.	16	Ditto	$\frac{7}{30}$,, $\frac{7}{6}$	$\frac{7}{20}$,, $\frac{7}{5}$	Tonics	...
12	Atrophia retinæ, duplex .	M.	59	...	$\frac{1}{70}$	$\frac{7}{40}$	...	Died soon after.
13	Alcoholic amblyopia, double .	M.	30	3 months	$\frac{1}{30}$	$\frac{1}{15}$	Told to give up tobacco and drink	Nearly well in 3 months. Still drinks and smokes.
14	Hyperæsthesia retinæ, duplex	M.	16	2 weeks	Vision not impaired. $\frac{7}{4}$,, $\frac{7}{6}\frac{1}{3}$	$\frac{7}{30}$,, $\frac{7}{6}$	...	Completely cured.
15	Atrophia retinæ, duplex .	F.	24	3 weeks	$\frac{7}{4}$,,	,, $\frac{7}{12}$	...	Cure permanent, 2 months later.
16	Ditto . . .	F.	...	1 month	,,	,, $\frac{7}{5}$	...	Left colour vision bad. Did not return again.
17	Amaurosis, double . .	M.	...	...	$\frac{71}{12}$	8	...	Did not return.

No.	Diagnosis	Sex	Age	Duration					Treatment	Remarks
18	Atrophia retinae, duplex, cum hyperaesthesia	M.	20	2 months	$\frac{10}{30}$ „ $\frac{10}{40}$	$\frac{10}{30}$ „ $\frac{10}{40}$	$\frac{10}{30}$ „ $\frac{10}{40}$	...		Hyperaesthesia permanently cured when seen 4 mos. later.
19	Cataracta senilis, duplex	M.	63	1 month	$\frac{10}{30}$ „ $\frac{10}{55}$	$\frac{10}{30}$ „ $\frac{10}{55}$	$\frac{10}{30}$ „ $\frac{10}{55}$	...		Failure.
20	Syphilitic atrophia retinae	F.	55	Ditto	$\frac{10}{70}$ „ $\frac{10}{30}$	$\frac{10}{30}$ „ $\frac{10}{30}$	$\frac{10}{30}$ „ $\frac{10}{1000}$	...		Did not again return.
21	Atrophia retinae, dextrae	M.	48	6 weeks	$\frac{10}{30}$ „ $\frac{10}{100}$	8 „ ...	...	...		Failure. His left eye had been removed.
22	Ditto, duplex, after choroiditis	M.	21	3 weeks	$\frac{10}{200}$ „ $\frac{10}{100}$	$\frac{10}{75}$ „ $\frac{10}{30}$	$\frac{10}{30}$ „ ...	...		Did not again return.
23	Atrophia retinae, duplex, with hyalitis	M.	34	5 weeks	$\frac{10}{40}$ „ $\frac{10}{12}$	$\frac{10}{40}$ „ $\frac{10}{12}$	$\frac{10}{40}$ „ $\frac{10}{12}$	...		...
24	Atrophia retinae dextrae; posterior capsular cataract, left	F.	50	5 months	$\frac{4}{6}$ „ $\frac{4}{6}$	$\frac{1}{30}$ „ $\frac{1}{30}$	$\frac{1}{30}$ „ $\frac{1}{30}$	...		...
25	Cataracta senilis, duplex	F.	60	Ditto	$\frac{1}{30}$ „ $\frac{12}{10}$	$\frac{1}{30}$ „ $\frac{12}{10}$	$\frac{1}{30}$ „ $\frac{12}{10}$	...		No further improvement.
26	Cerebral retinitis, double	M.	...	1 month	$\frac{10}{200}$ „ $\frac{10}{100}$	$\frac{10}{200}$ „ $\frac{10}{100}$	$\frac{1}{100}$ „ $\frac{1}{100}$	...		Failure.
27	Atrophia retinae, duplex	M.	43	5 weeks	$\frac{4}{61}$ „ 4	$\frac{2}{5}$ „ 2	$\frac{2}{8}$ „ 2	...		...
28	Ditto	M.	...	1 month	$\frac{1}{6}$ „ 4	$\frac{1}{5}$ „ 4	$-\frac{1}{4}$ „ 4	...		Colour vision uncertain.
29	Ditto	M.	...	3 weeks	$\frac{1}{10}$ „ $\frac{1}{6}$	$\frac{1}{6}$ „ $\frac{1}{6}$	$\frac{15}{20}$ „ $\frac{12}{30}$	...		...
30	Cerebral atrophia retinae, left.	F.	52	2 months	$\frac{1}{12}$ „ ...	... „ ...	$\frac{12}{30}$ „ $\frac{12}{30}$	...		Relapsed, and again cured by santonine.
31	Hyperaesthesia retinae, dext.	M.	30	Ditto	$\frac{10}{30}$ „ $\frac{10}{30}$	$\frac{10}{30}$ „ $\frac{10}{30}$	... „ ...	...	Biniodide of mercury	Pain cured at once.
32	Retinitis diffusa, duplex.	M.	50	9 weeks	$\frac{1}{3}$ „ 2	$\frac{1}{2}$ „ 2	$\frac{1}{30}$ „ $\frac{1}{30}$	...	Ditto	...
33	Atrophia retinae, duplex.	M.	26	3 weeks	8 „ 8	8 „ 8	8 „ 8	...		Incurable, but treated for experiment.
34	Ditto, ditto, after choroiditis	M.	19	4 weeks	0 „ 0	0 „ 0	$\frac{10}{75}$ „ $\frac{10}{20}$	...	Ditto	Colour vision completely restored on left eye.
35	Hyperaesthesia retinae dextrae	F.	24	2 weeks	$\frac{7}{10}$ „ 7	7 „ 7	$\left(\frac{7}{13}\right)$ „ $\left(\frac{7}{13}\right)$	...		Left eye had been always very bad.
36	Syphilitic retinitis, double	M.	33	2 months	$\frac{1}{1000}$ „ $\frac{1}{100}$	$\frac{1}{4}$ „ 2	$\frac{1}{4}$ „ 2	...		Mercury failed. Colour vision much improved.
37	Progressive atrophy of nerve, double	M.	52	3 weeks	0 „ 0	0 „ 0	$\frac{2}{13}$ „ $\frac{2}{24}$	...		Failure.
38	Cerebral amblyopia	F.	40	2 weeks	$\frac{1}{1000}$ „ $\frac{1}{1000}$	$\frac{1}{30}$ „ $\frac{1}{30}$	$\frac{1}{30}$ „ $\frac{1}{30}$	...		Failure.
39	Atrophia retinae dextrae	M.	57	5 weeks	$\frac{2}{40}$ „ $\frac{2}{3}$	... „ ...	... „ ...	...		...

accompanying deficient sight is the result of alterations in the nervous elements of the eye, that improvement in one respect is obtainable without an accompanying amelioration in the other symptoms.

The dose employed by us in almost every case has been the same, viz., one grain per diem. This dose was administered at bedtime, to avoid the unpleasant yellow vision caused by even so small a quantity.

In the course of numerous experiments on animals with this drug, for the purpose of ascertaining, if possible, the mode of production of the santonine yellow vision, it became evident that the seat of this action lies in the retina or brain, since the other parts of the eye preserve their normal tints when the coats of the eye are removed to a small extent behind, so as to admit of the vitreous, lens, aqueous, and cornea being observed by transmitted light. No yellow pigmentation of the macula lutea was ever observed.

During these experiments it several times occurred, especially when young kittens were employed, that, within a few minutes after the animals were killed, a dense cataract developed itself in the lenses of both eyes. Within half an hour these parts became quite opaque, the opacity remaining very marked after the removal of the lens from the eye. This seldom occurred to any extent in the eyes of adult animals.

From this we were led to administer santonine in cases of cataract, in the hope that it might exhibit some curative action. The cases at our disposal were few, and not very suitable, since they consisted of nearly ripe, instead of commencing cataracts. In one of the cases (No. 25, Table) there seemed to be some improvement after six months' use of the drug. We had no opportunity of employing santonine in a commencing cataract in a young person.

In conclusion, it may not be amiss to remind our readers, that, in physiological doses, santonine, in the healthy subject, shows a marked action upon the eye and brain. Prominently stand the alterations in colour-vision, which are now too well known to require statement in detail. Besides this, as proved by the experiments of Dr. Edmund Rose, of Berlin, the retina becomes hyperæmic, both arteries and veins being very markedly enlarged in rabbits poisoned by this drug. Then also distinctly cerebral symptoms are produced, as headache, dizziness, nausea, and vomiting, the latter evidently not arising from disorder of the stomach, but from brain irritation. Alterations in taste and smell are also produced in some cases, while, in animals poisoned by the drug, spasms, first of the cerebral, then of the spinal, nerves occur. These facts, showing the elective affinity of the drug for the eye and brain, will tend to confirm the impression, deduced from the cases already referred to, that santonine will yet take a prominent place in the treatment of certain forms of eye disease.

III.—On the Pathology of Club-foot and other allied affections.
  —By James Hardie, M.D., Surgeon to the Clinical Hospital,
  Manchester. (Based on a paper read before the Medical Society
  of Manchester.)

Having lately had the fortune to obtain the parts in a case of
extreme and extensive muscular shortcoming, I am induced to take
the opportunity of describing the case, and of making a few remarks
on the pathology of the affection. The term "muscular shortening"
is used as being the best which suggests itself, so as shortly to com-
prehend the various abnormal conditions of the case, according to
the present usually received pathology; but, as will be seen imme-
diately, it does not, according to the views I have been led to enter-
tain, express accurately either the cause of the affection or the
condition of the parts affected.

The subject was a female child, two and a half months old at the
time of death. During life, the appearance which at once arrested
one's attention was the clubbed condition of both hands and both
feet, the former being rigidly flexed and pronated on the wrist-
joints to a right angle with the forearm, and the latter being in a
state of extreme varus. On further examination, however, it was
observed that though both elbows could be flexed, neither could be
extended beyond an angle of about 60°, and in this latter position
the arms were usually held. Further, on taking hold of the legs,
it was found that the knee-joints, which were in an extended position,
were absolutely immovable, with the exception of a slight degree of
mobility forwards. The peculiarity of this latter condition, together
with the difficulty of recognising the bony prominences, made it
almost appear as if the knee was somehow turned round about, and
though the *rationale* of this was by no means clear, the difficulty of
assigning the true relation of parts was so great as to make one
look forward to the dissection with a considerable degree of interest,
when the child (which was badly nourished and seemed to have little
chance of life) happened to die. The appearance of the child was
altogether most peculiar. It seems to have resembled very closely
that of one of which there is a small woodcut in Mr. Adams's work
on 'Club-Foot' (p. 203). On the occurrence of its death, I was
permitted to make a careful dissection of the parts involved; and,
without entering minutely into particulars, may briefly describe their
general appearance.

After the removal of the muscles and tendons, the rigid condition
of the wrist-joints completely disappeared. It was found to be
owing, mostly, to a contracted condition of the superficial flexors

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and palmar fascia. The movements of the elbows, however, after a similar dissection, were still considerably restricted. As regards the lower extremities, in which the phenomena were much more pronounced, it was found that the ligaments and bones were also extensively involved in this distortion. With the exception of a little more looseness, the ankle-joint remained as it was, and as to the knee, after the removal of all the muscles, except the insertion of the rectus femoris, its flexion posteriorly was as impossible as in the undissected condition. While the movement forward became more free, any attempt to flex the joint was at once arrested by the rigidity and tightening of the ligaments. The position of the condyles on the head of the tibia was remarkable, and accounted for the abnormal relations of the parts observed during life. They rested on the latter quite on the anterior margin of their surface, and thus projected themselves prominently into the popliteal space. Lastly, it was found that the shaft of the tibia was much arched forwards; the fibula, however, maintaining its normal shape.

Such were the appearances met with in these limbs, and it has seemed to me that by viewing the pathology of talipes in the light afforded by a combination of abnormalities in a case such as this, a more correct estimate may be formed of its cause than by a study of such as are usually met with, viz. with the deformity limited to the parts about the ankle in one or both feet. It is assumed—what no one will be disposed to question—that the primary cause of the talipes was also that of the other deformities.

It is obvious, in the first place, from a dissection such as that described, as indeed surgeons are sufficiently aware of from the troublesome treatment so often required after tenotomy, that other tissues besides the muscles are involved in a case of talipes; and that the simple division of contracted tendons need not suffice to set the foot at liberty so as to get it into its normal position. We are led to infer, from the shortened and unyielding condition of the ligaments and other structures, that the affection must have existed for a considerable time during the growth of the child. This condition is not that of a recent and *quasi* temporary flexure, but has evidently been produced by the tissues growing to the form and size of a joint in a constant state of flexion. The question, however, is as to the primary cause of this condition. Has it been produced by spasmodic contraction of the muscles involved, by arrest of development of the shortened tissue, by external pressure on the child, as by the uterus, or in what manner? The generally received opinion at the present time is that spasmodic muscular contraction is the primary cause, and that the shortened condition of the other tissues is a secondary matter—the result of the persistence of this contraction. This was the view entertained by Stromeyer. Guérin, Adams, and the majority of writers at the present day also give

their adherence to it. Little considered that the deformity may either be produced by spasmodic contraction of the shortened muscles, or, in other cases, by paralysis of their opponents.

The theory of arrest of development has almost fallen into oblivion, although this is that which, in a certain sense, I am inclined to adopt. That of mechanical pressure is so obviously insufficient to explain the conditions met with, besides being, from various considerations, so improbable, that I shall dismiss it without further remark, saving this, that I by no means wish to say that it is never the cause of deformities such as these, but that it must be an exceedingly rare thing for it to be so, and that when it is, the cases can only be slight and amenable to minor treatment. I may also just mention a case in exemplification, which I met with not long ago. At birth, both feet were turned up, spread out, and flattened against the front of the leg, constituting a well-marked specimen of talipes calcaneus. I had no doubt whatever, from the appearance of the parts, that it had been produced in some way by mechanical pressure, and accordingly advised nothing more than rubbing and manipulation. In the course of a very few weeks the deformity had almost completely disappeared.

Leaving this, then, let us address ourselves to the theory of spasm *versus* arrest of development.[1] Either theory might explain equally well certain conditions which often enough accompany the

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[1] I might also have quoted the theory of paralysis of the opponents of the shortened muscles. Little was of opinion that many cases are due to this, and Mr. Barwell at the present time is the principal supporter of the theory. The latter, indeed, considers this to be the cause of nearly all cases of talipes. It is supposed that during intra-uterine life the fœtus has had a convulsive attack, leaving certain muscles paralysed, or that this condition has occurred in some unexplained manner as happens frequently enough in early childhood. That the muscles on the opposite side of the joint thereupon draw the limb in the direction of their action, and being maintained in this position, an interstitial shortening commences, and the muscles and other structures afterwards grow to a size commensurate with their diminished area. This seems a most unlikely theory, and the arguments of Mr. Barwell in its favour are scanty and inconclusive. The principal is, that the most common cause of non-congenital talipes is, undoubtedly, paralysis. Most of the arguments against the spasm theory hold good against this, and I shall not, therefore, allude to it further, except to draw attention to the difficulty if not impossibility of explaining the condition of the knee-joints in my case by its means. Owing to the position of the fœtus *in utero* these were in a state of extension, and they were also found to be perfectly rigid, so far, at least, as concerns flexion, but unless Mr. Barwell means to affirm that, while tissues are still being developed and formed, this is accomplished on the shortest possible scale, which, of course, is known not to be the case (otherwise, to refer to nothing more, why were not the flexors of the thigh on the trunk also short in this case?), it would have been supposed that a certain amount of extra length and looseness would still have been available. The condition of the limb certainly bespeaks a much more active agency than want of power of the flexors. As Mr. Barwell points out, it is well known to surgeons that when limbs are constantly confined to one position for a considerable time, shortening of the muscles will certainly result, but this only holds good after birth.

affection, such as its symmetry on both sides, or its being sometimes limited to a single joint, or its occasional extensive manifestation, as in the present case. There are, however, several considerations which militate seriously against the spasm theory.

1. Beyond the simple shortening of the muscles, there is no other evidence after birth of spasm. After division of the tendons, there is no difficulty encountered by the persistence of the spastic condition. It is to be supposed, therefore, that it must have relaxed some time before birth, and we should then have expected a greater amount of mobility in the joints than is met with; or, if the ligaments should have grown into position, that the muscles should be flaccid in a corresponding degree. On the contrary, they are always the most tense of all the structures.

2. Comparing intra-uterine with extra-uterine life, there is the difficulty of imagining a condition in the latter resembling this supposed liability of muscles in the fœtal state to spastic contraction. We have, in common cases of talipes, a group of muscles affected with spasm, by no means liable to be so affected in the child, at all events, not as an isolated group. It may, I think, be affirmed that such a thing as spasmodic contraction of the *tibialis anticus, tibialis posticus* and *flexor longus digitorum,* and *gastrocnemius,* as a separate group, without any of the other muscles being involved, is unknown as originating after birth. True, we have, often enough, talipes of one kind or another, occurring as a postnatal affection on account of muscular spasm. But in this case the whole of the muscles of the limbs are generally involved, and the resulting deformity is produced by the superior strength of a certain group. Such cases, too, are produced by organic lesion of the nervous centres, and are, therefore, permanent or very slowly recovered from. Why, we may ask, should it be different in the fœtus?

3. The great constancy with which congenital talipes occurs in the varus or equino-varus form seems quite inexplicable on the spasm theory. Opposite forms of the affection are treated of, but they are confessedly exceedingly rare; and it is necessary to look for some other cause than some obscure affection always implicating the same nerves. This, too, it must be noted, when, as in some cases, widely different parts of the nervous centres are involved in disease. Why should hydrocephalus cause irritation of the same nerves as lumbar spina bifida?

4. As regards the period of fœtal life at which the condition arises, we might suppose that instead of the fourth or fifth month, which is the time usually referred to as the period when it is first discoverable, the peculiar nervous condition might originate shortly before birth, giving rise to, let us say, a case of severe varus. In this case, we would expect to find a very rigid condition of the muscles with the ligamentous structure loose and the bone unal-

tered, and, consequently, a case immediately remediable, for a time at least, by tenotomy. But I need not say that such a case is never met with. To explain the appearances met with in any case of talipes, we must always go back to a date preceding the full term of gestation by three or four months at least.

5. It might be supposed that the irritation of the nervous centres producing the spasmodic condition, would exist altogether without reference to the position of the fœtus in the uterus, so that, though its feet might be lying at one time in the usual posture, viz., resembling *varus,* yet owing to the occurrence of some peculiar state of the nervous system, the peronei muscles might be thrown into a state of contraction, turning the foot outwards to a state of talipes valgus. Or, again, applying the supposition to the rectus femoris, that, while the fœtus is in the usual state with the legs bent on the knees, the muscles might become rigidly contracted as in the case under consideration, so as to draw the leg into an extended position. Now, although I cannot deny the possibility of the former case, it appears to me in the highest degree improbable; and with regard to the latter, admitting its possibility, it must be regarded as a strange coincidence that the presentation in these cases at birth is always a breech. It is certainly a much more feasible supposition that the straight condition of the limb was the result of the position of the fœtus: that is, with the whole of the lower extremities doubled up on the trunk at the hip joints, as is a common position in breech presentations. We may infer from this that spasm of the muscles does not occur in those on the convexity of a flexed limb, and that the character of the deformity is a thing depending on the position of the limb in the uterus.

6. It is improbable that the nervous system of the fœtus at the fourth or fifth month is developed to such a degree as to be subject to disordered action, or that the muscular system is so entirely under its control to the exclusion of the purely vegetative growth of the embryo.

7. It will be observed that in my case the flexor muscles in certain joints (the ankles, elbows, and wrists), were contracted, and the extensors in others (the knees). Analogy would make this appear improbable; and it is singular that, as before remarked, the position of the limb favoured this.

Relinquishing this theory, then, as ir-reconcilable in many respects with ascertained facts, let us see what support these give to that of arrest of development.

By "arrest of development" I do not mean that the muscles and other structures on the contracted side of the joints have at some period ceased to grow, and have remained of a lower grade of development, or have possibly undergone a degeneration of structure. Dissection of the parts sufficiently disproves any such hypothesis.

We find the muscles, ligaments, and surrounding tissue exactly of the same structure as in the normal condition. The only difference that can be perceived is that they are formed on a smaller scale than they should have been, and if, by the term "arrest of development," some have understood the former condition as existing, I can at once agree with Adams and others in regarding it as a myth. But if, by the term, we signify only what every one admits—structural shortening—and then go back and substitute one kind of nervous influence for another as the cause of this, the influence, namely, of some peculiar perversion of the excito-nutrient system of the mother for some peculiar irritation of the nervous centres of the fœtus, as is the supposition necessary in the former theory, then I see nothing in the anatomy of the parts nor in the reasoning to warrant the complete rejection of this theory, which it has of late years received.

The following considerations appear to give it considerable support :

1. The frequent association of talipes with monstrosities and other minor deformities, such as hare-lip and spina bifida. Some have asserted that the occurrence of talipes in anencephalic monsters is a cogent argument in favour of the spasm theory, inasmuch as the nervous centres, they say, are probably in some state of irritation. Mr. Barwell, with as much reason, considers this association as an argument in favour of his theory of paralysis. Undoubtedly, it is more than a coincidence that these conditions so frequently accompany each other; but to say that the one is the cause of the other is nothing more than an assertion, which on a little reflection one would hesitate to give credit to. Much more probability is attached to the supposition that both are the result of the same cause. Hare-lip, or an abnormal number of fingers or toes, is also a common accompaniment of monstrosity. But these are not considered due to a spasmodic or paralytic condition of any of the fœtal nerves. Why should another affection, a similar condition to which may be produced by muscular agency after birth, be singled out and put down as certainly depending on this in these cases? The truth seems to be that the excito-nutrient system of the mother, which governs and regulates the growth of the fœtus as it does that of her own structures, is in an unhealthy condition, and hence all these various departures from the typical formation. It is, of course, foreign to our purpose now to inquire into the ultimate cause of this condition. Probably enough, what are termed maternal impressions may be credited with a large proportion of the cases.

2. Connected with the above is the occasional hereditary nature of talipes. Like other peculiarities, this has frequently been observed to occur in certain families to a very remarkable extent. Little has remarked, also, that the parents of children born with talipes often

present a somewhat peculiar shape of foot; those having children with varus, for example, often having uncommon convexity of the tarsus, without contraction of leg muscles.[1]   Whatever truth there may be in this (and it is probable enough), I think it will be granted that it is much more easy to conceive of both classes of cases as resembling harelip, say, in being due to an original something in the fœtal germ, modifying its subsequent shape, than to conceive of there being a hereditary peculiarity in the nervous centres, which causes a certain group of muscles to assume a state of spasmodic contraction.

3. An attentive consideration of the mode in which the fœtus is developed will not only show the great probability of this being the cause of talipes, but will also explain the reason of the latter being so constantly in the varus form.   The fœtus, as every one knows, from its earliest visible existence, is rolled together towards its anterior aspect, and even at the full term of gestation this condition is observed in a very striking degree.   Each of the principal divisions of the body, as it shows itself, is seen in this sort of convoluted condition, and as it grows, it gradually unrolls and unfolds itself till it is capable of complete extension.   The mode in which this is accomplished has been carefully investigated by Eschricht, a Danish observer.[2]

Eschricht has shown that the bent and rolled up condition of the early fœtus is owing to the fundamental tissues being fashioned in this form, and not to the flexion of joints.   The joints themselves indeed are originally shaped in accordance with this bent up state of the skeleton, and it is only as development proceeds that their normal shape is attained.   Volckmann has very happily likened this gradual unfolding of the fœtus to the growth of a vegetable bud, and by keeping the latter in view the former will no doubt be more correctly estimated.   To take the vertebral column as an illustration: during the early months of the fœtus this has the form of an arch, with the head strongly bent downwards on the sternum, much more so than can be accomplished after birth—indeed, with the face turned somewhat backward.   The anterior part of the head is therefore very little developed in comparison with the vault of the

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[1] Anatomists would tell us that this (according to the spasm theory) is produced by contraction of the plantar muscles.   But talipes is caused by contraction of the leg muscles.   The intensification of parental derangement in the progeny in this case, therefore, consists in a change of seat of the affection from one set of nerve-cells to another!

[2] The investigations of Eschricht originally appeared in the Danish language. He subsequently, however, published a summary of them in the 'Deutsche Klinik,' 1851, No. 44, to which those interested in this subject would do well to refer.   In the same periodical, 1863, there appeared a paper by Volckmann " On the Etiology of Club-foot," in which the labours of Eschricht are referred to.   A translation of this is to be found in the 'Year Book of the New Sydenham Society' for 1863, by Mr. Thomas Windsor, in his " Report on Surgery."

cranium. The sacrum at the same time is turned sharply forwards and upwards. Thus it is seen that the convex aspect is more developed than the concave. As growth proceeds, although it does so for the most part *pari passu* on either aspect, still it is ultimately more active in front, and the concavity of the arch is gradually filled up, so that when the structure of the joints is complete their physiological action permits of the complete extension of the trunk. A similar process takes place in the extremities, and it is when their original position is borne in mind that its great interest and significance with reference to our inquiry become apparent. According to Eschricht, the legs are first seen with their posterior aspect directed towards the front of the abdomen, with the knee looking forwards and outwards, and the foot extended on the leg in the position of pes equinus, its plantar surface being flattened against the abdomen.

As growth proceeds, the limb in this case assumes its normal position in a sort of spiral manner. The knee turns outward and backward, and changes from its straight position into one of flexion, while the foot becomes flexed on the leg, and the little toes turned away from each other so as to be directed downwards. As regards the upper extremity, the flexion, according to our authority, is not so marked, nor the evolutions so complicated. The hands are first seen flattened on the thorax, and as the arm lengthens they gradually slide down, and the elbow extends. The latter is never flexed to such an extent that the tip projects beyond the thoracic wall. Growth in this case, then, is more a process of lengthening than of unfolding, and in this respect the arms resemble the fingers and toes, which are never flexed, but grow directly forwards.

These researches are of surpassing interest, and as I have said, explain not only how talipes and allied affections are produced, but the reason why they assume the particular form they do. It is not, for a moment, to be denied that the processes we have so briefly described may occasionally be imperfectly performed. That a deformity from this cause should occasionally occur need excite no more surprise than that a harelip or spina bifida or webbed fingers should occasionally occur from the imperfect accomplishment of other parts of the vegetation of the fœtus. Horticulturists, to recur to the analogy of the bud, frequently enough meet with similar conditions in an irregular, or contracted, or webbed state of the leaf, flower, or fruit. We have, as before remarked, to suppose some peculiar condition of the parent—this may either be of the spermatic fluid, of the ovum, or of the mother after conception—which causes a defective development of the progeny. We thus conclude that the affected limbs never have been in their normal position, but grow, from the first, in the state they are found in at birth. Others, who support the spasm theory, consider that the limbs may have been at

one time quite normal, but have, at some later period, assumed the contracted position. How much more probable is the former supposition, orthopædists are well able to judge.

Placing these observations of the Danish physiologist and the description of my case alongside each other, we see how exactly the former, together with this theory, explains the various appearances of the latter. The knee-joint, which was formed in the straight position, had failed, from some peculiarity in the mode of growth of the tissues on its patellar aspect, to accomplish the evolution of flexion. The muscles and ligaments had apparently grown too short to permit the joint to assume other than the straight position. As a consequence of this, we find that the tibia, as it increased in length, pushed itself forward on to the very front of the condyles of the femur, causing a certain amount of flexion forward of the joint, and then at length, being unable to lengthen further in this direction, had bent in the middle, and made the remainder of its growth in this way. Similarly might we explain the *varus* condition of the feet. They had been arrested during the rotation from the position we spoke of, of having the little toes directed towards each other. Accoucheurs are well aware that children at birth very commonly have their feet turned inwards in a semi-varus condition; and the fact of the little toes being primarily in apposition instead of the great toes, is proved by the fact that in the siren form of monstrosity the limbs are united with the little toes together. The complicated movement which the ankle-joint undergoes in its evolution, and the late period at which it is accomplished, are, no doubt, the reasons why the peculiar malformation we are considering should most frequently affect this joint.

We need not refer particularly to the arms, as their condition is to be explained in precisely the same manner. It may be remarked, however, that the movements here being simpler, and the mode of growth more a process of lengthening, is a sufficient reason why clubbing of the hands should be a comparatively rare affection.

We have now shown why "muscular shortening" should usually occur in the particular modes it does, and concerning the exceptional varieties of it, it need only be said that those which cannot be accounted for by some exceptional cause are probably either owing to some peculiarity in the original direction of growth; or more probably, perhaps, owing to the period of growth of the fœtus at which the peculiarity of the excito-nutrient system of the mother began to affect it. If we allow the possibility of maternal impressions having such an influence, then, if these are occasioned at a late period, we may have rigidity of the knee in the flexed position, and so on.

The bearing of this explanation of the cause of club-foot on its

treatment is sufficiently obvious. Admitting its correctness, it is evident that not the muscles only, but the bones and ligaments are also involved in the abnormal condition from the first. Too much reliance, therefore, must not be placed on the efficiency of tenotomy. Surgeons believing in the muscles as the original cause of the mischief, and trusting too much to the relieving of the tension they exhibit, are sure of disappointment. We may infer, in a most intelligible manner, that tenotomy should only be regarded as a preliminary to treatment that has for its object the retaining of the joints in their normal position, for a period sufficiently long to allow of the bones and other structures growing into the shape that this encourages. In many cases this period must necessarily be very protracted, but considerable time may also often be saved by extending the use of the tenotome as much as possible to all the contracted tissues.

In conclusion, I think it will be granted that the various conditions we meet with in affections of this class may be quite intelligibly explained by the theory of arrest of development as I have stated it, while also the difficulties involved in the former are obviated.

And, on the other hand, I am not aware of any serious objections which may be urged against it. At the same time, also, it commends itself to us by its simplicity, and its agreement with facts observed in the vegetable kingdom, and with our ideas of this mode of growth of organised structures.

IV.—Cases of Excision of the Knee-joint.—By W. W. Moxhay, M.R.C.S., Surgeon to the Royal Berkshire Hospital, Reading, &c.

The following cases were communicated to the members of the Reading Pathological Society, and the writer is encouraged to hope that their publication will be acceptable in the present form to the readers of the 'Medico-Chirurgical Review,' as a contribution towards the history of excision of joints, an operation which still raises discussion among surgeons, and has yet to win its way to their entire acceptance. Without further preliminary remarks, I will now enter on the record of my cases.

Case 1.—The first case; it is that of J. C—, age 29, a tolerably healthy-looking man, with chronic disease of the knee-joint, admitted May 14th, 1861. There is much indolent swelling of the joint, with no very great tenderness. Case diagnosed, chronic synovitis, with suspicion of ulcerated cartilage. He had suffered some considerable time.

June 21st.—The operation of excision was performed under chloroform by means of the H-shaped incision, and the limb was laid upon Price's splint. The ends of the tibia and femur were extensively ulcerated, and there was all the vascularity of the synovial membrane and thickening around it that is usually observed.

22nd.—He has been vomiting all night; the pulse is 112; he has not, however, the look of having undergone so severe an operation; but one eye is inflamed by the chloroform.

24th.—Pain across middle of belly; tongue dry; ordered an aperient.

25th.—Bowels not acted, still has the pain; Ol. Ricin. ʒss st.

July 7th.—Transverse wound healed, perpendicular ones nearly so. There has been some bagging of matter on the outside relieved by incision.

17th.—Some matter which had been deep-seated came away in the dressings. He looks pale, and complains of the belly being puffed up. Removed the limb from the splint, and merely applied a back and front one.

21st.—Looks pallid; cough and mucous expectoration.

25th.—Opened the lower end of a sinus half way down the calf.

August 1st.—Much bloody discharge; complains of pain after food; looks anæmic. Ordered some citrate of iron.

4th.—Less discharge; but he can bear no shake or jar of the limb.

12th.—Opened an abscess in the ham; the bones are getting consolidated; but much matter comes from the last wound. I find, by the way, that distension of the belly has occurred on this and the other occasion when matter has collected and been pent up.

22nd.—Much discharge from the wound in the ham; bones still allow of some movement on each other.

September 12th.—He was discharged from the hospital for change of air. The seat of the operation is swelled; the bones are not *firmly* united. He is able to get about on crutches, and there is much less discharge, which is not offensive as it has been.

November 16th.—Seen as an out-patient to-day. He can raise and move his leg about, and can bear upon it slightly. There still, however, is much swelling and discharge, and the probe passed through one opening touches bare bone.

December 14th.—Seen again. Less discharge, but several apertures. Limb in good position; he can still bear upon it slightly, and can move it about freely. So I have great hopes that bony union, though slow, did take place, and enable him to walk well. This I cannot however positively state as a fact, as I never saw him again.

It will be seen that this case was in the hospital three months, and was under observation five months. This, of course, is slow work; but still delay is better than losing a limb. I cannot avoid saying that this poor man suffered much, after leaving the hospital, from the niggardly spirit in which the Poor Law Guardians doled out nourishment to him, which perhaps made his progress slower than it would otherwise have been.

CASE 2.—The next case I will relate is of much interest; inasmuch as the mischief for which the operation was performed was of an acute character, and traumatic in its origin.

John Payne, æt. 11, a thin, unhealthy looking boy, was admitted on June 29th, 1861, with acute synovitis of the knee, attended with much swelling from effusion, and much pain and tenderness on pressure or movement. There is a small punctured wound over the patella, caused by his having some days since fallen upon a nail which had evidently penetrated the bone for some distance, and perhaps gone through it. Perfect rest on a splint was ordered, and calomel and opium with evaporating lotions.

July 3rd.—Free incisions were made into the joint; free discharge of thin matter; the discharge continued very profuse, and his health completely broke down. The matter smelt just like the collections of old bones to be found in marine store dealers' shops. Amputation or excision became the only means of saving life.

Excision was performed on the 14th. The synovial membrane was intensely vascular; the patella was found perforated. There was no ulceration of cartilage on the tibia or femur; but it was of a pale yellow colour, and of a swelled and sodden appearance. At the operation the synovial membrane was freely snipped off, and thin slices removed from the femur and tibia, and the patella cut away. An abscess was opened in the operation, extending a short distance up the outer side of the thigh. In this case the U-shaped

incision was made, which enabled me to utilise the perpendicular side cuts, which had been made to open the joint on a previous occasion. Ordered Tr. Opii, ℥xv, st. et rep. si opus sit. Chloroform was of course used at the operation.

In the evening the boy had vomited much; he had refused nourishment; his pulse was rapid, feeble, and indistinct. Ordered the injection every four hours of a quarter of a pint of beef-tea with one ounce of port wine.

15th.—Has taken four doses of laudanum, and has retained the injections; his pulse is a little more distinct; tongue densely loaded, and he looks wretched.

16th.—Takes some nourishment; pulse over 120. It was not possible to count it before.

17th.—Removed the surface dressings, wound looking tolerably healthy.

23rd.—Wound and its neighbourhood swelled; face looks puffy; urine alkaline, and, under the microscope, shows strings of globules and some prismatic and pyramidal crystals. Ordered nitric acid.

27th.—Matter bagging in front.

August 8th.—He can nearly lift the limb by its own muscles; outer edge of condyle projecting.

13th.—Up to-day. He has for some days had the limb off the splint, and is now only having one applied to the back and front.

31st.—Discharged convalescent with a limb useful, and promising to be still more so. His stay in the hospital was two months, and his stay after the operation a little over six weeks.

This case seems to me to be worthy of some thought; it was acute, and it was traumatic, both qualities casting some doubt and hesitation upon the propriety of resection. There are not many cases of the traumatic character recorded, and those chiefly gunshot wounds, and the success has not been great, either in the Crimean campaign or in the American war. Mr. Crompton, however, of Birmingham, seems to have operated successfully in one case, where a charge of shot lodged in the condyle of the femur. I must confess in this case, and confessions are most useful in surgery, that I was rather horrified to find no destruction of cartilage, though I doubt not it was just on the point of beginning, and hurriedly thought I had better amputate; wiser reflection, as I think, immediately followed, and I came to the resolution of converting the case by excision into one of compound fracture, no doubt rather a bad one. The patellar mischief confirmed me in this idea, and I am pleased to say that in this anxious case the end justified the means. The boy had, however, a most narrow escape. Another point of interest is the failure, which I have more than once seen, of incisions to relieve the suppurating joint. Whether from my own ignorance of

the proper method, or from the cases themselves not being suitable, I must say I have felt disappointed with this mode of treatment.

CASE 3.—Charles Hockly, æt. 35, a healthy looking man, was admitted on December 31st, 1861, with chronic synovitis of the knee, resulting from an injury four years ago; most of this time he has been on the sick fund of his club, and some part of it he has spent in this hospital, having recently had the benefit of perfect rest, &c., here for six months. The pain he has lately suffered has been so severe as to prevent sleep. The limb jumps frequently, and has become thoroughly useless, as he can bear no movement or pressure. He keeps it in a semi-flexed position. There is only a moderate amount of swelling; little or no constitutional disturbance.

January 6th, 1862.—Under chloroform, and by means of the U-incision, removed patella and slices of the femur and tibia; cartilages ulcerated over all the bones implicated; vascularity and thickening of the synovial membrane and surrounding tissues. Laid the limb while he was still under chloroform on Price's splint.

Evening.—Found his pulse intermit every tenth beat.

7th.—Looks rather distressed; he has been vomiting all night. Tongue dry, and brown in the middle. Ordered some effervescing mixture.

8th.—Sickness gone, but he looks miserable. Pulse 120, small end feeble.

9th.—Vomiting returned, still looks miserable. Pulse 96, full and even. Pus and blood escape by the wound, some lodges where the patella was. Egg flip.

10th.—Countenance despairing, abdomen distended; has vomited thrice since yesterday; the bowels have also acted three times. Gave him some chloric ether and chlorodyne.

11th.—No vomiting : is more cheerful. Pulse 96, feeble.

30th.—Parts consolidating.

February 10th.—Wound nearly healed. Limb removed from splint; a simple one applied to the back and front and one side.

28th.—Knee getting firm, but he shrinks when an attempt is made to flex it. Some few small apertures.

April 27th.—Discharged from the hospital convalescent. This man's stay in the institution was somewhat under four months after the operation. I have repeatedly seen him since he left, and on one occasion not long after he was engaged in digging. Soon after this he obtained employment at Huntley and Palmer's biscuit manufactory as a labourer, doing the same work and receiving the same pay as other labourers. His limb is as straight as a flagstaff, and as firm as a rock. I had the pleasure of showing him to the members of the Reading Medical Society some time ago.

CASE 4.—Ellen Bint, æt. 17, pale, but tolerably well nourished,

was admitted on August 4th, 1862.   She had suffered for four years
and more from pain in the knee-joint, and from inability to use the
limb, and she has been completely disabled since February, not having
been able to put her foot to the ground since the beginning of that
month.   She has been an in-patient here more than once for the
same affection.   The joint is swelled and tender on pressure or
movement, and some slight grating is felt on the patella being
moved upon the trochlear surface between the condyles.   She herself
urgently requested that the knee might be removed, and declined to
try rest and other expedients she was well acquainted with, having
found only slight and temporary relief from them.   She was, how-
ever, persuaded by me to try for six weeks; her sufferings, however,
became so great that on

September 4th I performed excision, removing slices of tibia
and condyles and the whole of the patella, under chloroform, the
limb being laid on Price's splint while she was still under its influ-
ence.   The cartilage over the patella was ulcerated; that over the
remaining bones was of that swelled, yellowish, and sodden appear-
ance which, I think, immediately precedes ulceration.   The synovial
membrane was red and swelled, and the surrounding soft parts
thickened.

11th.—Doing well.   An abscess has formed in the situation of
the patella, and the matter has been let out.

October 8th.—Wound healed, except at a few points.

13th.—Limb removed, and a simple back splint used.

15th.—Up to-day.

20th.—Had an attack of sickness, which, however, soon passed
off.

November 28th.—Discharged from the hospital convalescent.

I find the exact date when she was able to use the limb in walk-
ing has not been noted; it was not long after her discharge.   In
April, 1869, I happened to meet her in the street, and though
recognising her face, I was obliged to ask her if she were the girl
who had had her knee-joint removed, being so astonished at the
excellent way in which she walked.   No one but those who had
known what she had undergone would have noticed the very slight
limp there was in her gait.   She had then been long in service as a
lady's maid.   I asked her if she found any shortening, and she said
none; the limb is perfectly straight.   I have lately heard of her, and
find she is married.   Now I do not mean to say that *no* ladies with
wooden legs *have* got married, but I fancy that when they have
them their chances of matrimony are really and seriously lessened.
This girl's stay in the hospital after operation was about three
months.

It is but fair, as the result in this case was so good, that I should
mention that our respected friend, Dr. McIntyre, of Odiham, was

present at the consultation on this girl, and strongly advocated resection. The question was, ought we, as there is no evidence of ulceration anywhere but on the patella, to subject the girl to so severe an operation? He answered yes, to anticipate the certain destruction of the joint, and consequent breaking down of the health and strength, which would render her unable to repair the injury inflicted thereby. I must say my leaning to the advisability of this line of practice was much confirmed by his opinion, and I think it influenced also the opinions of my colleagues in giving their assent.

I am, at any rate, glad that such an operation was performed when the patient was in moderately good health, as I am sure the progress of the case was thereby much hastened. On the other hand, I confess it might be argued, why should you put a person's life in jeopardy when the disease has made no dangerous progress, and life is not likely to be endangered for some time? and the diseased state might be recovered from with anchylosis? I would answer, the life so prolonged would be a life of suffering. The time of perfect rest, &c., required is so long that patients, belonging, at any rate, to the class my patient belonged to, could not ordinarily afford it. The cure, or rather so-called cure, is frequently temporary : it is, therefore, right, especially when the suffering is great, to run some risk for the sake of giving the patient relief from pain and a useful and nearly natural limb, and to expedite the cure by operation; this cure being, you well recollect, substantial and permanent. Mr. Swaine, our latest author, argues this point, I find, much in the same way, and confirms his views by mentioning rather critically a patient who was under Mr. Hilton with knee-joint disease for a period of ten years, suffering much, going to the sea-coast, &c., and all ending with the result of a badly-shaped limb. He quotes Mr. Solly (who I know was a great advocate for patience in the treatment of diseased joints), as expressing great disappointment at many of the cases he had thought cured returning to him with a repetition of the evil.

This girl's case is much to the point, inasmuch as she had experience in the necessary treatment for saving her limb, and herself elected to have the operation performed rather than have repeated the abortive attempts at cure, each attempt having been followed by an increase of the suffering. And she was, I think, right, for experience shows that a very slight accident or exposure will often undo the work of months of rest, &c.

CASE 5.—George Miles, æt. 10, a miserably unhealthy and also a miserably stupid boy, was admitted on March 13th, 1866, with enlargement of the knee-joint, the result of long-continued chronic synovitis. He has had the advantage of rest, &c., here on a pre-

vious occasion; the limb is useless from tenderness and bad position of the joint, and his health is breaking down.

July 26th.—As no improvement took place from the rest and good food, I to-day excised the joint, removing the patella and slices of tibia and femur. Synovial membrane very red and fringed, commencing ulceration of cartilages, much thickening and degeneration of neighbouring soft parts. Chloroform used and Price's splint.

August 2nd.—He has been uninterruptedly doing well. Swelling subsiding.

10th.—Abscess in situation of patella.

27th.—Some discharge and some mobility.

November 7th.—Discharged convalescing, union softish; cautioned to show himself now and then. Four months since operation.

This boy was seen very seldom afterwards. The union remained softish for some time, as shown by the limb bending more than I could have wished. His stupidity, and that of his friends, was so great, for it quite seemed a *family* failing, that though I got a splint made that could be screwed, I never could get him or them to attend to keeping the limb straight. The result, therefore, though a success, was not such a great success as I like to see.

CASE 6.—Elizabeth Lewington, æt. 8, was admitted August 28th, 1866, with her knee useless from its being bent to a very acute angle by former old disease of the joint. The joint is slightly swelled, and the tibia is drawn behind the condyles. It cannot be straightened, but there is no bony ankylosis. The girl is delicate.

September 25th.—Under chloroform, performed excision. I had to remove several slices before I could extend the limb into good position, the difficulty being caused by the tissues being all matted together, more particularly at the back of the joint. I was also, perhaps, rather chary in my sections, recollecting her age and the state of the epiphyses. Laid the limb on Price's splint.

October 2nd.—Was obliged to lift the limb and readjust it, on account of the end of femur projecting and causing a sore.

31st.—Removed the splint and applied merely a back one; wound nearly healed.

November 10th.—Free discharge of blood and matter from the inner part of the wound. Ordered Quinine.

December 31st.—Discharged from hospital convalescent. She is able to lift the limb by its own muscles, but there is slight mobility at the seat of the operation on grasping the limb and attempting flexion.

I have seen this girl frequently since; the limb soon became thoroughly useful, and was quite straight. There is lately, however, a slight tendency to bend and bow out. The shortening is also, as might be expected, becoming more marked as she gets nearer to adolescence.

This case is, I think, eminently satisfactory. She came in with a useless incumbrance, and went out with a limb that will enable her to gain her own livelihood in any way. The most interesting question that arose in the treatment of this case was this:—Why not divide tendons, and forcibly or gradually extend the limb? My own limited experience has been against this line of practice, for in such cases it is not the tendons which resist extension, but the glueing together of the soft parts with the skin forms a semi-cartilaginous mass, in which the bones are imbedded, as it were, in a firm and closely surrounding nest. Moreover, the position of the tibia then becomes, in reference to the condyles of the femur, such that it is positively locked, as it were, against these prominences. The skin has been so adherent to the matted tendons, fasciæ, &c., that I have seen it tear in attempts at extension. These circumstances combined really make the extending of the limb into a good position next to an impossibility. I have also often found that the semi-cartilaginous tissue is exceedingly elastic. I mean in this way, that if we do succeed in stretching it a little, when we remove the extending power, the parts spring back immediately and strongly to their old position, as if acted on by a spring. I should, therefore, not be very anxious to accede to the idea of dividing tendons. I was glad to find the other day that I was confirmed in this by Swaine, quoting Professor Busch of Vienna with approbation, whilst expressing this same opinion himself. This patient was in the hospital a little over two months after the operation.

Case 7.—Charlotte Seymour, æt. 20, pale, thin, and delicate in appearance, was admitted on February 9th, 1869, with chronic synovitis of the knee. There is considerable swelling and tenderness, chiefly at the outer side of the patella. She has suffered for five years, and had been in the hospital twice for the same affection. There was no history of any injury.

18th.—Resection was performed under bichloride of methylene. Cartilages ulcerated. Synovial membrane vascular. Wound dressed with carbolic acid and linseed oil, 1 to 5. Limb laid on Price's splint. Liq. Op. Sed. ℳxxx.

19th.—Had a fair night. Pulse 134. Tongue dry and brown in the centre; some oozing of blood; has passed no urine; catheter used.

20th.—Pretty comfortable. Pulse 126. Pain in back, none in the leg.

21st.—Doing well; dressings changed; wound looks well; little discharge; tongue moist; pulse still frequent.

23rd.—Pain down the leg; coming on in fits; dressings changed, and the limb readjusted on splint, which relieved her. Wound looking well, not much discharge. Catheter still required. Took a little meat to-day.

24th.—Complains of her back; passed urine naturally. Pulse 124. Feeble appetite, not good.

25th.—Looks pale, thirst, pulse 132; much pain in leg. Ordered sulphite of soda.

26th.—Looks and feels better; small motion to-day. At 11 a.m. had some shivering and looked flushed. Pulse 140.

27th.—Pulse 116, with more power; nasty taste, attributed by her to the medicine.

March 1st.—Looks brighter. Pulse 110, fair in power; tongue moist and clean, in fact too red.

9th.—Abdominal pain after food, the last two or three days, of a griping character. Carbolic acid omitted. It was suggested by one of my colleagues that this acid was likely to be absorbed and poison the system. Lot. Chlor.

16th.—Better, but has complained of pains in the left shoulder, and side of the neck, where she says she is subject to rheumatic pains. Pulse 87.

20th.—The limb was yesterday taken off the splint, and a simple back one applied. Wound all but well.

April 2nd.—Has complained lately of jumping of the leg, which has disturbed her rest.

9th.—Doing well; bowels relaxed. On the 17th was sitting up.

June 12th.—Discharged from the hospital; still walking on crutches.

September 28th.—Saw her to-day. She walks with a very slight limp; limb quite straight and firm about knee; requires very little addition to heel.

October 20th.—Appeared to-day. She has severe attacks of pain, but is relieved by the flow of some matter, which has evidently been pent up; there is a small fistulous aperture at the outer side, but no diseased bone can be felt. The limb is in excellent position, and feels firm to my manipulation, but she is chary of laying any weight on it.

March 16th, 1870.—She again showed herself; limb quite firm and straight, but she still wears the back splint.

Since last report I have again seen her. She was a considerable time before she bore on the limb, and I strongly suspect there is a small abscess between the bones, which somewhat retards her recovery. Promises very well. This girl was in the hospital four months after the operation.

I now, February 20th, 1871, have often seen this patient; she walks well, and has no symptoms of any disease.

CASE 8.—I now come to the last case of the series. It is the only unsuccessful one, for it ended in amputation. I am happy to say, however, life was saved.

Edward Stark, æt. 40, but looking much older, was admitted on March 2nd, 1869, with disease of the knee of two years' standing, the result of accident; chronic synovitis; he has suffered more or less ever since, and was here some months ago. He received then some benefit, but was cautioned that he might at some future time require an operation for his relief.

The joint is much swelled with a doughy feel; there is tenderness on pressure or movement, considerable gnawing pain, and occasionally has shoots through the joint. The limb is nearly fixed in a flexed position; tenderness evinced on moving the patella. Feels very weak; appetite not good; pulse feeble, 80; has had cough the last few months, but no hæmoptysis. His health until lately has been good.

12th.—The patient having been much disturbed at night by jumpings of the limb, notwithstanding opiates, I performed excision to-day, under the bichloride of methylene. There was extensive ulceration of cartilage, and great vascularity of the synovial membrane, and thickening of it and the surrounding tissues. In the evening I found him easier than he had been, for he had had much pain in the leg. Pulse 98, full.

13th.—Pulse 92, not so full; much jerking of the limb; has taken beef-tea; pretty well. I need not, however, relate the details of this case, and the fluctuations we felt between hope and despair, suffice it to say that he was discharged from the hospital on December 11th, in anything but a satisfactory state, union being anything but firm—I might say there was none—and his health being very shaky. He was readmitted on April 21st, 1870, and amputation was performed on April 27th. He made a good recovery from this, and was ultimately discharged on July 2nd. The ends of the bones were found deeply and extensively carious. Here is a failure indeed, but still the question in this man's case was only between amputation and excision. His age, especially the age as judged by his appearance, made me little sanguine of success. I see Swain says excisions of the knee should not be performed after forty-five, and that he would rather not operate after forty, but this man was much older, as I have mentioned, than his age. This patient was in the hospital six months after the operation of excision, and about two and a half after the amputation, so I am afraid the board of management have found him one of their bad bargains. It was, however, right, I think, to have given him the chance of saving his limb.

I have in the previous pages contented myself with giving an unvarnished honest account of the results of an important operation in my own hospital practice. Much may be said about it in a general way; but I have thought it better to make this paper rather a recital of cases than a dissertation on the ope-

ration, so that the bulk of one's remarks seemed better placed against the respective cases. The subject is, however, full of interest, and I must say that I never look upon any operative cases with greater delight than upon those who have successfully undergone the operation of resection of the knee. The operation is so truly conservative. Bones, muscles, nerves, arteries all preserved, and a shapely and useful limb seen, instead of the wooden pin or sham cork leg. On this matter of the wooden pin I cannot refrain from relating a conversation with one of my colleagues. We were conversing about the man Hockley. " Would not he," said my colleague, " be as well off with a wooden pin as he is likely to be now ?" " You should have seen him do," I answered, " what I have lately seen him do, and, I am sure, you would not ask that question." " Well, what was it ?" " Well, I saw him digging with a spade. I think if he tried that with a wooden pin, he would be very soon obliged to give in. Why, his wooden pin would stick into the earth in a very short time, and completely disable him." Statistics I thought of entering into, but they are of little value without the knowledge of surrounding circumstances, so I will avoid them; for instance, the mortality in various accounts differs from 14 to 50 per cent. My own numerical statement is eight cases: one amputation, seven recoveries, no death. The latest, I believe, are given by Swain and Price, and those who are interested can easily refer to these books. I am, however, happy to say that the per-centage of recoveries seems increasing.

V.—Partial Moral Mania—Kleptomania.

By J. H. Balfour Browne, Esq., Barrister-at-Law.

Although it is difficult to see how one set of mental operations, as, for instance, those which go to determine a difference between right and wrong, can be affected with disease while in all other respects the mind is sane ; still it is a fact that a man's relations to external nature may be distorted in so far as one series or class of acts are concerned, while in other classes of acts or impressions those relations may be in a perfectly normal condition. A man may be blind without losing the use of his ears. But still it is not altogether correct to say that a man can be morally insane while at the same time he is intellectually normal. For, as what we know of mind is only thought, we cannot regard a mind which always thinks wrongly with respect to certain matters, although in other matters its process may be without error, as in its intellectual wholeness complete.

I now propose to consider a class of cases in which even a more limited species of acts are affected by disease—a class of cases in which only one or two of the social relations of the individual are interrupted by the presence of the abnormal conditions of brain. Although it is difficult to separate a man's feelings from his thoughts, it is not difficult to make a distinction between various desires or passions in relation to their objects. Thus, if we found morbidity only manifested in relation to the appropriative tendency in human nature, it would be reasonable, for the sake of convenience, to distinguish such a manifestation of disease from that in which the tendency to destroy one's own life was found to be the most prominent mental feature. It is really madness in relation to the same mind and thought, whether its symptom be stealing a handkerchief or cutting one's throat ; but as there are different kinds of skill acquired by different parts of the body, so there are different propensities acquired by mind. Skill is the direction of energy to the educated part, partial moral mania seems to be the direction of morbid energy, or energy manifest under abnormal circumstances, through certain tendencies of disposition. And the most convenient means of classification is presented by the similarity of the most prominent features or symptoms of the disease in different cases, as it is these features and their object that call attention to that part of the disposition which is primarily affected. The disposition is just the stereotyped edition of a man. While a man is young and under favorable circumstances, his tendencies are only movable types. If we say a man's disposition is good, it is that the circumstances of the past have biassed him—like a bowl—to run over this green world in a direction we think heavenward. This is disposition in the lump.

But we all know how infinitely the various rooms of the house—disposition, so to speak—vary in different individuals. We find one man liking solitude and the great lessons it teaches, while another seems to enjoy his neighbour's elbows in his side as he is jostled in the market-place. One man has great ventures forth in the waves' hands, and prays that the wind may bring home his ships, and that his coffers may be at their golden flood tide. Another man lives in the shadow of great quiet hills, with nothing but books for friends, and would rather hear the babble of the streams than the chirp of all the coins in the world. One man imagines that

> "To breathe is not to live,"

while another man thinks that " well fed " is the acme of happiness, and never to want, the highest perfection. It is the sum of all a man's tendencies to the external that we designate his " disposition ;" and when we use such words as " miser," or " glutton," we mean to express, with as much exactness as one word can, the whole disposition of an individual. To say that a man whose disposition impels him to choose what is bad rather than what is good, is a bad man, and a stupid man, seems to be warranted by the dictionary meanings of words. We see many who choose the evil and eschew the good every day of their lives, and we see others who prefer the good of the spirit to the good of the body. But liberty is an excellent thing, and if we were all compelled by law upon all occasions to do well we would make the millenium a seven months' child—a consummation not to be desired. So we are all allowed to choose what is bad, if we prefer it, so long as our choice neither directly nor indirectly tends to injure other people. When disposition would impel us to the choice of something which belongs to another and, when we appropriate the article to our own use, law slips in and, for the reason that it is convenient that folk should be able to possess without molestation what belongs to them, punishes us, in order to prevent the formation of such unsocial (in the wide sense) dispositions. Such is the principle of our law, and whether the disposition is a result of disease or not, so long as punishment is calculated to restrain, so long should it be had recourse to.

But it is true that a disposition may get too strong for a man. He may, even when the strongest reasons for refraining from a certain act exist (*e.g.* the presence of witnesses and the certainty of punishment), be unable to restrain his propensity. And where such a fact can be satisfactorily proved it seems to us, after careful consideration of the subject, that the individual should be held irresponsible for such acts.

Partial insanity, then, may, according to medical men, be traced to an abnormal increase of vital energy in any part of the mental organism, which will probably be manifested in an excessive activity

of that state of consciousness with which the part affected is connected, or, what seems to us more probable, will in all likelihood manifest itself through those channels of mental life in which the greatest amount of mental energy has been wont to flow, or, in other words, be directed by the disposition of the individual. In relation with this statement it must be remembered that a man's disposition is not always an open book from which a runner might read, that it is not always formed by overt acts—although in many cases these are the scaffoldings of disposition—but is often built up in secret by the coral insects of thought. It must be remembered also that a disposition is not omnipotent, and that many wise men constantly act in direct opposition to the tendency of their nature; but where the true disposition can be ascertained it will, we imagine, be found the channel through which the excessive mental energy generated under the influence of disease will flow. It is true that not unfrequently the disease seems rather to change the character of the individual, and a man that was scrupulously honest before becomes a thief, a philanthropist a persecutor. But these facts, the truth of which we admit, only bear out our statement, for it seems to us a law of the manifestation of energy that its excessive flow under the influence of disease, through a channel in relation to which it is excessive, is productive of a result contrary to that which the ordinary healthy passage of energy would be expected to cause. If fifty people try to get through a doorway suited for the passage of one person at a time, not one gets exit, and that although the door is wide open and there are fifty persons wishing to get through. So it is with energy. As long as the disposition-channel—to make a phrase—is sufficient to allow the exercise, say of generosity, it manifests itself in good works; but when it has, owing to the excessive activity of mind, become too limited, there is a display of excessive meanness in all the actions of the individual, so that our assertion that it is the disposition of the individual that influences the manifestation, and gives a character to the symptoms, is borne out by facts.

In the following remarks upon partial moral insanity I shall attempt to describe—1, kleptomania; 2, erotomania; 3, oinomania; 4, pyromania—5, suicidal mania; and 6, homicidal mania; believing that these are at the present time the forms of disease which it is most important thoroughly to understand, and which it is the duty of those who write upon the medical jurisprudence of insanity most minutely to explain.

Kleptomania.—The idea of property, as we have it in our times, was not built in a day, any more than Rome was. That it has been built seems certain. In the first instance it may have been acquired from the undoubted possessory feeling a man has with regard to his own body. A man would recognise his hands as his own, and from that rudimentary notion of self-possession anything that could

minister to the welfare of self would, in time, become associated with the idea of property. Food would probably be that with which this advanced idea of property would be connected. But the real development of the notion of "mine" must have arisen from the remembrance of some want in the past, and its satisfaction in a time nearer the present, and from a sufficient appreciation of the course of nature to believe that such a want might arise in the future, when its satisfaction might be difficult. The man who really first had property was he who thought, " I am not hungry just now, but I may be in time to come. I have more food than I can eat just now, and I may not have enough to eat in time to come." But he found out that it was necessary to remember where the food was; then he found it necessary to hide the food and mark the place, so that he might find it again; and it was this fact of it being hidden that was the law that gave him the true feeling of ownership. But if food was "owned," and men began to think that possession gave a right to property, why should not the implements with which the food was procured be a subject of property? The hunter transferred the skin to his back or stretched it over a pole to shelter him, and so property increased. Then began the differences of the language of property. At first property in food only gave the pleasure of satisfaction of appetite, and then of taste; then when the hunter came for it again he had the satisfaction of feeling that by his ingenuity he had " earned his blessings," that he had done better than his neighbours by making the present live, as it were, on the past; then came pride in the shape of the instrument, in its ornamentation, in the glossy hide, in the antlers, in his house or wigwam, in the cleverness of his bartering exchanges, and in the stores he had laid up against the time to come. And so his feelings ramified, as it were, so the idea of property grew and strengthened, for feelings are strong in proportion to the number of actual or possible associated sensations. Then came money! and it was looked upon as valuable, not in proportion to the one real pleasure which it could procure, but as equal to all the possible pleasures which it might procure, and hence to be regarded as indefinitely advantageous. It is in this way that the present idea of property has been formed, and in this way has the moral condition of man been raised—first, by the enlargement of his sphere of activity; second, by the belief in the security of the future. The enlargement of the sphere of activity is of the utmost importance to humanity. It is good genuine work, be it with hand or head, that best forms character: and in order that a man may work he must believe in a future for which the present labour is providing comparative comfort. It is this anticipation of a future which is most characteristic of humanity, which best distinguishes man from the lower animals. Is it not this anticipation that opens the gate of heaven to us—is it not the

hopes and fears which come with this expectation which make night hideous ?—

> " And we fools of nature,
> So horribly to shake our disposition
> With thoughts beyond the reach of our souls."

Is it not this that makes man bend his knee to Him who formed the past and the present and the future—a world that is ours just now, and a world that may be ours hereafter ?

It is only the lower animals that live entirely in the present, and the present is always small. It is like a room, and humanity has made windows in its walls by which it surveys both the landscapes of eternity, while the brutes are content to live in the little close darkness of to-day. The present is great only because it can be made to contain glimpses of the past and of the future. Property, then, is possible only to those who have a future. It is something only in relation to time. But property must be respected by others than the proprietor, and in order that it may be respected it must be distinguishable. It must also be transferable, else property would be valuable only to a limited extent; and the transference of property must be safe, and ought in every country to be easy. And so from the rude beginning which we have described we arrive in time at a stage where there is a necessity for law, or "a rule of civil conduct prescribed by the supreme power in a state, commanding what is right, and prohibiting what is wrong."[1]

It is unnecessary to go further into the question as to the formation of the idea of property, or of the means which have been taken to render the acquisition and the subsequent possession of property secure. Enough has been said above to enable us to explain the connection of the idea of property with certain diseased conditions which may be brought under the notice of the medical jurist.

After property has been acquired, after the municipal law has forbidden theft and prescribed penalties in case the established rights of property should be violated, many persons are still found to be stupid enough to attempt to deprive their neighbours of their goods by means of fraudulent taking. But there are others who, through the disordering effects of disease, fail to perceive the relation in which they stand to the property of another, who fail to perceive the real connection that exists between owner and goods, to the exclusion of other individuals, or, even while they do understand the whole gist of the idea of property and possession, are, from their inability to be influenced by ordinary motives, which are the points of humanity's compass, unable to refrain, from the mere pleasure which arises from the act of appropriation.

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[1] " Law " is defined as " anything laid down, s. c., as a rule of action—a rule imposed, fixed, or established, decreed or determined." — 'Richardson's Dic.'
1 'Blackstone's Commentaries,' p. 44.

Very early in history we find instances of stupid hoarding under the influence of disease, and soon we find theft as a symptom of insanity. That avarice which sits

> "Upon a camell loaden all with gold:
>> Two iron coffers hong on either side,
> With precious metal full as they might hold,
>> And in his lap a heap of coin he told;
> For of his wicked pelf his god he made,
>> And unto hell himself for money sold;
> Accursed usury was all his trade,
>> And right and wrong in equall ballaunce waide,"

is compatible with health, in the ordinary sense of the word, may be true; but that such men as John Elwes, who at night was heard in his chamber as if struggling with some one, and saying, "I will keep my money, I will! Nobody shall rob me of my property," and who lived in wretched poverty, although he died worth £800,000; as Thomas Cooke, who never did a generous act, except dying and leaving £127,205 Three per Cent. Consolidated Bank Annuities for some one else to use; or as Daniel Dancer, the history of whose life and littleness is as well known as the story of his great wealth,[1] are in perfect health, in the truer and deeper sense of the word, we would emphatically deny. But the question of hoarding, save in so far as it is connected with theft, does not properly fall under our notice in this place.

Notwithstanding what some extreme thinkers say, we are compelled to believe that larceny, which is "a wrongful removal" (taking and carrying away) of the property of another, whether it be effected without consent or by consent obtained by intimidation or fraud, so as the owner consent not in the latter case to part with his entire right of property, but with the temporary possession only,[2] is not necessarily connected with insanity. But, at the same time, we must admit that theft may become a symptom of, and often is indulged in consequence of, morbid mental conditions.

No difficulty occurs where kleptomania, or the propensity to steal (using the word propensity in the meaning we have attached to it by our explanation of impulse and tendency), is only a symptom of well-marked mental disease. Thus, in the case of Renaud, which is quoted by Marc,[3] no difficulty could have arisen. The patient's ideas seem to have been very limited, indicating the existence of imbecility. The conclusion of the commissioners (MM. Denis and Marc) who examined him, was—"1. That his moral faculties were so feeble as to constitute a state of imbecility, which, however, did not preclude a certain degree of cunning when he delivered himself up to his propensity, or when he endeavoured to

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[1] See Henry Wilson's 'Wonderful Characters,' vol. ii, p. 38.
[2] 'Cr. L. Com. 4th Rep.,' p. 50.
[3] Marc, 'De la Folie,' vol. i, p. 170.

deny the acts which arose from it. 2. That it is exceedingly probable that Renaud experienced at times maniacal excitement, and it was especially in this exalted state that he twice attempted theft. 3. That in any case the mental condition of this individual did not appear to allow of the supposition that he had that degree of discernment and moral liberty which forms a necessary condition of criminality."

An interesting report on a case of mental derangement with kleptomania, by Dr. Max Mauthner, is printed in the second volume of the 'Medical Critic and Psychological Journal,' which, although it is too long to quote, throws some light on the subject under consideration. Prichard mentions a case in which the wife of a man of large fortune was in the habit of stealing upon all occasions when she visited shops for the purpose of purchasing. In this case paralysis and softening of the brain existed. So inveterate was the habit that the husband, as he could not shape his wife to do right in conformity with opportunities, tried to shape the opportunities to the disposition of his wife, and went to reside in the country.

The case of L. H—, who was confined in a lunatic asylum, and which has not as yet been reported, will further exemplify this class. She was extremely irritable upon certain occasions, but under ordinary circumstances was exceedingly morose. Her face was fixed in a "puckered" frown. She was, however, well educated, and could converse rationally upon many subjects. She was suspected of a morbid desire to acquire and hoard up, and upon a search being instituted fifteen bags were found concealed about her person. The number of articles contained in those fifteen bags (or those of them that were minutely examined) was 1182. Most of the articles were utterly worthless. We may mention some of them. There were 104 fragments of paper, 82 sewing needles, 18 gloves (mostly old), 12 moulds for wax leaves, 19 buttons (of various kinds), 60 feathers, 8 parcels of dried flowers, 4 pills, 3 fragments of dried fish, 138 fragments of ribbon, 9 bottles, 61 lozenges, &c. &c. In such cases, where the habitual theft is only a symptom of well-marked mental disease, little difficulty can arise. Where the individual who steals labours under a delusion, either that the property really belongs to him (as is very frequently the case when an individual labours under general paralysis in one of its stages), or that it has been stolen from him, and that he is only exercising the legal right of recaption, or that he has been commanded by God to take possession of certain articles, courts of law will not hold the individual responsible for his acts of theft, but will exempt him from the punishment declared by law. Such cases evidently fall within the rule of law stated in an earlier part of this work, viz. that if an accused person labour under "a partial delusion only, and is not in other respects insane, he must be considered in the same situation

as to responsibility as if the facts with respect to which the delusion exists were real." [1]

So far, then, there is no difficulty or uncertainty, but in those cases in which there is no other symptom of insanity except this diseased propensity to acquire property,—which is very frequently accompanied by the hoarding propensity, showing that it is intimately connected with the true primitive idea of property,—where the theft is the only sign of the presence of morbid conditions, the questions as to whether disease is the exciting cause of the larceny, and if so, whether it should be regarded as exempting the individual from punishment, are much more difficult of solution. That such cases do occur is certain.

A clergyman, who occupied a very excellent position in Edinburgh about forty years ago, who had distinguished himself by his learning and piety, and who, to use a "stock" phrase, was universally respected, was in the habit of stealing Bibles, and nothing but Bibles. He manifested no other symptom of insanity, and when questioned as to his conduct excused his acts on the ground that it was necessary to propagate the gospel. Well, it may not have been so mad an idea after all to think that theft of Bibles was calculated to do God service. How many people, sane enough withal, have attempted to propagate truth with a sword, as if human hearts needed to be ploughed before they would yield a harvest. [2]

"There are persons," says Dr. Rush, "who are moral in the highest degree as to certain duties, but who, nevertheless, live under the influence of some one vice. In one instance a woman was exemplary in her obedience to every command of the moral law except one—she could not refrain from stealing. What made this vice more remarkable was that she was in easy circumstances, and not addicted to extravagance in anything. Such was the propensity to this vice that, when she could lay her hands on nothing more valuable, she would often at the table of a friend fill her pockets secretly with bread. She both confessed and lamented her crime." [3]

A case has come under our own notice which has many features in common with that just quoted. Mr. M— was an individual of high rank. He was the owner of an excellent estate, and was as wealthy as most of his neighbours in the county in which he resided. He was never suspected of being insane, and the only evidence of mental unsoundness that could have been obtained was a confession upon the part of some of his servants that he was "sometimes

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[1] 'Broom's Commentaries,' p. 874, see 10 Clark and Finnelly, Reports 210, 211 ; Reg. *v.* Oxford, 9 Car. and P., 525, *s. c.*, Townsend's St. Tr., vol. i, p. 110.

[2] An interesting case of a book-stealer will be found in the 5th vol., 2nd series, of the 'Annales Médico-Psychologiques,' p. 666. Some cases of kleptomania will be found in the same journal, for April, 1855.

[3] 'Medical Inquiries and Observations,' vol. i, p. 101.

peculiar." Yet this gentleman was in the habit of appropriating "towels." He invariably, when visiting or on a journey, packed the towels he found in his bedroom in his portmanteau. And when he returned home the stolen articles were, by *his own directions*, returned to their real owners.

Marc mentions the case of a young lady of rank who was addicted to stealing handkerchiefs, gloves, and the like. She mourned over her propensity, wept, repented, and stole again. There was no symptom of any impairment of intellect.[1] Victor Amadeus, King of Sardinia, was in the habit of stealing objects of little value.[2] And an unpublished case has come under our notice where the propensity to acquire by theft manifested itself only in relation to pins. The case mentioned by Prichard is well known, where the individual would not eat unless the food was stolen, so that his attendant had to humour his appetite by placing his food in a corner, where it seemed hidden, but could be purloined without difficulty.

These and many other cases which might be quoted[3] show that theft may be the only symptom of disease, for surely we are entitled to infer the presence of mental alienation in a case where the motives to theft are so obscure, so unlike those which ordinarily govern the actions of men, as to defy all predication of an individual's action from the ordinary experience of the conduct of mankind. That where a clergyman, who is in every other respect strictly conscientious, who is guided by an earnest desire to comply with the commands of a strict code of duty, steals Bibles, and nothing but Bibles, when he steals them with a view to disseminate religious doctrines, one of the most imperative of which is " Thou shalt not steal," that we should regard such a person as insane with respect to that act seems to us a necessary consequence of thought. That a gentleman of rank and fortune should steal linen from his friends and hotel-keepers, and that subsequent to the theft he should command their return, seems to us sufficient evidence of morbid mental conditions. The relation of such individuals to the civil and criminal law of the country in which they reside is a question which will be considered in a subsequent chapter, and the answer to which may be surmised from what has already been said. But in the mean time we are considering whether there is a marked condition of mind which in its relation to circumstances manifests itself solely in connection with the idea of property, and we are of opinion that the cases quoted above, and those which have been referred to, prove that such is the fact. To show that it may exist as a premonitory symptom of a more serious disease, we may mention the case given

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[1] Marc, vol. ii, p. 254.

[2] Marc, vol. ii, p. 254. See other cases in Marc, p. 355, 262, 264, 255; vol. i, 308.

[3] Several cases given in Gall 'On the Functions of the Brain,' vol. iv, p. 140.

by Fodère.[1] It is that of a servant in his own family, who could not help secretly stealing from himself and others articles even of trifling value. She was, at the same time, modest, intelligent, and religious, and was aware that she did wrong. He placed her in an hospital, considering her insane, and after apparent restoration and a long trial he again took her into his service. Gradually, in spite of herself, the instinct again mastered her, and in the midst of an incessant struggle between her vicious propensity on the one hand and a conscientious horror of her condition on the other, she was suddenly attacked with mania, and died in one of its paroxysms.

A similar case is mentioned by Morel.[2] " I was once able to establish the non-responsibility of a patient who had stolen in church the ornaments and the most insignificant objects of ceremonial, and who presented no other symptom of disease than a marked state of congestion, great self-content, and a silly laugh ; the patient had no delusion, there was only a great intellectual weakness and the most complete indifference as to the fate which justice would award; only three or four months after his acquittal an attack of acute mania with delirium of grandeur, trembling of the tongue, and other symptoms of progressive paralysis, justified my prognostic." And a case is given by Prichard of a gentleman of fortune who resided at Scarborough, and who, amongst other peculiarities, was in the habit of stealing any articles of no value to him, and making little use of them afterwards, who died of general paralysis.

Yet it is necessary clearly to distinguish between such cases and between thefts properly so called. We are far from admitting that every one who steals is a kleptomaniac; we do not even go so far as to assert that every kleptomaniac should be held irresponsible for his thefts; and we assert that in all cases where theft is the sole symptom of the disease the individual should be held, in every respect, responsible for the commission of every other crime except that of larceny.

Several rules may, however, be given for the detection of real disease as the exciting cause of the criminal act. We would caution medical men and other persons who have to deal with such questions from paying too great attention to the existence of some stupidity in the execution of the crime in question as a proof of the existence of insanity. This is too frequently done. People have got into a habit of using the word " insane " upon all occasions which are far from being sufficiently adequate to warrant its use. Folk say of a neighbour, if he does some act which they consider foolish, " He must be mad." And from this somewhat wholesale importation of the word into

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[1] 'Traité de Médecine Légale,' f. i, p. 237. Quoted in ' Ray's Medical Jurisprudence,' p. 129.

[2] 'Traité des Maladies Mentales,' p. 410.

ordinary use the meaning has become somewhat less definite. Because a man leaves a knife with his name upon it lying beside the victim's throat that it has just cut, all the people cry he is insane. Because a man who murders his neighbour appropriates his clothes, and within a few days after the commission of the offence pawns the dead man's property, every self-constituted judge pronounces the man quite mad. Is it not the fact that, unless the criminal did some foolish thing, the commission of the deed never would have been associated in thought with him? Is it not a fact that all the inmates of our prisons indulge, not in repentance of the crimes for which they are incarcerated, but constantly regret some little bungled circumstance in connection with the act on account of which they are undergoing sentence?—not saying, " Would I had never done the deed," as a true man ought to say; but saying, " If I had not left the door open, if I had not dropped my hat, if that man had not heard his screams." But are such circumstances to be taken as a proof of the existence of insanity? There are very few who are not blinded by the rules of what they think a science, who would advance such a proposition. Neither is the association with the crime of one or two unusual circumstances to be regarded as an indication of insanity. An individual of the name of Campbell, who resided in a northern town a good many years ago, was proved to have stolen various articles. It was also proved that the articles had been stolen with the view of supporting a mother, who was entirely dependent upon the exertions of the accused; and, further, it was ascertained that upon one occasion, when crossing the church-yard in the dreary dark of a winter nightfall, while upon his way to commit one of the crimes with which he was charged, and being wholly unconscious that he was observed, he knelt down and prayed earnestly for a blessing on his undertaking. Sympathy was excited —the man stole for his mother, and he prayed to God to bless him while stealing—he must be mad! But, nevertheless, Campbell was hanged. And although the punishment by death for the crime of theft seems to be unwarranted by any law of God, of nature, or of expediency, which ought to guide a legislature, it seems to us that the exemption of the accused from all punishment upon the ground of insanity, as proved by the facts above stated, would have been ill-advised. Many individuals day and night use this great engine, prayer—the lever of the moral world—to hoist them up in the social world. Many people pray night and morning for Heaven's blessing upon acts which every Balaam prophet of our time has declared shall be cursed. What a marvellous revelation it would be if the thoughts that run through men's heads, or well over their lips, when they are on their knees, were made known. Surely a man with a mistaken idea of morality is not to be thought mad. A man who thinks that the end will justify the means, and who prays that the means may

be blessed because the end is worthy of God's blessing, is not to be looked upon as a dement. Neither is it well to decide the question of insanity or crime, as taken in connection with theft, simply upon the fact that the individual has only been in the habit of appropriating one kind of article. When such is the case the question ought to be considered in relation to the individual's capability, so far as opportunities went, to steal any other kind of articles. An old woman, Nickie Frizzel by name, lived in the castle-crowned town of Sterling some fifty years ago. Boys, whose imaginations helped to the conclusion that a crutch and nut-cracker jaws were the truest attributes of a witch, looked upon her as " ower grit wi' the diel." But even friends of the devil must die, and Nickie Frizzel paid her little debt of nature when it was overdue by some years. She died, and her house was searched. Many articles were found in her possession which had come into it by the back door of theft, and not by the front door of purchase. But the fact which excited most curiosity was the discovery of a washing-tub full of " peries," or peg-tops, which had, it was surmised, been stolen from the boys as she passed on her daily rambles. No wonder they thought her a witch ! But the discovery of all these peg-tops does not convince us that Nickie Frizzel was *non compos*. But instead of saying at length who ought not to be looked upon as mad, even though they steal, we had, perhaps, better say who ought to be considered as of unsound mind under such circumstances. The positive is generally a shorter road than the negative in such cases.

1. The means, the position, the rank of the individual, should be taken into consideration. We know that poverty and want are, under ordinary circumstances, incentives to procure food or money in the most accessible way, which for the poor is not unfrequently by theft. If hunger gnaws a man it would be a severe moralist who would censure the appropriation of food. Man seems to have a sort of right to live, as much as he can have a right, when standing in God's presence ; and when that right is menaced by undermining hunger there is at least some excuse for theft. But the law is to prevent theft, and the law properly looks upon want as the most powerful incentive to honest work, and not to dishonest pilfering. Although it should always lead to industry, and not to dishonesty, it does not always do so. The temptation to steal is great. It is so easy, and does not look very wrong ; the man you take from has enough and to spare, and you well-nigh perish with hunger. Thus it is that poverty is a real inducement to commit crime. Sad though it be, it is true ! Now, if we find a man of wealth appropriating to himself some article that, in comparison to his means, is of little value, we are surely warranted in supposing that his motive is somewhat different from that of the man to whom the same article or sum of money would be, as it were, life and that

" chance" which opens the world's door to man. It is certain that motive is to be judged as much by the position of the person wishing, as by the object wished for. What is a crust of bread after a good dinner?—what is it *not* after a long fast? So we say that the position and means of the individual suspected of labouring under kleptomania are to be carefully considered. And not only his social position, but that " position" which is his entire relation to the external world. An old copper coin, utterly valueless to anybody except to a boy, who might take it to play buttons with, would, in the eyes of an antiquary, be, as it were, the nucleus of a hundred pleasant feelings, and in that way have value in his eyes. For, as Shakespeare says,—

"What is ought, but as 'tis valued?"—*Troilus and Cressida.*

In this wide sense of the word position, a man's rank, his circumstances at the time, his relations to the individual stolen from or to any individual who might possibly be suspected of the theft, the circumstances of the theft—for the manifestation of cleverness or skill in the perpetration may be a perfectly healthy motive inducing to the crime—must all be considered. But if, as in one of the above-mentioned cases, an individual steals towels, and no ordinary motive likely to influence him individually or a healthy person circumstanced as he is, can be discovered, there is a strong probability that the individual stole in consequence of disease.

2. The value of the article taken should be ascertained. In many cases of true kleptomania the value of the article stolen does not seem to be of much importance. To the true thief the value is all important. Before going further, we would say that these tests altogether form a net which will catch the thief and allow the insane to go. Not one of these will alone be sufficient to decide the question of sanity or insanity, and in many instances they may altogether fail. With regard to the value, the case[1] of the lady who only took pins and concealed them in the hem of her dress is certainly illustrative. And we may refer the readers to the case of L. H—, mentioned in an earlier part of this work, and to the case of the lady who stole bread, which we quoted on the authority of Dr. Rush, as further showing that in very many cases the mere morbid desire to become possessed of something is so strong as to make the choice of the article according to the ordinary standard of value a matter of no importance. It is strange that the morbid desire to acquire should in many cases be limited so as to operate only in relation to one class of objects. But we generally find, if we chose to seek, the type of the same law in the manifestations of disease that are to be found in the actions which are the ordinary outcome of a state of health. Men's desires always " clot," as it were. They live in the

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[1] 'Reports Crichton Institution.'

light of gratification and they grow to that light. Men's desires have to be cut by the cloth the world gives them, and resignation is the obsequy of desire. We have to go without many things we want, and the inevitable is a good argument against us beating ourselves against the immovable bars. But education and birth, and all a man's circumstances, shape a man's desires until his mind is like an island with many long peninsulas running from it, one seeking the south with its summer and flowers, the other the north with its fierce winds and dreary snows. Men's minds, in so far as desire is concerned, differ infinitely. One man wants fame, another money, another love. One longs for a life in town, another for a life in the country. And so, as we narrow the sphere, one man will read no books that have not to do with the absolute, while another will read nothing but tales of how bad people were converted and turned out of the broad path into the narrow one. One man will have nothing but diaper-patterns for his carpet, while another glories to be walking over worsted flowers and ferns. If such limitations are compatible with health, we should expect in many cases to find still narrower pursuits under the influence of disease. If men who have the means to collect many things concerning which human interest might be felt, but devote themselves to the collection of postage stamps, why should we wonder that others, under the influence of disease, while the propensity to thieve gives them the means of obtaining many things, the possession of which is fraught with pleasure, should have all their energies directed to the acquisition of pins or table-cloths ?[1]

3. The precautions taken by the individual will occasionally throw light upon the question as to whether disease is present or not. Some kleptomaniacs steal openly. They make no attempt at concealment. But cases do occur where much ingenuity is manifested upon the part of the individual to conceal the act from the knowledge of others. The occasions of the theft will have some bearing on the question in connection with the history of the individual, the probability of insanity as judging from the existence or non-existence of predisposing and exciting causes. Gall met with four examples of women who when pregnant stole, or were impelled to steal, and who were perfectly honest at other times. The precautions taken to avoid suspicion are, however, often indicative of the presence rather of moral turpitude than of moral insanity.

4. Very frequently the kleptomaniac is not unwilling to avow the act. Many confess that they know that what they are doing is wrong, but say that they have a mad longing to possess themselves of everything they see.[2] Some plead inability to resist the temptation to steal when

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[1] Marc, vol. ii, p. 355, mentions the case of a medical man whose kleptomania was manifested in stealing table-cloths and nothing else.

[2] Marc, vol. i, pp. 275—303.

they see certain articles, and make no attempt at denial. And in connection with such confessions, we may often find the individual restoring the stolen goods to the real owner. When such restitution takes place without the presence of motives which would influence an ordinary man, such as probability of detection or the like, it is very strong corroborative evidence of the hypothesis that the original taking was due to disease. The number of thefts, the conduct, and the circumstances of the individual upon each occasion, ought not to be disregarded in the consideration of any case.

5. With regard to the conduct of the individual subsequent to the acquisition of the stolen article, the assertion that in many cases they make no manner of use of the property acquired may be taken as a rule. Kleptomaniacs very frequently seem to find the satisfaction of their morbid desires in the simple act of taking, and often throw away or disregard the article when actually possessed of it. In this they resemble children. The love of acquiring in the young outruns the knowledge of how to utilise an article when acquired. And so it is with many lunatics. When the article is not cast away or disregarded by the kleptomaniac, it will almost invariably be hoarded. And when neither of these courses of action are taken, but the individual proceeds to use it as it ought to be used, proceeds to derive the pleasure from it it was meant to minister, there is some cause to be careful in believing in the existence of kleptomania. Another circumstance which will assist the medical jurist in deciding whether the act belongs to the category of crime or disease is the existence or the non-existence of conspiracy, or a plan between the kleptomaniac and another person to steal together. Such a conspiracy to steal is common among sane persons, but does not exist amongst insane persons as a symptom of their insanity. There was once an idea that the insane could not combine to do any act, that they could not conspire together for good or evil. We believe, however, that such an idea is not borne out by the facts, and that insane persons do conspire to do certain acts, but *quoad* those acts they are sane, and for those acts they ought to be held responsible.

6. A curious fact has been observed in connection with the diseased propensity to acquire, viz. that in many instances it is felt only in relation to bright or glittering objects. People steal things that glitter. This rule is, however, by no means invariable. The analogue of such a propensity is to be found in certain birds. Every one knows the old story of the maid and the magpie—how the bird took the spoon, and the maid was suspected of theft. And few persons have not laughed over Ingoldsby's "Little Jackdaw of Rheims." We suspect that the individual who took and retained common pins must have had the diseased desire for the brightness. And in a very instructive case mentioned by Casper, to which we shall again have occasion to refer, the lady during her pregnancy had

an irresistible desire to possess shining objects, especially those of new silver. Other cases of the same kind might be mentioned. We need not again call attention to the fact that the history of the case must be carefully considered. Cases are on record where moral insanity has been ascribed to the injury of the head by the instruments which were used in the accouchement. And in the ' Journal de Paris,' March 29th, 1816 (it is a case often quoted), the following paragraph appeared :—" An ex-commissioner of police at Toulouse Beau-Consiel has been condemned to eight years' confinement and hard labour and to the pillory, for having while in office stolen some pieces of plate from an inn. The accused persisted to the last in an odd kind of defence ; he did not deny the crime, but attributed it to mental derangement produced by wounds he had received at Marseilles in 1815."

We will only in this place add a very few words. Kleptomania is by no means common. The ' Times' upon one occasion said, " Every one who is acquainted with London society could at once furnish a dozen names of ladies who have been notorious for abstracting articles of trifling value from the shops where they habitually dealt." This, it appears to us, is an exaggeration. However, that there are true cases of theft madness, in which neither delusion nor imbecility is connected with the desire to acquire, we are bound to admit. And the question for us here is, how are such persons to be dealt with when they come before our criminal courts ? And we have only again to repeat the recommendation that, if the individual is charged with any other crime than theft, the insane propensity to steal should not be regarded as a bar to punishment. It may be said that incarceration in a prison may aggravate the disease under which they labour, and it may be so, but that ought to make such individuals more careful not to commit such acts as may bring them into circumstances not compatible with health. If the individual is charged with theft, and it can be shown that he was in a condition to be deterred by the fear of punishment ; if, for instance, it is shown that it was the advantageous circumstances which tempted him to commit the crime ; if he can be shown to be, even with regard to his diseased propensity, under the influence of ordinary motives, he ought to be held responsible for his acts. If, on the other hand, he is not in a position to weigh motives, and if his incapacity is due to disease, if no ordinary circumstances induced to the theft, as no ordinary circumstances could have restrained him from its commission, he ought to be regarded as irresponsible, and ought to be exempted from any punishment.

The case above alluded to as reported by Casper will be of some importance in this connection.

Madame de X— had committed thefts in three goldsmiths' shops during her pregnancy. She had after her accouchement con-

fessed to her husband that she had during her pregnancy had an irresistible desire to possess herself of shining objects. She confessed to having taken objects from shops, and declared that on one occasion when she went to return the goods she had been restrained from so doing by the belief that the articles were her own. Much evidence was given which went to prove the existence of mental aberration. Casper was referred to, and he concluded that the diseased propensity of Madame de X— was not irresistible, that she had not been compelled to commit the three thefts in spite of herself, and they were criminal actions for which she was responsible, and he gave as reasons :—1. That although the accused had besought her husband not to take her to those places where shining objects were to be seen, she went to goldsmiths' shops of her own accord, and without any necessity for so doing. 2. That she paid away silver. 3. That she broke up the objects she stole in order that they might not be recognised and in that way lead to her detection. 4. She had not gone to the same goldsmith's shop twice. 5. She had concealed her conduct from her husband. 6. And when she was interrogated had made many false and contradictory statements. Looking at all the circumstances of the case, we cannot but think that the medical jurist's decision was in accordance with sound principles of law and medicine.

Chronicle of Medical Science.

REPORT ON MATERIA MEDICA AND THERAPEUTICS.

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Bloodletting as a Therapeutical Resource in Obstetric Medicine. By FORDYCE BARKER, M.D., Professor of Midwifery and Diseases of Women in the Belle Vue Hospital, New York.—Dr. Barker commences his paper by remarking, as an amusing commentary on the change of practice observable among the profession of late years, that he was unable to obtain a lancet at one of the best instrument maker's in New York, as there was no such instrument in the shop. He proceeds to show that, thirty years ago, the standard authors on obstetrics, both in Great Britain and America, recommended bloodletting in certain conditions connected with the puerperal state, and even during parturition itself under some circumstances. It used to be considered essentially valuable in the treatment of all the postpartum inflammations, and some considered it useful even in phlegmasia dolens and puerperal mania. Bleeding being now almost, if not entirely, discontinued in obstetric practice, Dr. Barker asks whether our predecessors were all wrong or the recent practice is all right ? and his own opinion is, that bloodletting has been unduly neglected of late, both by himself and others. He then proceeds to discuss the efficacy of bloodletting, under the three heads of the Diseases of Pregnancy, the Complications of Labour, and the Puerperal Diseases. As to the diseases of pregnancy, the doctrine of plethora predominated thirty years ago, and most of the alarming symptoms sometimes observed during gestation were attributed to that condition, but of late an opposite view has prevailed, and the functional disorders of pregnant women have been attributed to an impoverished condition of the blood. But while admitting the truth of this latter view to a very great extent, Dr. Barker still thinks that there are cases of local congestion, as, for instance, of the kidneys, which might be relieved by moderate venesection, followed, perhaps, by the use of iron and tonics. In support of his present opinions, Dr. Barker refers to some cases attended by himself, in one of which relief was decidedly afforded by a timely bloodletting, and in another the neglect of that measure was apparently the cause of a fatal result. In parturition itself bloodletting is now very rarely

performed, but still the measure may be adopted where there is great fulness of the vascular system, and it is of cardinal importance where convulsions are threatened, or where they result from uræmia. Dr. Barker agrees with Dr. Richardson, that in cases of uræmic poisoning, when the coma is fully developed, the patient is unconscious, the skin hot, the convulsion strong, and the suppression of urine nearly perfect, there is no remedy so swift, sure, and useful as the lancet. As regards post-partum inflammations, the therapeutical indications are to prevent or arrest the progress, or to remove the results of the inflammatory process, and Dr. Barker regrets that he has of late neglected the practice of bloodletting in endeavouring to accomplish these objects. But he admits that the exact value of this treatment of post-partum inflammation is by no means determined. While approving, in general, the treatment of puerperal mania by stimulants and sedatives, Dr. Barker nevertheless thinks that, in certain very rare forms of the disease, bloodletting may be of the greatest service, and he adduces a remarkable case from his own practice in confirmation of his opinion. The patient, a young lady, was violently delirious, and exhibited great muscular power. The quantity of blood taken was estimated at fifty ounces, and the convalescence was rapid and the cure complete.

The reading of this paper at the meeting of the Medical Society of the County of New York in December last was followed by an interesting discussion, in which some distinguished American physicians took part. One gentleman, who had been twenty-nine years in practice, and had observed all the changes of opinions on the subject of bloodletting, declared himself an advocate of the judicious employment of venesection. Dr. F. D. Lente thought that the time was arrived when the question as to the efficacy of bloodletting should be reopened, and he stated that, in an obstetric practice of twenty years, he had seen many cases benefited by that measure, but, on the other hand, he had found other remedies quite as efficacious. as, for instance, veratrum viride, which was little inferior to bloodletting in reducing the pulse and the temperature. Another speaker, whose experience had been gained within the last fifteen years, had never seen bleeding performed, and he doubted whether it was ever necessary. Dr. Austin Flint, who spoke on the subject of bloodletting generally, and not merely in its relation to obstetric practice, advocated the judicious employment of bloodletting. His own experience extended over more than thirty years, and in the early part of his professional career he had not only opposed bloodletting, but he had written an essay against it. Of late years, however, he had modified his youthful opinions, and he felt sure that the lancet would again find its place in the medical armamentarium, but the question would always arise as to the indications or contra-indications for its use. Bloodletting presented this advantage over all other remedies allied to it in their action, that it was prompt in its effects, and this was an important point where certain cases of extreme and pressing danger presented themselves, as, for instance, a case of acute laryngitis. On the whole, the opinion of a majority of the meeting

seemed to be in favour of moderate and judicious bloodletting.—
New York Medical Journal, January, 1871.

On the Stimulating Effect of Digitalis in Heart Disease.   By
B. D. TAYLOR, M.D., Belle Vue Hospital, New York.—Dr. Taylor
has published a case to illustrate the value of digitalis as a prompt
and efficient remedy when given freely in cases of sudden cyanosis
and syncope resulting from extensive heart disease.   The tonic action
of the drug when given for a considerable time in heart disease is well
known, but the present case shows its effect in restoring power and
regularity almost instantaneously to a feeble heart.   The patient was
suffering under extensive disease of the aortic and mitral valves,
and recovery was not expected, but still the result seems to show
that even under such circumstances life may be prolonged, and ex-
istence be made comparatively comfortable, by using digitalis as a
combined stimulant and tonic to the heart's action.   The woman had
had an attack of articular rheumatism and consecutive heart disease,
and when she was admitted into the Belle Vue Hospital she was
suffering also from congestion of the lungs.   One night Dr. Taylor
was called to see her when she was gasping for breath, with feeble
pulse, purple face, and irregular and confused action of the heart.
Alcoholic stimulants were administered without relief, but on the tinc-
ture of digitalis being given in the dose of thirty minims the pulse
increased, the action of the heart became regular, and the dyspnœa
was relieved.   The digitalis was continued in doses of ten minims
every two hours, but with iron and quinine in addition.   Another
similar attack was relieved by two doses of the tincture consisting
of thirty minims each, and in a subsequent seizure of a still more
severe character, the use of digitalis seemed to be beneficial, but the
patient eventually sank.—*Ibid.*, November, 1870.

On the Administration of Ammonia by Inhalation.   By J. H. H.
LEWELLIN, M.R.C.S., of Australia.—The idea of administering am-
monia by inhalation occurred to Mr. Lewellin in the following
manner: He was called to see a patient who had been a hard drinker,
and who had had a fit, followed by epistaxis and subsequent syncope.
Mr. Lewellin thought the patient was dead, owing to his cadaverous
appearance, and was preparing to inject some ammonia into the
veins, as the power of swallowing seemed to be lost, when the thought
struck him that the ammonia might be introduced by the pulmonary
system, if the patient would inhale, as well as by the injection into
the veins.   He accordingly poured some liquor ammoniæ fortis on a
handkerchief and applied it in the same way as chloroform is admi-
nistered.   The effect was immediate, and the pulse, which was before
imperceptible, was now distinctly felt.   In about twenty minutes
after the commencement of the inhalation the patient opened his
eyes and stared about him, and then fell back on his pillow and
appeared dead, but on recommencing the inhalation he again re-
vived. Mr. Lewellin, now fearing that bronchial irritation would
ensue, discontinued the inhalation, but was compelled to resume
it in consequence of the tendency to fainting.   After about three

hours' inhalation the patient began to be sensible of the smell of ammonia. He inhaled altogether between twelve and fourteen drachms of liquor ammoniæ fortis in four hours. He eventually recovered without any bad symptoms. Mr. Lewellin used the same agent in another case which was one of anæmia from excessive flooding, and was again successful. He suggests that when this method is adopted some precaution should be taken to prevent the vapour of ammonia from entering the nares, at the same time leaving those openings free.—*Australian Medical Gazette*, September, 1870.

On the Effect of Iodine in Passive Congestions. By Dr. J. B. SCHMITT, of Münstermaifeld.—Dr. Schmitt adduces a number of cases of illness in which he employed iodine with the most satisfactory results. In all these cases passive congestion very probably lay at the foundation of hæmorrhage, and this appeared to be the indication for the use of iodine. One of the cases was that of a female, who was chlorotic and suffered from nervous headaches, and whose menses returned every fortnight accompanied by depressing diarrhœa. After all ordinary remedies had been employed without effect for seven years, iodine was given every two hours in the form of pill, and in the dose of six milligrammes (a milligramme is $\frac{1}{1000}$th of fifteen grains). There was very soon a decided improvement in the symptoms, and the diarrhœa also ceased. The use of the iodine was continued for a considerable time, and the menses returned only every four weeks and the patient was cured. When the inconvenience appeared likely to return it was prevented by the use of the iodine. In other cases of profuse menstruation, Dr. Schmitt employed the remedy with equal success, as also in giddiness, headache, and epistaxis resulting from anæmia. He thinks that small doses are more useful than large ones, a drop of the tincture being a sufficient dose. He found iodine especially serviceable in some cases of diarrhœa which appeared to depend upon paralysis of the ganglionic nerves, and in cholera, the cause of which is, perhaps, to be sought in this lesion. (Reference is made to the experiments of Samuel, who found, after extirpation of the solar plexus, great congestion of blood in the intestinal mucous membrane, and a decidedly increased secretion in the intestines.)— *Schmidt's Jahrbücher der Gesammten Medicin*, December, 1870.

On the Use of Atropia in Eclampsia (Puerperal Convulsions). By Dr. MILESI, of Vilminore.—Dr. Milesi having obtained three years ago a successful result in a case of eclampsia, by the use of atropia, he employed the remedy in another case more recently and with the same success. He gives the details, by which it appears that the patient was attacked a few hours after her confinement with convulsions, which were repeated at intervals of about an hour between them, and she had also severe headache. Dr. Milesi bled her and took away a pound of blood, after which she said that her head was better; but the pain soon returned, and leeches were applied to

the head. The convulsions, however, continued as frequently and as violently as before, and coma supervened. Dr. Milesi finding that the antiphlogistic treatment was of no avail, prescribed an injection of atropia dissolved in water by means of alcohol, the proportions being 3 centigrammes of atropia in 280 grammes of water (a gramme is about 15 grains) to be divided into four injections. The convulsions and coma still continued, but the convulsions were at less frequent intervals and of shorter duration, and eventually the patient quite recovered, although it should be mentioned that Dr. Milesi bled her again to the extent of a pound of blood. This is the same patient who had been treated by atropia for the same disease by Dr. Milesi on a previous occasion. Dr. Milesi, in summing up the particulars of the treatment and its results, doubts the utility of bloodletting in puerperal convulsions, and considers atropia as a powerful and efficacious remedy in relieving the paroxysms.—*L'Imparziale, Firenze,* 16 Luglio, 1870.

On the Use of Oxygen in Dyspnœa. By Dr. ANDREW H. SMITH, of New York.—In answer to the question why dyspnœa is sometimes relieved by oxygen, while in other cases in which the obstruction to respiration appears no greater the same relief is not obtained, Dr. Smith replies that in ordinary respiration the blood is very nearly saturated with oxygen, and that inhaling an atmosphere ever so highly charged with it will not add very greatly to the quantity absorbed. If there be a partial obstruction of the air-passages, leaving the air-cells intact, then, by adding to the inspired air sufficient oxygen to supply the deficiency of that element, the normal respiratory conditions are very nearly restored. Thus if the volume of air entering the lungs is reduced to one half the normal amount, and the per centage of oxygen which that half contains be doubled, then the normal quantity of oxygen comes into contact with the normal quantity of blood. But if, instead of a partial obstruction of the tubes, one half of the air-cells is blocked up by exudation, a different result ensues, for although the patient may be made to breathe the normal quantity of oxygen, that element acts only on half the amount of blood; and as the absorbing power of the blood is limited, the aëration of that fluid remains imperfect. Dr. Smith adduces two cases in illustration of his views, in both of which oxygen was administered, but in the first case the result was favorable, and in the second it was fatal. The first was a case of capillary bronchitis, in which, of course, the tubes were partially obstructed by accumulated mucus, but allowed a certain amount of air to pass; the second case was one of pneumonia, the air-cells of one lung being entirely filled by exudation. The air-tubes in this latter case were indeed unobstructed, but the little blood that circulated through the lung was shut off from all contact with the atmosphere, and the system failed to receive sufficient oxygen for the support of life.—*Medical Gazette of New York,* January 14, 1871.)

On the Action of Essences and Flowers in the production of Atmospheric Ozone and on their Hygienic Utility. By Professor PAOLO

Mantegazza, of Pavia.—Professor Mantegazza records a series of experiments made by himself on the production of ozone by the action of essences and flowers, the essences including such substances as eau de Cologne, extract of millefleurs, essence of turpentine, camphor, essence of lavender, &c., and the flowers including jonquils, mignonette, hyacinths, &c. The Professor regards the experiments of Schönbein upon the deodorizing properties of ozone as decisive, and as he proves that essences and flowers have the property of developing ozone, he considers that essences and flowers are also deodorizing agents, and probably therefore disinfectant. Dr. Mantegazza deduces, as the results of his investigations, the following conclusions, namely, that various essences, such as those above mentioned, when in contact with light and atmospheric oxygen, developed a very large quantity of ozone, equal or superior to that obtained with phosphorus, electricity, or the decomposition of permanganate of potash; that odoriferous flowers also develope ozone, but that no inodorous flowers develope any, and therefore it would appear that the ozonogenic properties of flowers reside in their essences, the most odoriferous giving the largest amount of ozone. The property of essences and flowers in developing ozone, and thereby acting as disinfectants, leads him to recommend the use of these agents in marshy countries and in places infected with miasmatic animal exhalations; and he suggests that persons who live in such situations should surround their houses with odoriferous trees, shrubs and flowers, and perfume themselves with odoriferous essences.—*Il laboratorio di Patologia Sperimentale di Pavia,* 1870.

On the Therapeutical Use of a new Indian Remedy, the Ailantus Excelsa. By Mr. Narayan Daji, of Bombay.—The *Ailantus excelsa,* belonging to the natural order of Simarubaceæ, is a large tree, indigenous to India and Ceylon. The medicinal part is the bark, which is stripped off the tree in long flat pieces, and is denuded of its epidermis. The active principle, according to the researches of Mr. Daji, appears to be an uncrystallizable bitter substance in combination with various bases and other matters, and the medicinal virtues of the bark depend entirely upon an azotized principle of an acid nature, to which the author proposes to give the name of *ailantic acid.* This acid is of a waxy consistence, of a reddish-brown colour, deliquescent, very soluble in water, uncrystallizable, and of a purely bitter taste. As the tree belongs to the order of Simarubaceæ, to which the Picræna excelsa or Jamaica Quassia tree also belongs, it may be inferred that it possesses the characteristic properties of that order, and such is, in fact, found to be the case. The Indian tree is the representative in the East of the quassia in the West. The ailantic acid, given in doses of from one to three grains, acts as a tonic and stomachic, exciting the appetite and promoting digestion. It is therefore useful in cases of atonic dyspepsia accompanied with loss of appetite, and Mr. Daji states that he has found it serviceable also in diarrhœa and cholera, and in remittent and intermittent fevers, although its anti-periodic powers are not trust-

worthy. The Ailantus bark may be prescribed in the form of decoction, infusion, extract, or tincture. The dose of the decoction is from one to two fluid ounces, twice or thrice a day ; that of the infusion is the same ; the dose of the tincture is from half a drachm to two fluid drachms ; and that of the extract is from three to five grains.—*Asiatic Press of Bombay*, 1870.

On the Febrifuge Properties of the Eucalyptus Globulus. By F. W. LORINSER, C. HALLER, SEITZ, BUCHNER, C. PAUL, and GUBLER.—Dr. Lorinser has raised several plants from the seeds of the *Eucalyptus globulus*, a tree of New Holland, but often cultivated in Spain, in consequence of the febrifuge properties of its leaves. By digesting the leaves in spirit of wine he obtained a tincture, which he gave to two patients suffering from fever, in the dose of a teaspoonful night and morning. The paroxysms of fever were diminished at first, and afterwards ceased altogether. Dr. Lorinser then requested some physicians to institute experiments with this tincture in cases of intermittent fever in Germany, occurring near some great rivers. The results appear to have been very satisfactory, for out of fifty-three patients forty-three were perfectly cured, and of the others, whose cases were not so satisfactory, some proved not to be instances of intermittent fever at all. In some of the cases relapses occurred, but they again yielded to the use of the tincture. Dr. Haller employed the tincture of the Eucalyptus in some quotidian and tertian fevers, but does not seem to have had so much success as was expected. Professor Seitz also employed the tincture, without much success in Munich, but, nevertheless, he thinks that the Eucalyptus may be more beneficial in southern districts, where the trees are larger, and the leaves more numerous, more deeply coloured, and more aromatic. Buchner has examined chemically the leaves of the tree grown in Munich, and has found in them an oil similar in smell and taste to cajeput oil from the Melaleuca, which is closely related to the genus Eucalyptus. He also found in the leaves some tannic acid, a bitter principle, and a bitter-sweet matter, something like dulcamarin. The leaves when carefully dried by a gentle heat seem to lose nothing of their properties, and after several months they tasted and smelt as aromatic as when they were fresh. According to Paul and Gubler, the powdered leaves of the tree are beneficial in bronchitis.—*Schmidt's Jahrbücher der Gesammten Medicin*, October, 1870.

On Chloride of Ammonium as a specific Therapeutic Agent in the Treatment of Hepatitis and Abscess of the Liver. By Dr. STEWART, of the Royal British Fusiliers.—Dr. Stewart observes that, although chloride of ammonium has been for some time employed and valued by the Germans and the French in the treatment of diseases in which mercury and other alterative deobstruents are indicated, yet he has never found the salt particularly mentioned in relation to the treatment of hepatitis and abscess of the liver. After numerous and careful trials he now recommends the drug almost as a specific in

such cases, and he states, moreover, that he has found it very serviceable in all cases of hepatic disease whatever, whether depending on organic disease or on functional derangement. The proper period for the exhibition of the remedy is after the abatement of acute symptoms, and when diaphoresis has been freely established, and it should then be administered in doses of twenty grains night and morning. About fifteen minutes after the chloride has been taken a sensation of warmth is experienced at the epigastrium, which gradually spreads over the whole surface of the skin. The patient at the same time says that he feels "light-headed." In cases of hepatitis the pain is either removed to a point higher up than the liver or is entirely relieved. Dr. Stewart gives a history of a number of cases, and shows that, during a nine months' trial of the salt, out of a total of thirty-one, not one was followed by a fatal result. He also highly recommends the chloride in cases of chronic dysentery, and advises the continuance of its administration for some time after the disappearance of acute symptoms.—From the *British Burma Press*, Rangoon, 1870.

On the Value of Opium in the Treatment of Rheumatism. By Robert Knaggs, M.R.C.S.E., of Melbourne.—Mr. Knaggs having more than forty years ago suffered from a very painful attack of acute rheumatism, which was aggravated rather than relieved by bleeding, determined to try the effect of opium in this disease, as recommended by Dr. (now Sir Dominic) Corrigan. He has had abundant opportunities of testing the value of the remedy of late, as rheumatism has been very prevalent for many years in Victoria, and, indeed, in the Australian continent, owing to an unusual prevalence and long duration of wet and cold in that portion of the globe. In cases of rheumatism attacking chiefly the smaller joints, and approximating in character to gout, colchicum is especially useful, though even in such cases Mr. Knaggs finds it advantageous to add morphia for the relief of pain. But in rheumatism involving the larger joints, attended with severe pain, copious sweating, high fever, loaded tongue, and strong and quick pulse, he has never found any benefit from the use of colchicum, and, on the other hand, he has found opium of the highest value, shortening the duration of the disease from a period of six or seven weeks to an average of ten or twelve days, preserving the constitutional powers, and preventing the cardiac complications. The dose of opium must be determined by the severity of the pain and the effects produced by the remedy, but Mr. Knaggs usually commences with a pill containing a grain or a grain and a half every three or four hours; and if in twelve hours no decided improvement is observed he raises the dose to two grains, and so on until three or even four grains is the dose administered. The last-named dose, however, is very exceptional, and is seldom required.—*Australian Medical Gazette*, October, 1870.

On the Therapeutical Employment of the Sulpho-Carbolates. By Dr. A. E. Sansom, of London.—The sulpho-carbolic acid was first

prepared by Mr. Crookes, and Dr. Sansom has procured sulpho-carbolates of most of the alkalies, alkaline earths, and metals, and he has studied the chemical and therapeutical characters of these compounds. He prepares the sulpho-carbolic acid itself by liquefying, by the aid of heat, carbolic acid with strong sulphuric acid, the results being the evolution of heat and the production of a syrupy liquid, which after a time becomes crystalline. Salts are obtained by neutralizing this liquid sulpho-carbolic acid with equivalent weights of various bases. The sulpho-carbolate of sodium appears to have yielded Dr. Sansom the most satisfactory results. He has employed it abundantly in the diseases of children, and has found it very efficacious in the treatment of thrush, and also of stomatitis, which has lately been very prevalent in London. He has found it useful, also, in follicular inflammation and ulceration of the tonsils, accompanied with pyrexia, and sometimes even with sloughs. In eighteen cases of scarlatina in which the sulpho-carbolate was administered the recovery was very rapid, the throat signs becoming speedily alleviated and the pyrexia diminished. Dr. Sansom has likewise made an extended trial of this sulpho-carbolate upon phthisical patients at the Chest Hospital, of which he is one of the physicians, and he thinks the results very satisfactory. He states, however, that in most of the cases cod-liver oil was given in addition. Among the sulpho-carbolates of the alkaline earths Dr. Sansom considers that of calcium to be the most interesting. He has employed it in twenty-six cases of rachitis, in which he believes it to be most useful, and the results have justified his anticipations. The usual dose for young children of one to two years old was five grains. Dr. Sansom has also obtained sulpho-carbolates of iron, copper, and zinc, but the iron salt is the only one he has administered internally. He does not, however, consider that the sulpho-carbolate of iron is superior in its operation to the other salts of iron, and, so far as the special influence of sulpho-carbolic acid is concerned, he thinks that the sodium salt is the most efficacious.—*British Medical Journal*, December 24th, 1870.

On the Use of Mercury and Iodide of Potassium in Syphilis of the Nervous System. By Dr. E. L. KEYES, of New York City.— Dr. Keyes, whose paper is founded on cases attended by Professor Van Buren, gives the particulars of thirty-four instances of syphilis of the nervous system, including hemiplegia, paraplegia, epilepsy, facial paralysis, paralysis of special muscles, and mental derangement. It should be stated that Dr. Keyes indicates as "syphilis of the nervous system" an effect upon the nervous system caused by the introduction of the syphilitic poison, but unaccompanied by any visible lesion of the nervous matter. Most of the cases he adduces are, however, imperfect, because many of them recovered, and in those which ended fatally the post-mortem appearances are not recorded ; but still he brings forward sufficient evidence to prove that severe nervous phenomena are often produced by the poison of syphilis, of which no visible signs can be found after death.

Dr. Keyes discusses the question whether any physical change is wrought in the nervous tissue by the poison of syphilis, or whether the symptoms are due to some subtle principle in the blood which has not been detected, or whether, admitting some lesion to have occurred, it may not have been removed during life; but he does not give any very definite answer to his own questions, beyond suggesting that the probable pathology of nervous syphilis consists in congestion or actual inflammation in the form of what he terms *pachymeningitis,* by which he probably designates an inflammation of the cerebro-spinal membranes attended by some amount of thickening. Dr. Keyes points out what he considers to be the diagnostic marks of nervous syphilis, among which are the transient character of the paralytic or other seizures, and mydriasis occurring either in the eye of the affected side or in the other eye, without any disease of the eye itself. Some of Dr. Keyes's cases are very striking, and the effects of the iodide of potassium as a remedy are very remarkable. In one the patient had distinct symptoms referable to a syphilitic attack, for which he had been treated successfully by the iodide in large doses, as much as ninety grains a day being prescribed and continued for a considerable period. But some time afterwards he was seized with a series of severe nervous symptoms, including delirium, epileptiform convulsions, and blindness. Morphia, chloral and chloroform were given without material relief, until iodide of potassium was commenced in half-drachm doses every two hours, alternating with a little chloral. In twenty-four hours some improvement was perceptible, and gradually all the unfavorable symptoms, including the blindness, disappeared, and the dose of the iodide was reduced to ninety grains a day, at which it stood at the date of the report. In his general remarks on treatment Dr. Keyes expresses his opinion that mercury and iodine are both efficacious in the nervous manifestations of syphilis. In the case of iodide of potassium he regards the effects it produces, in some instances, as little short of miraculous. He recommends large doses of this salt, the only indication to leave off increasing the dose being the arrest of the symptoms. In one case, where the disease was inveterate, and the relapses frequent, no less than one ounce a day was administered in four two-drachm doses, and continued for six weeks. When mercury is used, Dr. Keyes thinks that it should not be pushed to salivation, but continued in small doses, short of causing ptyalism. It should be noticed that different constitutions are differently affected by the iodide of potassium, as they are by mercury. Five-grain doses of the iodide may sometimes produce violent symptoms of iodism, while in other cases an ounce daily may only give rise to acne. This salt should always be given largely diluted with water, and never, if it can be avoided, upon an entirely empty stomach.— *New York Medical Journal,* November, 1870.

On the Use of the Calabar Bean in Tetanus. By Dr. D. C. BLACK, of Glasgow.—Dr. Black records a case of tetanus in which the Calabar bean was employed, and, although the case proved fatal, he

thinks that the physiological properties of the bean render its use admissible.   The patient was a boy, aged eleven, who had sustained an injury to the right foot, followed by an epileptiform seizure, but which Dr. Black found to be due to an attack of tetanus.   He applied poultices, saturated with laudanum, to the wound, and ordered the internal use of the calabar bean—four grains of the extract being dissolved in an ounce of water, and twenty drops of the solution being given as a dose every hour.   There seemed at first to be some abatement of the violence of the paroxysms, but the improvement did not continue, and larger doses of the bean were given together with morphia, but without any good result, for the patient died about a fortnight after the injury to the foot.—*British Medical Journal*, March 4th, 1871.

On Carbolic Acid as a Remedy for Carbuncle.   By Dr. J. C. Nott, of New York.—Dr. Nott, having failed in treating carbuncle successfully by the ordinary methods, was induced to try carbolic acid in one of his cases, but without any sanguine expectation of a very favourable result.   He made a deep incision into the carbuncle, and stuffed the wound with cotton, saturated with pure carbolic acid, and he also painted the whole surface of the hardened mass with the acid.   There was pain at first, but it soon ceased, and the patient never complained of any afterwards.   The acid was inserted into the wound every day for a week, and the surrounding inflammation and induration rapidly subsided, till there was nothing to treat except a small open wound, which soon healed.   Dr. Nott thinks that there was more than a mere caustic action exerted by the acid in this case, for although he had used incisions and caustics very often before, he had never seen such a real abortion of a carbuncle.—*New York Medical Journal*, January, 1871.

On the Therapeutical Uses of Iodoform.   By Dr. Styles Kennedy, of Delaware.—Dr. Kennedy states that iodoform, used therapeutically, is alterative, nervine, sorbefacient, antiperiodic, and anæsthetic. As an alterative, it acts with more rapidity than other medicines of a like class, in doses of one, two, or three grains, three times a day. It is prompt and efficient in its action as a nervine tonic, and speedily subdues pain.   Its sorbefacient properties are manifested rather slowly.   It is a powerful anti-periodic in doses of five to seven grains. It is useful as a local anæsthetic.   It is rapidly absorbed into the blood, but accumulative effects have not been observed.   It is destitute of any local irritant action, in which it differs from other preparations of iodine.   Dr. Kennedy thinks that it may be administered, with reasonable expectation of success, in the following cases, viz., neuralgia of every kind, chronic rheumatism, scrofula, syphilis, chronic skin diseases, and in many other cases where a powerful alterative agent is required.   This quality is greatly enhanced, in Dr. Kennedy's opinion, by the addition of pure iron (ferrum redactum, B. P.).—*New York Medical Journal*, November, 1870.

On the Present Aspect of the Antiseptic System of Treatment in Surgery. By Professor LISTER.—A case lately occurred in Professor Lister's practice of a young man who had sustained a fracture of the ulna and a dislocation of the upper end of the radius. The case had been at first mistaken, and when it came under Professor Lister's observation the dislocation was unreduced, and the broken ends of the ulna had united at an obtuse angle, so that the limb was practically almost useless. It therefore became necessary to break the ulna again, with a view to make the forearm straight and to reduce the dislocation. The steps taken for this object were materially promoted by the employment of the antiseptic treatment. The skin was first washed with a watery solution of carbolic acid, in order, Mr. Lister observes, to destroy all putrefactive particles in the epidermis and hair-follicles, and then an incision was made while an assistant threw over the part a cloud of spray of carbolic acid by means of Richardson's apparatus. The newly united bone was broken through by means of a pair of strong bone-pliers, smeared with an oily solution of the carbolic acid, and as it was still impossible to reduce the dislocation of the head of the radius, this part was removed at the neck of the bone by means of the pliers, again smeared with oil, and the parts concerned in the operation being kept bathed in a cloud of spray. A folded cloth dipped in solution of the acid was first laid upon the wound, and the whole of the limb was then enveloped in lac plaster, the cloth having been previously removed. The dressings were changed the next day, and again two days afterwards, the coagulated blood being removed, and the carbolic acid was again applied, but now the dressings were left untouched for four days, at the end of which there was no pus at either of the wounds, and healing was going on under a scab. " In other words," says Mr. Lister, " putrefaction being excluded by means of an efficient antiseptic guard, while the exposed tissues were protected from the action of the antiseptic salt by the interposition of a layer of unstimulating material, the disturbing influence of external agency was avoided, and we attained very closely to the conditions of a subcutaneous injury." Mr. Lister attaches great importance to the employment of the spray in operations like that which he records, for as he attributes suppuration to the presence of putrefactive organisms in a wound, he considers that the spray, by penetrating into every part of the exposed surface, effectually prevents the development of any such germs, some of which might otherwise escape the action of the antiseptic lotion, and subsequently propagate their kind.—*British Medical Journal,* January 14th, 1871.

CHRONICLE OF MICROLOGY.

By J. F. STREATFEILD, F.R.C.S.

Cellular Structure of the Red Blood-corpuscles.—Dr. J. G. Richard-son believes in the dual nature of the red blood-corpuscles in cell wall and cell contents, being opposed in this, among others, to Prof. Austin Flint, jun., Prof. Lionel Beale, and Prof. Ch. Robin, who would all, however otherwise differing, deny that any separate envelope exists. The author refers to his former published researches as leading to the position he now assumes. In order to obviate the difficulty induced by the extremely small size of mammalian blood-discs generally, he procured two specimens of Menobranchus or Proteus, whose red blood-discs measure $\frac{1}{450}$th $\times \frac{1}{650}$th of an inch, and may be seen by the naked eye. Their coloured portion will, with great readiness, crystallize *within* its envelope. A drop of blood is de-posited upon a slide, allowed to remain uncovered about ten minutes, or until a mere line of desiccation appears at the margin ; then it is covered with a thin glass. Crystallization progresses until some-times it affects the contents of almost every corpuscle either wholly or in part, the cell wall being left, in the former case, perfectly colourless and transparent. The crystals, elongating, have the effect of sticks within an ordinary bladder partly filled with fluid. This is no deception, as is shown by the author. Twice he has succeeded in cutting a corpuscle in two with sharpened needles upon the stage of the microscope, and beneath a half-inch objective combined with a No. 2 eyepiece. On penetrating the vesicle with the edge of the needle its coloured contents were instantly evacuated, and [disap-peared at once in the surrounding fluid, while the cell wall immedi-ately shrunk together, and became twisted upon itself and around the nucleus into a perfectly hyaline particle, which showed some tendency to adhere to the point of the instrument. The author adduces also many cogent arguments against the German theory of a porous substance which maintains the shape of the blood-disc, and he concludes that the red blood-corpuscles of the vertebrata gene-rally are vesicles, each composed of a delicate, colourless, inelastic, porous, and perfectly flexible cell wall, enclosing a coloured, fluid, sometimes crystallizable cell contents, which is freely soluble in water in all proportions.—*Transactions of the American Medical Association* (reprint), Philadelphia, 1870.

The White Blood-globules and the Capillary Walls in Inflamma-tion. By M. V. FELTZ.—The passage of leucocytes through the coats of the vessels has not been proved ; the epithelial lacunæ or stomata, admitted by Cohnheim, have not been recognisable, not-withstanding that numerous preparations have been made with nitrate of silver ; the solution employed and favorable to this kind of

research is of 1 gramme to 1000 of water. The attempts at colora-
tion of the globules with powdered cinnabar have been as negative
as those essayed with aniline blue. In either case the author has
only obtained the circulation of pulverulent matter, sometimes of
the phenomena of embolism, by agglutination of the foreign mole-
cules. Here and there he has seen grains arrested upon the white
globules, but never has he been able to make out any kind of pene-
tration. It is hardly necessary to add to this that he has never seen
these powders penetrate the vascular coats nor pass through them.

From experiments on the circulation in the peritoneum he is able
to prove that, with the solution of nitrate of silver, undermentioned,
one may colour, for some hours at least, the contours of the pave-
ment epithelium, but he has not been able to discover lacunæ like
those described by Recklinghausen in the peritoneum of the dia-
phragm. In peritoneum inflamed artificially by the introduction of
foreign bodies into the abdominal cavity he has been able to prove that,
at the outset at least, the leucocytes have not their origin in the epi-
thelium, for one sees this yet intact above the elements of new forma-
tion which surround the vessels and infiltrate the peritoneal tissue.
The epithelial tissue is modified not until some six hours after the
commencement of the inflammation. As to the proliferation of the
leucocytes in the blood, the author, who supposed its occurrence in
1863, in his work on leucæmia, has not been able to prove it, not-
withstanding the numerous researches made since then.

In the normal corneæ of rabbits he has been able to prove the pre-
sence of fusiform and stellate corpuscles, regularly disposed between
the bands or bundles of laminar tissues forming the substance of the
organ. In this respect he admits the description of His. In in-
flamed corneæ, after some hours of inflammation, he has seen these
corpuscles swell, double and treble in size, and their processes un-
dergo the same dilatation. Their contents are transparent and
finely granular; sometimes there are visible one or many nuclei.
After a longer time—of from two to eight hours—the contents of
the dilated corpuscles divide, and take forms analogous to those that
the leucocytes show, which ultimately become free. It may at any
time happen that this process remains inactive, and that the hyper-
trophied corpuscles undergo a true colloid degeneration. The author
has never actually seen proliferating divisions or scissions of the
nuclei.

According to the author, the generation of the new elements is
made at the expense of the protoplasma or contents of the corpus-
cles, whose nutrition has been changed by this vascular derange-
ment, and gives rise to the nutritive disturbance that is called
travail inflammatoire. It is not far-fetched to consider that the con-
tents of the hypertrophied corpuscles, becoming free by some cause
or another, may yet take determinate forms.—*L'Abeille Médicale.*

*Suppuration and the Passage of Leucocytes through the Coats of the
Vessels.* By M. Picot.—These subjects have been investigated on
the peritoneum alone. The author would not experiment on the

lung, even of the frog; the capillary network in that tissue being so compact that hæmorrhages are inevitably produced. He experimented both on cold-blooded animals (frogs) and on warm-blooded (mice and kittens). To inflame the peritoneum he has been contented with the contact of air, and to study that which occurs in relation to the leucocytes, he has not had recourse to an artificial colouring of these elements, which are perfectly visible, and, in his opinion, cinnabar rather hinders than aids in their discovery.

According to the experience of M. Picot, Virchow's theory as to the production of the connective-tissue corpuscles is not at all in accordance with facts.   Cohnheim's theory as to the passage of leucocytes through the coats of the vessels is an error of interpretation; and, at any rate, not to have taken into account the intra-vascular white elements, and not to have certainly ascertained the actual horizontal plane in which they were situated, are serious omissions on the part of that observer and his followers.   Clearly, then, the formation of leucocytes in suppuration of the peritoneum is a genetic fact, for these elements appear in places smaller than soon after they become, and pursue their phases of evolution, without origination of any previous anatomical element, as M. Ch. Robin has asserted this long time past.—Ibid., *Journal de Médecine,* Bruxelles, July, 1870, pp. 37-8.

Diagnostic Value of the Corpuscular Blood-elements in the Urine of Bright's Disease.—Dr. Joseph G. Richardson has had in view the importance of attaining more definite knowledge of the exact condition of the kidneys than that afforded by estimation of the amount of albumen or the character of the tube-casts in the urine. He holds to Cohnheim's views on inflammation, that the same process affects man equally with the inferior animals, for he says, " By diluting a drop of my own blood upon a slide with pure water introduced at the margin of the thin glass cover, and thus reducing the liquor sanguinis to the specific gravity of the saliva, I found it possible to watch every step of the change in which, by mere distension, the white blood-cell is converted into the salivary corpuscle, with its one, two, or three nuclei, its actively revolving molecules confined by a cell-wall of exceeding tenuity, capable of presenting all the phenomena of deep staining of the nuclei, with the entire cessation of movement on the addition of aniline dye.   In like manner, when the liquor muci and liquor puris are similarly diluted, their corpuscles are also seen, for the most part, to be converted into salivary globules, and I infer, therefore, that we may regard the strong presumption afforded by Cohnheim's experiments upon the rabbit as established into a fact, and conclude that most (at any rate) of the corpuscles of *human* pus are simply white blood-cells which have wandered out through the vascular walls."

In order to determine from microscopic examination of the urine, not only the grade of inflammation, but its tendency (*i. e.* whether advancing or retrogressive), several observations upon specimens obtained at intervals of a day or two will generally be necessary, and

that they may afford the greater assistance in diagnosis these should be made comparative in their character. The sample of urine to be tested is placed in a conical graduated measure, of at least four fluid ounces' capacity, carefully covered, and allowed to remain undisturbed for twelve hours, when the bulk of deposit is noted; a small amount of the sediment is removed from the bottom of the vessel by means of a glass tube drawn off to a moderately fine point, two or three of the last few drops that have entered are allowed to escape, and the outside of the pipette wiped dry; a minute portion of the remaining contents is then deposited on a slide, covered with a square of thin glass measuring exactly half an inch across, and the surplus moisture absorbed from the margin of the covering glass by a soft linen rag, great care being taken to avoid movement of, or pressure upon, the square. It is obvious that, by adjusting a slide thus prepared upon the stage of the microscope, so that, for instance, the right upper corner of the cover shall occupy the field of view, and by means of the horizontal stage movement running it across until the left corner appears, then raising the stage with the vertical movement the width of a single field, reversing the horizontal motion as far as the right border, and so on, every part of this film of fluid, measuring one fourth of one square inch, may be examined, and the number of its contained red and white corpuscles, tube-casts, epithelial cells, &c., accurately ascertained. The apparent magnitude of this surface, when viewed under a one-fourth inch objective, giving an amplification of 200 diameters, will, of course, be nearly seventy square feet, so that time would be needlessly wasted in enumerating all the cells, &c., seen in such an area, except when very sparsely distributed; if abundant, counting those seen in a few fields, or even in sundry thousandths of an inch (as marked off between the threads of the cobweb micrometer), and noting the average, will often answer every purpose."

The author thus concludes:—" It will be seen that while red and white corpuscles in the urine, in their normal proportion, point to renal hæmorrhage, and the same elements, when more nearly equal in number, indicate an acute or subacute nephritis, the existence of white blood-cells (pus, mucous or exudation corpuscles) *generally* show a chronic or, at least, less active inflammatory condition of the kidneys. Further, that a series of comparative examinations, performed with the precautions above detailed, at intervals of a few days, affords an important guide to the effect of treatment and to the progress of the disease; and, therefore, it may be, I think, safely asserted that, due regard being paid to the general symptoms and the occurrence of albumen and tube-casts in Bright's disease, we can, by a careful study of the corpuscular blood-element, as seen in the urine, diagnosticate the form and stage of the renal affection with much more accuracy than it has heretofore been customary to do."—*American Journal of the Medical Sciences*, January, 1870 (reprint).

Results of the Injection of Fungus-spores, &c., into the Blood of Animals.—E. Semmer confirms as a matter of fact authenticated by

Hallier, Zürn, Chauveau, Delafond, and others, in modern times, that the blood contains in contagious diseases great quantities of Micrococcus-fecula, Mycothrix- and Leptothrix-threads, and that these forms always appertain to different funguses in the different diseases.   He says, " I have repeatedly, as to the funguses, examined the blood of the animals, which, at the veterinary institution of Dorpat, sinking of contagious diseases, were dissected, and with the following results :

" In glanders there are found in the blood, the lymph and the glanders-matter, numerous Micrococcus-cells and Mycothrix-threads, in the (splenic) cattle-disease (*Milzbrand*), and in *septicæmia* the blood contains numerous Micrococcus-cells, Mycothrix and Leptothrix-chains and threads, which long ago, no doubt, have been known as rod-like corpuscles.   But that these rod-like corpuscles are fungus-threads there may be adduced in evidence the instances of five pigs dead of septicæmia, in which the origin of the little rods from the Micro-coccus-cells could be followed up, for single short little rods con-sisted of Micrococcus-cells united together in rows ; elsewhere of a Micrococcus-cell with a little rod-like process ; yet other larger little rods showed distinct jointing as indication of sprouting, and in some even the jointing has disappeared and these formed the inarticulate little rod-like corpuscles.   The little rods appearing in the (splenic) cattle-disease are for the most part shorter, smaller, more faintly outlined, and more numerous than those appearing in septicæmia, which latter are of very various lengths, distinctly outlined, singly articulated.   But also the little rods seen in the (splenic) cattle-dis-ease are not always of the same nature, and there also variations appear, and they often approach to the form and size of the little rods of septicæmia.   The little rods appear in yet other blood-de-composition diseases besides the (splenic) cattle-disease and septic-æmia.   In the blood of healthy beasts are found little Micrococcus-cells of the *Penicillium glaucum* and little rods moving about in the intestines and the liver.

" Now, it was of much importance to prove whether the contagious diseases were induced by the funguses which in those diseases are found in the blood.   For this purpose I have made a series of expe-riments, which have led to the following results :—Penicillium-spores of the size of the blood-corpuscles were mixed with distilled water, and a small quantity thereof injected into the jugular of two foals by means of a little syringe, with needle-like cannula, which was in-troduced into this vessel on account of the exposed position of the jugular.   The beasts remained perfectly healthy after the injection. Some weeks afterwards Micrococcus-fecula from cheese and saliva were in like manner, in the same animals, injected without the foals after the injection even showing any symptoms of disease ; so also they continued in good health after the injection of Arthrococcus-fecula from acid liquor.   A second series of injections were made with larger masses of spores and fecula of the *Penicillium glaucum*, whereupon the animals evidenced slight fever, that terminated in complete recovery.   When the foals subsequently were put to death

for anatomical purposes it was found that all the organs and tissues were left in normal condition.

"Then I cultivated funguses in well-boiled media from the (splenic) cattle-disease blood in proper flasks, recommended by Hallier, closed so as to be air-tight, with an india-rubber stopper, through which a twice bent **U**-shaped glass tube is carried. The spores of these funguses were mixed with distilled water and a drop of it injected into the jugular of a foal. The foal after that continued apparently in good health. Five days after the first injection about two ounces of the same fluid, which contained numerous fungus-spores and Micrococcus-fecula, were injected into the jugular of the same foal with a larger syringe with a fine needle-shaped cannula. It brought on fever; the foal, however, kept a good appetite, and apparently recovered, till on the tenth day after the injection its appetite was gone, a staggering gait and considerable fever appeared, and in the night of the tenth–eleventh day it died. In the dissection the following observations were made.

"In the neck, at the place at which the incision for the purpose of injecting had been made, the connective tissue was thickened, brawny, infiltrated, interspersed with ecchymoses; the jugular filled up with black pitchy blood, not otherwise changed; further under in the neck considerable brawny infiltration of the connective tissue, which did not stand in connection with the place of injection; on the left shoulder a large blood-extravasation under the skin in the connective tissue and between the muscles. In the abdominal and thoracic cavities reddish transudation in small quantity; in the pericardium similar transudation in considerable quantity; ecchymoses in the peritoneum, the intestines, the pleura, the heart, and in the lungs; the spleen enlarged, full of blood, easily broken down, interspersed with blood extravasations; the liver of yellowish-brown colour, liver-cells involved in fatty granular degeneration; the kidneys enclosed with a large, yellow, brawny mass, easily broken down, infiltrated, of yellowish-grey colour from fatty granules, degeneration of the epithelial cells of the urinary canaliculi; lymphatic glands enlarged, softened, infiltrated, some of a brownish-red colour, which originated in blood extravasations. The brain and spinal marrow injected with blood, sodden; the brain-ventricles filled with clear colourless transudation; the blood, dark brown, viscous, pitchy, without firm clot, contained great quantities of the corpuscles, characteristically little-rod-like for the (splenic) cattle-disease.

"Here, then, by injection of fungus-spores and Micrococcus, which had been cultivated from the (splenic) cattle-disease blood, was the (splenic) cattle-disease induced afresh; the ninth day after the injection came the outbreak, and on the tenth day the foal died."— *Virchow's Archiv*, vol. l, part 1, pp. 158-60.

The Cord in Traumatic Tetanus.—Dr. Clifford Allbutt reports four cases to the Pathological Society. "Comparing the appearances in the several cases, it was seen that they were similar, only differing in degree as regards softening; in two out of the four cases

meningeal hæmorrhages were observed, the vessels of the cord were generally distended, thickened, varicose and plugged; and in one case there was universal thrombosis, with spaces around the vessels filled with matter resulting from the granular disintegration of the clots. In two of the cases there was considerable blood-staining of the cord by oozing from, if not actual rupture of, the vessels, and in two cases hæmorrhage into the cord in different places. Both in the pia mater and in the central grey matter similar vascular changes were observed. The central canal of the cord was stuffed with epithelial matter in over-abundance. There was nuclear proliferation in the connective tissue, probably in excess of health. The cells in the anterior horns were singularly wasted in a very symmetrical manner, no doubt due in part to exudation about the vessels, but also to changes in the cells themselves. The cells were the subject of yellow disintegration, beginning in the centre of the cells, and invading them from centre to periphery. Many were seen to have run together, forming an irregular and more or less fatty mass, these masses giving rise to the appearance of small yellow masses in the anterior horns. At any rate, the latter were destroyed more or less by exudation into them, and peculiar degenerate changes in the cells. . . . . . Dr. Allbutt explained that, as far as he could judge, the hæmorrhage and thrombosis he had described were not post-mortem conditions."—*Lancet*, February 25th, 1871, p. 270.

Regeneration of the Spinal Cord.—MM. Masius and Van Lair say, " No one has as yet observed the *reproduction* of a segment of *excised* cord, the excision of a medullary segment of 2 mm. in size, a month after the operation. The two ends are united by a cylindroid mass of yellowish translucent substance. A portion of this gelatinous substance examined under the microscope mounted in serum shows—

" 1. Very delicate cellules, some of which appear *spherical* or *ovoid*, and devoid of prolongations. Some of these are bipolar, whilst others possess prolongations which can sometimes be traced easily from one cellule to another. All the cellules are composed of a finely granular protoplasmic mass, of a relatively large spherical or ovoid refractive nucleus, surrounded by a membrane with very clearly defined double contour. The nucleolus is brilliant, small, spherical, and always very apparent; the prolongations are fine and pale, and appear to proceed from the protoplasm. These are the sizes of these elements:

" Spheroid and stellate cellules, diameter of the cellule . . 0·0128 m.
   ,,   ,,   ,,   ,,   nucleus   . 0·0096 ,,
   ,,   ,,   ,,   ,,   nucleolus . 0·0016 ,,
Bipolar cellules, great diameter . . . . . 0·0208 ,,
   ,,   ,,   small diameter . . . . . 0·0080 ,,

" These cellules are perfectly identical with the cellules taken from different portions of the grey substance of the spinal cord in healthy frogs; these are, therefore, nervous cellules. They differ in nothing from the cells of the *human* cord, save in some secondary characters;

they are smaller than the latter, but this reduction affects only the protoplasm; the mean dimensions of the nucleus are nearly equal to those of the human cord-cells.

"2. Besides the preceding cellules, we find corpuscles of different dimensions (but nearly always greater than those of the cellules); they are generally of a round form, and are composed of an accumulation of angular granulations of a deep yellow, or sometimes even quite black colour. These are, very probably, *nervous* cells attacked by pigmentary metamorphoses.

"3. Certain elements intermediate between the two preceding. Some of these are like nerve-cells, devoid of prolongations, but already containing, grouped around the nucleus, granulations like those which compose the large pigment-corpuscles. The others, larger and apolar, are almost completely invaded by the pigmentary matter; the nucleus appears as a circular uncoloured spot, and the nucleolus has disappeared.

"4. Thick and slightly flattened fibres, in which may be seen elongated nuclei. In all respects they resemble the fibres of Remak.

"5. Slender varicose fibres, far less numerous than the preceding. They are identical with the amyline fibres of the nervous centres.

"Both ends of the cord show alterations which extend to two *millemètres* beyond the surface of the section. The large fibres appear still normal; but the slender fibres are more varicose, and are nearly entirely decomposed (near the surface of the section) into globules of myeline. The cellular elements present the same appearances as the cells which are met with in the uniting gelatinous substance."— *Monthly Microscopical Journal*, May 1st, 1870, pp. 236-7.

Calcification of dead brain-cells—Virchow writes, "As I, some long time ago (in this 'Archiv,' 1856, vol. ix, 620), first spoke of the occurrence of chalky ganglion-cells of the brain, I was inclined to bring them into relation with the chalk-metastases described by me. Since then in a great number of cases I have convinced myself that another interpretation must be taken. Evidently the precedence of this calcification belongs to that group of phenomena which I have previously described ('Verhandl. der Berliner med. Gesellsch.,' 1867, 253) as one of the peculiarities of dead parts in the interior of the human body. I find, that is to say, a multitude, especially in the cortical matter of the brain, in which the cells with their processes, sometimes also fine nerve-fibres, are calcified, extremely abundantly after traumatic influence upon the cranial bones. At one time there appear in these parts of the brain atrophic recesses, so-called yellow plates, as in the previous observation I have referred to; at other times *one sees nothing at all with the naked eye*. In the first case the chalky elements appear, after a previous contusion of the brain, in the shape of the red softening, within the mass of the contusion, yet more particularly about its circumference; in thicker brown scars they lie without the cicatricial substance in the neighbouring brain substance, whilst in the scar itself brain-cells go to ruin altogether. The second case is the more interesting, where the naked eye perceives no change

at all. I have several times, when there was externally in the bony covering of the brain a trace of an impression or a fissure, examined the thereunder lying, apparently uninjured, parts of the convolutions, and have found most frequently the ganglia-cells in the grey cortex calcified. This, then, was a true *necrosis by commotion.*

"For aught I see, no one besides myself has, in modern days, followed up these remarkable events. Förster, who, as I have directed, had made the first observation thereof, saw it in the spinal marrow. My experiences include collectively the brain."—*Virchow's Archiv,* vol. 1, part 2, p. 304.

Mammary Gland. — At the meeting of the Paris Academy of Sciences, 23rd May, 1870, M. Cl. Bernard presented, in the name of MM. G. Giannuzzi and E. Falaschi, a brief communication entitled "A contribution to the knowledge of the intimate structure of the mammary gland."

If one injects the milk-ducts of the mammary gland with Prussian blue, one readily perceives that at their origin they form networks around the excretory cells which exist in the acini. These networks are like those of the pancreatic ducts. The tubes of which they are formed have no proper coat.

The excretory cells are polygonal, having a more or less flattened form. Their contents are granular, having a very great number of granules and fatty drops. They have a very distinct nucleus, and a prolongation like that of the cells of the salivary and pancreatic glands. There are also cells with two prolongations.

The authors have made their observations on the human gland, that of the sheep, the cow, and the goat.—*Archives Générales de Médecine,* July, 1870, p. 115.

Dysmenorrhœal Pseudo-membranes.—MM. H. Huchard and F. Labadie-Lagrave have been making observations on this subject. Most of the cases were allied to endometritis, in which the inflammation of the uterine mucous membrane produces the dysmenorrhœal disturbance, and causes the formation and expulsion of the membranous products. But in some cases the dysmenorrhœal membranes show all the elements of hypertrophied uterine mucous membrane, all the anatomical characters of the menstrual decidua, without offering any traces of an inflammatory exudation, characteristics which have led Simpson to admit the *pathological exfoliation of the uterine mucous membrane.* But this uterine exfoliation question had been affirmed in France, in 1814, by Dr. Moreau. This form of membranous dysmenorrhœa by exfoliation is very rare, and in very few of them has a complete examination of the dysmenorrhœal membranes demonstrated with certainty the hypertrophied uterine mucous membrane with its epithelium, its vessels and glands. The dysmenorrhœal membranes may be complete or fragmentary, the pains, in the latter case, only ceasing after the expulsion of all the membranous fragments. These, reunited, present a triangular shape, in which the membranous body always appears. The outer

surface is unequal, villous, of a reddish-grey; the inner surface is humid, polished whitish. But it may happen that these relationships are changed, and that the dysmenorrhœal membrane has an even outer aspect, and a spongy internal surface, by reason of its introversion, analogous to that to which the uterus itself is subject.

The anatomical structure is alike in the gravid and menstrual membranes. The former are thicker than the latter. In abortion there is no inflammatory exudation, as is seen in pseudo-membranous dysmenorrhœa.

At about the second month of pregnancy the gravid decidua present a pavement epithelium instead of a cylinder or prismatic epithelium. In membranous exfoliating dysmenorrhœa the epithelium always preserves the characters of the uterine mucous membrane.

If the vaginal mucous membrane has separated itself and come away, it is very different to that described above, and under the microscope it has nucleated cells, pavement epithelium.—*Archives Générales de Médecine*, July, 1870, pp. 69-83.

Glioma; Glio-sarcoma.—Dr. Erskine Mason, of New York, reports the case of an infant of five months old, which from birth had been photophobic, and had had, for the same period, a "yellowish reflection from the eyes," according to the father's report. The parents were healthy, and gave no history of malignant disease. The child also appeared to be quite healthy. At two months old it had an "inflammation of the eyes." In both eyes there were iritic adhesions. The ophthalmoscope showed tumours occupying some part of each fundus oculi, irregular vessels coursing over them; the optic discs were not to be seen. Both eyes, supposed to be gliomatous, were enucleated; of them, Dr. Delafield reports that they "were exactly alike. Cornea transparent; iris in contact with cornea; lens pushed forwards against iris; retina detached and converted into a fibrous cord; choroid in place, many of its epithelial cells hypertrophied. The space between the choroid and detached retina was filled with a thick reddish fluid, and a firm brownish mass, composed of shrivelled blood-globules and granular matter. The outside of this firm mass had many cells, resembling choroidal epithelium, adhering to it."

Dr. Jeffries, of Boston, notes another case (of glio-sarcoma), in a healthy man, of twenty-seven years, who had had for many months transient recurrences of œdema of the lids of the right eye. Then the eye became inflamed and very painful for a while, and this used to recur; vision was lost to it. The other eye was unaffected. In a year "a yellowish looking tumour, which raised the upper lid, but did not prevent motion of the globe, was seen in the position of the attachment of the superior rectus muscle." The globe, and "about two thirds of the superior and one half the external rectus muscles," were removed. The optic nerve was "enlarged two or three times, and of a dirty grey colour. The tumour consisted of the superior rectus muscle enlarged with the growth. The choroid was firm all

round, 2‴ thick, in spots lighter in colour. The retina adherent, but not thickened apparently. The sclerotic, on section through the affected muscles, thinned, and showing where the disease had passed through it. The whole of the ciliary body, *i. e.* muscle and processes, equally affected with the disease. Less pigment than natural in these and the whole choroid. A section of the optic nerve showed only the *rounded* typical cells of glioma, none oval or spindle-shaped. In the recti muscles there were principally rounded glioma-cells, but some oval. In the choroid mostly spindle cells, but here also all the shapes from this through oval to round cells, with one or two nuclei."

Dr. Delafield, of New York, gives five cases of retinal tumours. He reviews the modern literature of the subject. Of the *secondary* tumours, the choroid is the first seat, and after it, generally, the optic nerve.

CASE 1.—" The cavity of the globe, posterior to the lens, was filled with a soft whitish mass, stained red in some places by hæmorrhages, and so soft as to be semifluid. The elements of this mass, examined fresh and without the addition of any fluid (Hartnack's 9 immers.), were round cells, of very pale, finely granular appearance, exhibiting no nucleus until iodized serum was added, and measuring ·0116 mm. They did not resemble the granules of the retina examined in the same way. After hardening the eye in Müller's fluid, the tumour was seen to be continuous with the retina over about half its surface, and in close apposition with it over the other half, the optic disc being only covered by the tumour. Sections were then made of the tumour and retina in many different directions. The retina, where it is only in apposition with the tumour, appears well preserved; its layers have their normal relations, except that the limitans interna and radiating fibres are thickened. In some sections small portions of the tumour remain adherent to the limitans interna. When sections are made of that portion of the retina which is continuous with the tumour, it may be seen that in some sections only the rods and cones and limitans externa are left, the tumour replacing all the other layers. In other sections the rods and cones, limitans externa, outer granules, and outer inter-granular layer, are all distinct and unaltered. At the line where the tumour ceases to be continuous with the retina the growth of the tumour is seen to take place in two ways. First, as we follow the layers of the retina towards the tumour, we see round cells making their appearance in the layer of nerve-fibres, and a little farther on, in the layer of inner granules, the internal inter-granular layer remaining intact. These cells increase very rapidly in number, rendering the layers in which they occur much broader, pushing the limitans interna inwards, and the external inter-granular layer outwards, the cells in the two layers coming in contact with each other, until there is one continuous mass of cells extending from the limitans externa inwards. Second, we see the round cells making their appearance in the same layers, and increasing in the same way, but the limitans interna, instead of being pushed inwards, and then dis-

appearing in the tumour, is pushed inwards and then turned over outwards against the adjoining portion of limitans."

The other four cases are too long for insertion. In three of them it is noticeable, the author says, that " in the optic nerve the cell-growth replaces the nerve-fibres instead of the fibrous septa between them. The conclusions which I would draw from these cases are—

" 1. The elements of these tumours, when not changed by preservative fluids, do not correspond to the normal elements of the retina, but to those of connective-tissue cellular new growths.

" 2. That these new growths having the character of permanent new growths, the shape and arrangement of their elements correspond exactly to those of the round-celled medullary sarcomata of other regions," &c.

The author adopts the term glio-sarcoma.

Dr. Knapp relates a case of retinal glioma. " Immediately behind the lens the retina enclosed, or was metamorphosed into, a soft yellowish tumour, the size of a small hazel-nut. The posterior portion of the detached retina was folded and studded with a few miliary swellings, which, on microscopic examination, manifested themselves as small glioma tumours, growing out of an entirely degenerated retina, so that their starting-points could not be traced to a particular stratum of the retina. The minute examination of the tumour behind the lens showed that the pseudoplasm was, to its greatest extent, enveloped by the *detached and wrinkled retina and its pars ciliaris,* which was in connection with the equatorial edge of the crystalline. The surface of the tumour was smooth throughout, but somewhat wrinkled and nodular. The tumour could be raised from the enveloping retina, except at a small area in which it was blended with it. In all the other places the surface of the tumour consisted of the *inner* retinal layers. The limitans interna, the fibrous and ganglionic layers, were well preserved in most places, the molecular layer had disappeared; both the granular layers were blended, no inter-granular layer being visible. The granular layers were thickened by increase of the radiating connective-tissue fibres. Coalescent clusters of small round cells (glioma) lay in the inner granular layer, and extended through the outer granular layer and outer limitans into the vitreous space, generating the bulk of the tumour. In some places there was also a proliferation of small round cells starting from the outer border of the outer granular layer, and in other places the small cells crowded in the inner retinal layers, destroyed the nervous elements, and extended through the ruptured internal limitans on the inner side of the retina. Both the last-named sources of newly formed cells were, however, limited, producing no compact masses of pseudoplasm.

" The new growth started in isolated clusters from the inner granular layer, invading, subsequently, the outer granular layer and the inner strata of the retina. At the same time inflammatory action was present in the retina, which, being of a plastic character (increase of connective tissue), rendered the adhesion between retina

and choroid somewhat firmer than usual.   The new growth developing within the granular layers of the retina, therefore, found a greater resistance on the part of the choroid and sclerotic than on that of the inner retinal layers and vitreous.   The inner layers of the retina were stretched and pushed inward as the tumour increased in the outer layers.   The growing pseudoplasm produced at first a partial detachment and doubling up of the retina, after which the whole retina became separated from the choroid, as is usual during the development of intraocular tumours in general.   The seat of the tumour was in the anterior portion of the retina, near the ora serrata.   The tumour, in its growth, exerted an immediate traction also on the pars ciliaris retinæ, detaching it from the ciliary body.   It protruded into the vitreous, being, as it were, invaginated into the retina, so that, when the retina became totally detached, it enveloped the tumour like an external coat." — *Transactions of the American Ophthalmological Society*, New York, 1871, pp. 70-86.

REPORT ON PATHOLOGY AND PRINCIPLES AND PRACTICE OF MEDICINE.

By Francis C. Webb, M.D., F.L.S.,

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Visceral Lesions in Variola.—M. Quinquad, in a paper on the epidemic of smallpox observed in the hospital of " La Pitié" in 1870, treats of the visceral lesions occurring during the course of the disease.   1. *Lesions of the lungs.*—Pulmonary alterations present different types, which are not all of the same importance.   They are principally met with in cases of confluent smallpox, which succumb about the tenth day of the eruption, or when desiccation of the face has commenced.   Anatomically one type is characterised by the occurrence of small, hardened, yellow points, of the size of some tubercles, but not projecting, and wanting the semi-transparent greyish tint which characterises miliary neoplasms.   Sometimes they are confluent, and form hepatized spots, which resemble lobular pneumonia.   Sometimes a localised pleurisy coexists at their level. By examining these indurated points with a lens under water, small yellowish masses are seen on their borders.   Twice the author has found small caverns surrounded by a red vascular tissue. These were agglomerations of inflamed vesicles with softened centre.   In no case did tubercles exist at the summit of the lungs or disseminated elsewhere.   Histologically these granulations are found to consist of cells, and the section does not present the appearance of small nuclei squeezed one against the other, as in tubercle, but that of larger or smaller cells, epithelial cells, and some leucocytes.   The base and anterior border of the lung are the seats of these lesions.   They may coexist with points of pul-

monary atalectasis, bronchial alterations, congestion, and œdema of the bases. Clinically, in cases of this kind, there is noticed dyspnœa, intense fever, and slight cough, with subcrepitant râles over the bases. In other cases there is lobular pneumonia, with or without atalectasis, indurated patches, hepatized, and formed of cellular elements, granular bodies, and fatty granules. These patches of pneumonia supervene at the time of the suppurative fever, or of desiccation, the pulse and temperature rising. Sometimes, at the period of desiccation, a secondary pneumonia is developed. In hæmorrhagic and confluent cases pulmonary apoplexies may sometimes be found, especially at the bases of the lungs. Atalectasis is not uncommon; more or less regular islets of it are found specially at the posterior borders of the lungs. 2. *Variolous pleurisy* may occur, supervening either at the onset of the disease or at the period of desiccation. Pleurisy may also be developed at the level of pneumonia. 3. *Endocarditis.*—The author made five autopsies of recent variolous endocarditis. During life a bruit with the first sound and at the base had been established. After death, reddened gelatiniform masses were found on the ventricular surface of the aortic and mitral valves. 4. *Pericarditis* is rarely met. Serous effusion in the pericardium is not unfrequent, but it is doubtful whether it is inflammatory. Sometimes, however, there is exudation, and the membrane is vascular. In one case the contained fluid was puriform. 5. *Myocarditis* is met with in variolous patients, who rapidly succumb, and especially in hæmorrhagic cases. It is characterised by granulo-fatty lesion of the primitive fibres, with production of myoclastes, either in the internal or external perimysium. In three cases the author found diffused reticular arteritis disseminated in the capillary networks of the myocardium, either in the middle of the tissue or in the subserous portions. 6. *Lesions of the liver* are more difficult to establish. In a patient who died on the sixth or seventh day from hæmorrhagic variola the liver was found very large, yellow, as if stained with the colouring matter of the bile. In the centre of the lobule there was a spot of gamboge-yellow colour; the periphery was more transparent and less coloured. Histologically the cells of these portions are found gorged with fat (vesicles and granulations). In hæmorrhagic cases which terminate rapidly the liver is always altered; it frequently presents an icteric appearance. 7. *Lesions of the kidneys* are especially present in cases of hæmorrhagic variola. On section the tubuli are found opaque, filled with epithelium, and albuminoid and fatty granulations. This condition the author thinks analogous to degeneration of the tubules under the influence of phosphorus. In confluent cases the lesion of the kidneys is often at a minimum, except in drunkards. 8. *Lesions of the muscles.*—Granular fatty degeneration is observed in grave or hæmorrhagic cases. The lesion is characterised by a granular opaque state of some of the primitive muscular fibrillæ, which are the seat of proteic and fatty granulations. True proliferation of myoclastes and of the cells of the interstitial tissue is less frequent. 9. *Orchitis* was observed in three cases. Two cases were examined after death. The chief lesion

was at the termination of the epididymis. The serous membrane was there covered with a yellowish exudation, formed of proteic matter. The commencement of the epididymis was hardened. On section, a yellowish matter was observed between the spermatic convolutions; at certain points there was œdema. The wall of the canal was found hypertrophied, its contents fatty; the connective tissue was the seat of abundant proliferation of young cells, forming a friable tissue at the termination of the epididymis.—*Archives Générales de Médicine*, September, 1870.

On the Specific Character of Miliary Fever.—By Professor PIERRE BURRESI.—In answer to Professors Besser and De Renzi, who questioned the existence of such an exanthem as "*la miliaire*," the author describes its anatomical characters, and details the result of his thermometric and uroscopic observations. The skin is the seat of the localisation of the morbid process in miliary fever, as the intestines are in typhoid, and the liver and spleen in recurrent fever. The miliaric eruption is of the nature of a suppurative dermatitis, limited to the more superficial part of the papillary layer of the derma, and differing from that of variola in its more superficial character and the lower degree of intensity of the phlogistic process. It runs through three distinct stages.—(1) Vesicles are formed by sub-epididermic exudation, proceeding from hyperæmia of the superficial vascular network of the derma. (2) The contents of the vesicles become purulent. (3) The intra-vesicular fluid becomes completely dry; this is followed by detachment of the epidermis and desquamation, at times very abundant. Miliary fever differs from other species of fevers in the following thermometric characters:—(1) The temperature becomes rapidly high during the first and second days of the malady. In twenty-four or thirty-six hours it reaches its maximum of 39°—39·5° C. The temperature never rises slowly, as in typhoid. (2) During the stage preceding the eruption, and also during that of the eruption itself, there are slight matutinal remissions, but the temperature of the evening scarcely ever rises above 39·5°—40° C. The maximum of the temperature in miliary fever is usually equal to the mean of the temperature of recurrent and typhoid fever, the cause being, probably, the subtraction of heat produced by the evaporation of the abundant and continual sweat. (3) In some cases of miliary fever the temperature, which, on the evenings of the third, fourth, and fifth days, has been as high as 39·5°—40° C., as soon as the eruption is accomplished, falls suddenly on the following morning to 37·5°—38° C., and in twenty-four or thirty-six hours it has gone down to the normal standard. This sudden defervescence is not observed in typhoid, but it is observed in typhus, in measles, and in benign smallpox. (4) On the supervention of suppuration the temperature commonly rises 1°—2° C.; it is maintained at this point for one or two days, and then, in the next two or three days, it falls below the fever standard. This is analogous with the suppurative stage of variola. (5) After the eruption of miliary fever, in certain cases, sweating is

suppressed, and there is a sudden and remarkable increase of temperature (2°—4° C.). It sometimes rises to 42°—42·5° C. This is serious, and is sometimes the precursor of death. It is analogous to the sudden rise of temperature which sometimes takes place in grave scarlatina; it is not observed in recurrent and typhoid fevers. In miliary fever, unlike other fevers, the daily excretion of urea, in place of being increased, is diminished below the normal standard. In some cases the author has found it reduced to 6·00 grammes. The cause of this, the author thinks, is to be found in the activity of the cutaneous function and an extraordinary excretion of nitrogen by the skin. Refrigerant treatment increases the quantity of urea in the urine. During convalescence from miliary fever the daily excretion of the urea by the kidneys fall much below the standard of convalescence after other fevers (it may be reduced even as low as 1·00 or 2·00 grammes). It only regains the normal point slowly when nutrition is thoroughly re-established.—(Pamphlet). *Paper read before the International Medical Congress of Florence*, 1869.

Indian Fevers.—Surgeon J. W. Moore, in a paper on the ' Diagnosis of the Fevers of India,' calls attention to the difficulties of accurate diagnosis of fevers in that country. In India there are four recognised forms of fever, remittent, typhoid, typhus, and relapsing, but the typical symptoms are not always present or well-defined. The diagnosis of remittent fever from typhus is not so obscure as that of remittent from typhoid. Typhus is unfrequent in India. The diagnosis of relapsing from remittent fever is also very difficult. The author does not think that the periodicity impressed on these fevers by malaria is sufficient to account for the difficulties of diagnosis. He thinks that when hybrid forms of fever occur it is probable that two specific maladies exist at the same time and in the same person. He believes that three, or even all the fevers may coexist. Eighty per cent. of the natives of India suffer before the age of puberty from one or other variety of malarious malady. Their systems are saturated with malaria, hence the periodicity which obscures the signs of typhus and typhoid. The author proposes to designate these hybrid forms by such terms as typhus malarial, typhoid malarial, and relapsing malarial.—*Indian Annals of Medical Science*, March, 1870.

On Ulceration and Perforation of the Large Intestine in Typhoid Fever.—M. Leudet, of Rouen, has communicated to the Académie de Médecine a memoir on ulcerative lesion in the great intestine, including not only the cæcum, but the ascending colon and the rectum, following in the course of typhoid. He describes the morbid process as beginning in the mucous follicles, of which the edges become eroded, forming ulcerations, at first isolated, small, rounded, and superficial, but which increase in size and depth, become confluent, and form irregular patches of ulceration, involving first the mucous, then the muscular and peritoneal coats, and giving rise to secretions tinged with blood, or more rarely to hæmorrhages. The ulcers terminate in perforation, which is followed by pathological

accidents, varying according to their seat, *e.g.* abscess in the right
iliac fossa; peritonitis, with escape of gas and fecal matter into the
peritoneal cavity; peritonitis generalised or circumscribed by
adhesions; stercoraceous abscess in the pelvis or perineal fistulæ.
Ulcerations of the large intestine especially occur in adynamic cases
of long duration. The symptoms of ulceration are pain and a return
of diarrhœa after a temporary improvement; those of perforation
vary with its seat, *e.g.* circumscribed pain, with tumefaction in the
right iliac fossa; shivering, with intense pain along the course of the
great intestine; meteorism, vomiting, and other signs of peritonitis;
or deep-seated pain in the pelvis, and the appearance of a swelling
in the perineum.—*Bulletin de l'Académie de Medecine,*' Rapport de
M. Barth, Nov., 1870.

Intestinal Occlusion.—Separation and elimination of portions of
the intestine. Two cases of this somewhat rare occurrence have been
submitted to the Académie de Médecine, one by M. Henri Dubois,
and the other by M. Halleguen. In one a portion of small intestine
forty centimètres long was passed by stool; in the other a portion
measuring seventy-five centimètres was expelled. In each case there
was recovery. The following is an abstract of M. Dubois' case. On
July 8, 1860, a young man swallowed 500 grammes of black cherries
with their stones. On the following day he swallowed the same quan-
tity of cherries and stones. In the evening he was seized with violent
pain, seated at the umbilicus and radiating over the belly, there was
great desire to go to stool, but no relief was obtained; loud bor-
borygimi, tender belly; cold sweat over the body; quickened pulse;
vomiting. The following day the symptoms were aggravated. As
the case went on the pains became more acute, and principally
localised in the right iliac fossa. The abdomen became tense and
tympanitic, except in the right iliac fossa, and along the course of the
ascending and transverse colon. On the 15th, a globular tumour
could be felt in the region of the cæcum, and extending into the
ascending colon. Pinched face, small frequent pulse, stercoraceous
vomiting, great prostration with complete inaction of the bowels,
although sulphate of magnesia, croton oil, &c., were given with injec-
tions. On the 17th he was better, vomiting had ceased, the belly
was less distended, pulse 118. Flatus and some yellow sanguinolent
matter with gangrenous odour passed by the anus. On the 18th,
there were some yellowish stools containing débris of the intestinal
mucous membrane. On the 20th, a stool of fæcal matter was passed,
and in it was found a portion of small intestine 40 centimètres long,
in which the three coats could be easily distinguished. From this
time recovery was rapid, but no cherry-stones were found in what
passed from the bowels. One case is related in which six feet (84
centimètres) of large intestine were passed, and complete recovery
took place. The author adds the following table of cases where life
has been preserved after the expulsion of portions of gut :—

40 days after the expulsion of 10 centimètres of large intestine (*Hill*).

6 months	,,	58	,,	small intestine	(*Gasté*).
8 ,,	,,	5	,,	large ,,	(*Druhen*).
2 years	,,	,, ,,		,, ,,	(*Ehrmann*).
2 ,,	,,	,, ,,		,, ,,	(*Baillie.*)
3 ,,	,,	36 inches		small intestine	(*Vulpes*).
5 ,,	,,	,, ,,		,, ,,	(*Cayol*).

2 years after a second expulsion, 5 years after a first expulsion of, in all 12 English feet of small intestine (*Forbes*).

7 years, (*Monro*).

—*Ibid.*

Tubercle compared with other Pathological Products.—Dr. Mandl finds that there is no special histological character peculiar either to tubercle or cancer. He denies the existence of the corpuscles described by Lebert as round and globular, opaque, and measuring from five to seven thousandths of a millimetre. He finds that these corpuscles are nothing more than the product of an artificial division of tubercle into fragments, which may be rounded or angular, but which belong to no constant type, and may vary in size from the five thousandth to several hundredths of a millimetre. These corpuscles, which have been wrongly considered as anatomical elements proper to tuberculous matter, are also found with analogous characters in certain forms of cancer (reticulated cancer of Muller). Elements which cannot by the highest power be distinguished from them are also to be found in certain products of inflammation, in false membranes, in hepatised lungs, in concrete pus. It is this analogy which has led Reinhardt and the German school of Berlin to consider tubercles as a chronic pneumonia, to which they give the name "caseous pneumonia," as if deductions drawn from some minutes of microscopical examination could counterbalance the teachings of the experience of thirty years, which prove that tubercle is the product of a diathesis *sui generis*, transmissible by heredity, appearing under different forms in the members of the same family— one child dying, perhaps, from tubercular meningitis, another carried off by tubercular peritonitis, a third presenting tubercular deposits in the cervical glands, whilst the mother will precede or follow them, carried off by pulmonary phthisis.—*Ibid.*

On the Connection between Hæmoptysis and Pulmonary Tuberculisation.—Skoda criticises the doctrine of phthisis ab hæmoptoë, recently revived by Niemeyer. It is supposed that blood which remains in the bronchial tubes and in the air-cells will cause chronic inflammation, producing fever and the signs of phthisis. But how does it happen that nothing of the kind is observed in cases of pulmonary hæmorrhage in heart disease? When death occurs in a phthisical patient from hæmoptysis, we neither find the bronchi nor the air-cells containing blood; it is otherwise in pulmonary hæmorrhages from a cardiac cause. An infarcted condition of the pulmonary tissue is very rare in the hæmoptysis of the tuberculous, and hæmorrhage in these cases only exceptionally depends upon heart disease. On the other hand, we do not see the pulmonary infarction

of cardiopaths followed by chronic inflammation. It only produces a feeble reaction, the blood coagulates, becomes encysted, pulmonary infarction results, but suppuration does not follow. Such infarctus may remain for months or years, becoming by degrees smaller, and at last disappearing. The blood-globules undergo metamorphoses, terminating in the formation of black pigment and fatty degeneration. The liquid part is reabsorbed, the black pigment remains, and if the infarctus has existed some time, black spots remain in the lung. All this accords but little with the hypothesis of Niemeyer. Observations, both on the living and the dead, compel the admission that, whether before or during tuberculosis, hæmorrage is bronchial, and not intra-alveolar. How otherwise are we to account for the rarity of infarctus? If the blood comes from the bronchi, on the contrary, it is easily discharged by coughing. In any case, at autopsies on phthisical cases, it is most rare to find blood in the bronchial tubes; at most we meet with it in the larynx and trachea. All that Skoda can admit is, that hæmorrhage may produce serious consequences in a tissue already diseased—for instance, on the internal surface of a cavity where a little blood may remain and contribute to irritation. He argues that blood is not itself an irritant to the tissues; the ease with which blood is absorbed in bruises proves this. There is no reason, therefore, to admit that in the tuberculous effused blood should be a cause of aggravation. Hæmoptysis is only important in a semiological point of view, establishing the existence of pulmonary affection in the course of development. When acute pneumonia passes into a chronic condition the progress of the exudation is not that of tubercle. Pneumonic exudations may remain for months or years without producing the destruction of the lung, but this is not the case in tuberculosis. There is an important difference between the two maladies, and they must not be confounded. Hæmoptysis is a symptom of tuberculosis, or of the morbid state which predisposes to tuberculosis. Besides the hæmoptysis of the tuberculous and of cardiopaths, there are other varieties, which may recur frequently without being followed by grave pulmonary disease. But these cases are rare, and at times there is in the background a localised tuberculosis. At other times the hæmorrhage depends upon dilatation of the capillaries or veins. Some morbid transformations of the lung may also produce hæmoptysis, which may recur without ever leading to tuberculosis. The health is restored after a time, unless the hæmorrhage has been sufficiently copious to produce anæmia.—*Lyons Medical Journal and Journal de Medicine, de Chirurgie et de Pharmacologie de Bruxelles,* Janvier, 1871.

Pigment Induration of the Lungs.—Dr. Francis Delafield has published some observations on this condition of the lungs, which was first described by Virchow, in 1847. The lesion is not uncommon, and is associated with cardiac disease. Of sixty cases of lesions of the heart, in twenty pigment induration of the lungs was found. The lung is usually small; the pulmonary pleura thick

and opaque, and gives the lung a greyish colour, mottled by the pigment of the lung substance beneath it. The lung texture is dense and resistant, very dry; it contains very little air, and very little blood or serum escapes on section. Sometimes, however, the lung tissue is œdematous, but not congested. Sometimes irregular portions of lung-tissue are still firmer, and break down under the finger, but do not present the granular appearance of croupous hepatization. Hæmorrhagic infarctions are frequently found. The colour is a uniform marked pink. It may be mottled with spots of brown or black, in a variable degree. The increase of pigment, on which Virchow insists, is seldom very noticeable with the naked eye. The microscopic appearances are characteristic. There are four pathological changes :—(1) New pigment; (2) hypertrophy of the walls of the air-cells; (3) dilatation of the capillaries; (4) a marked increase of cellular elements within the alveoli. From an examination and comparison of sixty cases of cardiac disease, it appears that mitral stenosis is almost always accompanied by pigment induration of the lungs; that simple mitral insufficiency causes it in nearly half the cases; and that aortic disease with mitral insufficiency causes it in one fourth of the cases.—*American Journal of Medical Sciences,* January, 1871.

On Œsophago-Tracheal Fistula.—Drs. Saussier and Carteron, in a monograph on œsophago-tracheal fistula, record the case of a man, æt. 57, who suffered from difficulty of swallowing and cough, at first dry, afterwards with opaque sputa, emaciation, fever, and threatened suffocation. At last there was complete inability to swallow; he was fed by the œsophageal tube for a time, but ultimately the tube could not be passed into the stomach, and when the patient coughed air passed through its orifice. After death it was found that on a level with the bifurcation of the bronchi the œsophagus presented a kind of ulcerated pouch, three centimetres in diameter, filled with purulent matter. On its anterior surface it communicated with the termination of the trachea by a solution of continuity four centimetres long and three broad. The œsophageal wall was transformed into scirrhous tissue, with gangrenous detritus, limited in its circumference by indurated cellular tissue. Above and below the lesion, the air passages and œsophagus were healthy. The bronchial glands were slightly hypertrophied; the lungs presented no alteration. Abnormal communications between the œsophagus, and pharynx, and air-passages are of three kinds : 1. Congenital. 2. The result of wounds or foreign bodies. 3. Depending on a pathological cause. In congenital communications the œsophagus is usually divided into two portions, of which the superior terminates below in a cul-de-sac and the inferior, pursuing, on leaving the stomach, its normal course, opens above into the trachea, in nine cases out of ten, immediately above its bifurcation. Children with this malformation have lived from one to four days. The authors have collected twenty-three cases in which the cause of the communication has been a pathological one. Of these the opening was

between the pharynx and larynx in 2 cases, between the œsophagus and trachea in 10 cases, between the œsophagus and right bronchus in 3, between the œsophagus and left bronchus in 1, and between the œsophagus and right lung in 7 cases. The most frequent pathological cause was cancer (17 out of 23), and in all the disease commenced in the œsophagus. In nearly all cases there was a dilatation of the œsophagus at the level of the lesion.—*Bulletin de l'Académie de Médecine*, Rapport de M. Barth, Nov., 1870.

On Apoplexy and Hæmorrhage into the Ganglia of the Great Sympathetic in a case of Addison's Disease.—A case is recorded by Professor A. Tigri, of Sienne, in support of the theory advanced by Schmidt, of Rotterdam, which connects Addison's disease with an alteration of the abdominal sympathetic. The case was one of bronzed skin. The longitudinal and ganglionic cords of the great sympathetic were altered from the cranium to the coccyx; the ganglia were much enlarged, as also were the branches proceeding from them, and of abnormal redness; the alteration was most evident in the great splanchnics and in the solar plexus. The splanchnic nerve was larger than the pneumogastric. In the cervical region the left superior cervical ganglion was larger than the right; it was lengthened below and its neurilemma was hypertrophied. The inferior cervical ganglia and the first thoracic ganglia were of a red-brown colour. M. Tigri thinks that the lesions of the suprarenal capsules and of the lymphatic glands, which presented interstitial hæmorrhages, like ecchymoses, found in this case, were the consequence of the pathological condition of the central nervous system. The tissue of the lymphatic glands contained the remains of altered blood. Tigri explains these interstitial hæmorrhages by a paralysis or paresis of the vasomotors. The bronzed skin indicates increased activity of the chromatogenous apparatus of the skin, this increased activity being caused by an abnormal state of the great sympathetic. This functional increase of activity may go as far as to produce interstitial hæmorrhage, this latter manifesting itself by the presence of a yellow residue of the blood, amorphous or undergoing fatty change. Peyer's patches and the solitary glands of the small intestine were hypertrophied; there were ulcerations of the mucous coat of the ileum. These are referred to the morbid condition of the abdominal sympathetic.—*Lyons Medical Journal and Journal de Médecine, de Chirurgie et de Pharmacologie*, Bruxelles, Novembre, 1870.

Morbid Growth of the Semilunar Ganglia of the Sympathetic.—Dr. R. T. Edes, in a paper on morbid growths connected with the nervous system, relates the following case. Mrs. B——, æt. 71, three years ago, had pain and difficulty in urinating. March 1869.——It was thought that left kidney could be distinguished on pressure. General health improved a little for few weeks, when pains returned. Tongue became red and somewhat tender. Extremities cold. No vomiting. Constipation throughout the case. Died November, 1869. The left kidney was found of normal size, closely adherent by fibrous tissue to the aorta. A section showed several thick

layers of whitish brawny substance upon the outside, between which, and also in the region where the pelvis ought to have been, were irregular cavities filled with darker soft material, some of which existed also in the pancreas.   A small portion, probably of the supra-renal capsule, adhered to the kidney, and presented the appearance of a coarse fibrous network filled with reddish jelly.   The left renal artery was contracted, and atheromatous at its entrance.   Behind the kidney were two ganglia of the sympathetic nerve, and above and connected with these were two large nerves, probably the splanchnic, which passed behind the kidney into the mass of fibrous material between it and the aorta.   The upper and anterior sent a branch to one end of a hard fibrous mass on the left side of the cœliac axis, which corresponded in situation to the semilunar ganglion of the other side.   These nerves soon became thickened and involved in the fibrous mass before mentioned, and could be traced distinctly but a short distance therein.   The cœliac axis and superior mesenteric artery were surrounded by the fibrous tissue, with which the nerves became apparently continuous, and which extended downwards three fourths of an inch or an inch, and had no very definite lower border. The branches of the epigastric plexus also entered this mass.   Thin sections of the mass showed in some places the appearance of fibrous bundles with elongated nuclei, at others cells of an elongated and somewhat fusiform shape were found with nuclei.   In some portions there were indications of a stroma.   The author regards the growth as a sarcoma.   In the nervous ganglia there was great hypertrophy of fibrous tissue.   The bundles of nerve-fibres were surrounded by thick concentrated annular masses of connective tissue, in most though not all instances non-nucleated.   There was no proof, however, that the nerve-tubes or cells were degenerated from pressure. The interest of the case lies in the rarity of reported cases of lesion of the sympathetic ganglia.—*Amer. Journal Med. Sciences,* Jan., 1871.

Chorea.—Dr. Roger records a case of chorea associated with articular rheumatism and defect of the mitral valve.   The point of interest in the case was that the choreic movements were confined in a great measure to the muscles of the right side, whilst the rheumatic symptoms principally affected the left side of the body.   A local epidemic of chorea was observed by Dr. Steiner in January and February of 1870; he saw nineteen cases.   Imitation as a cause was out of the question, for there had been no intercourse between the patients.   The cause of the disease Dr. Steiner believed to be the unusually severe weather and sudden and frequent changes of temperature, " in consequence of which any disorder under which children happened to labour passed over into inflammation," the result, as Steiner supposes, of an irritation set up in the spine.   In only five out of the nineteen cases was it possible to detect with certainty rheumatic symptoms—partly articular and partly endocardiac.   The remaining fourteen cases, therefore, must be received as those of a rheumatic affection of the spinal meninges, unassociated with any

rheumatic affection of the muscles of the joints or of the heart. In the treatment of the nineteen cases Steiner found bromide of potassium without effect. Fowler's solution combined with opium proved useful.—*Amer. Journ. Med. Sciences,* Jan., 1871, *from Centralblatt f. d. Med. Wissenschftn.,* July 9th, 1870.

Syphilis of the Nervous System.—Dr. E. L. Keyes has recorded thirty-four cases of syphilis affecting the nervous system. The cases were observed under the direction of Professor W. H. Van Buren, M.D., and were studied chiefly in regard to diagnosis and treatment. Classified according to the most prominent symptom, fourteen of the cases were hemiplegic, nine were of paraplegia, four of epilepsy, two of facial paralysis, one of paralysis of biceps and deltoid, and four of intellectual derangement. Of the thirty-four recovery took place in eleven; the disease was arrested with considerable improvement in five; five were still under treatment, but doing well; death had taken place in seven, and six had been lost sight of. The author draws the following conclusions: "1. That nervous symptoms depending upon syphilis may arise within the first few weeks after an infecting chancre, or at any period later during the life of the individual. 2. That it is presumable from the study of published autopsies that the earlier a nervous symptom (paralytic or otherwise) occurs, the less likely is there to be any material lesion which an autopsy can reveal, and that, in a given case, there exists no constancy of relation between the nature, the situation, and the severity of the lesion, and the nature, situation, and severity of the nervous symptom to which that lesion may give rise. 3. That cerebral congestion is probably the pathology of many of the earlier nervous syphilitic symptoms. 4. That syphilitic hemiplegia occurs as a rule without loss of consciousness, even when the attack is sudden; but that the paralysis usually comes on gradually, the patient being under forty years of age, and having had fixed constant headache for some time before the attack. 5. That mydriasis, existing alone, or with other nervous symptoms, without positive disease of the eye, is presumptive evidence of syphilis. 6. That paralyses of single muscles, or sets of muscles, are frequently syphilitic. 7. That syphilitic paraplegia generally comes on gradually, often without any local symptom to call the patient's attention to the injured portion of the cord, and that it is rarely complete; that the bladder almost always suffers more or less, and calls for special local treatment; that paraplegia may be developed as a symptom of inherited syphilis. 8. That syphilitic epilepsy usually occurs after thirty in patients who have not had epilepsy in early life; that headache is liable to precede the attacks; that the convulsions occur often, many in quick succession, the intermission between the series of attacks being comparatively long, but that, during this period, headache or other nervous symptoms exist and become aggravated, contrary to what obtains in idiopathic epilepsy; that syphilitic epilepsy is liable to be associated with or followed by some form of paralysis. 9. That aphasia is often associated with the intellectual disturbances caused

by syphilis. 10. That loss of memory is a common nervous symptom of syphilis, as are also all forms of mental disturbance, from mild hallucinations and illusions up to actual insanity, and all these without any necessary accompanying paralysis. 11. That inordinate emotional expressions are often associated with the mental weakness caused by syphilis. 12. That care must be taken to distinguish certain symptoms caused by gout from the same symptoms owing their origin to syphilis. 13. That the prognosis is better as a rule for nervous symptoms caused by syphilis than for the same symptoms depending on a lesion equal in extent caused by another malady of the nervous centres ; but that after the arrest of the disease, an indelible impression is often left upon the nerve tissue, which manifests itself by impaired function, and which treatment cannot overcome. 14. That the iodide of potassium pushed rapidly to toleration (the author relates cases in which the iodide was given in drachm doses three times a day), unless the symptoms subside before that point is reached, is the main outline of treatment; that mercury, used at the same time, or alternated with the iodide of potassium, is often of great value in protracted or inveterate cases ; and that tonics, change of air, and surroundings frequently influence the effect of treatment in a marked degree, and may become essential to success."—*New York Med. Journal,* Nov. 1870.

Progressive Osteomalacia.—The case is recorded by Dr. Gussmann in ' Würtemb. Med. Corresp.,' Blt. xl, 1870, of a man, æt. 38, who, on a cold night, whilst perspiring, stood for some time with his feet in a puddle of ice-water ; he was soon after seized with pain in his neck and back, which continued during the ten years he lived. He became pale and emaciated. At length a permanent distortion of the spine set in, with difficulty of breathing, which seemed mainly due to compression of the lungs from an enlarged gland situated beneath the sternum. Pain after a time was experienced upon any movement, especially of the trunk. Febrile symptoms afterwards set in. Before death, in consequence of pressure upon the spinal cord by curvature of the cervical vertebræ, the left arm became paralysed. A *post-mortem* examination showed that the anterior wall of the chest was very much bulged forward to the level of the third rib, and at the lower portion of the chest, at its sides, the ribs were forced out, very much bent, of a deep blueish colour, their periosteum not thickened, but readily removed, and at some points they were cracked. Upon dividing the integuments they were found reduced to the thinness of paper, and the contents of the cavity of the chest consisted in a great measure of a soft, fatty, reddish substance. The cervical vertebræ were much curved laterally, with the convexity of the curve to the left side ; the dorsal vertebræ were curved outwardly. The vertebræ and bones of pelvis projected backwards. There was some degree of gibbosity of the clavicles and of the sternum, in which indications of osteo-sarcoma were present. The bones of the extremities and cranium were normal.—*Amer. Journ. Med. Sciences,* Jan., 1871, *from Centralblatt f. d. Med. Wissenschftn,* July 23rd, 1870.

On Tænia Echinococcus.—Dr. J. Cleghorn, of Jounpore, after describing the frequent occurrence of hydatids of Tænia Echinococcus in the livers of cattle throughout the Punjab, gives the following account of the natural history of the cestode:—" The fully developed worm rarely exceeds one quarter of an inch in length, and is composed of four segments or joints. It is said to be self-impregnating, and a fully grown joint is supposed to contain 5000 eggs. The embryos are developed in the latter, and are provided with hooklets. The habitat of the worm is the intestinal canal of the dog and wolf; the eggs are passed with the droppings of these animals, are swallowed by cattle, &c., when grazing, and by man with his food, especially with the vegetable and watery part of it. The embryos, having gained entrance into the intestines, bore their way into the liver by means of their hooklets, when they become developed into hydatids, frequently attaining a large size, and in the interior of which the scolices are produced. When these scolices find their way into the intestines of a dog, they gradually grow, ultimately becoming a mature tapeworm and completing the circle of development. The author confirms the statement of Frerichs and others that hydatids are rarely met with in the human subject in India. But he thinks this immunity may be more apparent than real. With regard to natives observations are wanting. In the case of Europeans, he is inclined to believe that a certain proportion of cases of hepatic abscess, which are not accounted for by dysentery, are due to the irritation set up by the embryo of Tænia Echinococcus, in boring its way and settling in the liver. The inflammation would, in the first instance, be confined to the spot occupied by the embryo, extend from it as a centre, and a single or topical abscess, as distinguished from pyæmic abscesses, would be the result. Suppuration of fully developed cysts has frequently been met with in Europe (see Frerichs, Rokitansky, Murchison, &c.), and difficulty has occasionally been found in distinguishing them from tropical abscess. The author adduces the case of an Eurasian whom he attended for hepatic abscess, which ultimately proved fatal. On post-mortem-examination, two large abscesses, communicating with each other, were found in the right lobe, and a degenerated hydatid cyst entirely occupied the left lobe. There was an abscess the size of a turkey's egg in each hemisphere of the brain. The presence of abscesses in liver and brain with hydatid cyst seems suggestive."—*Indian Medical Gazette*, Oct. 1, 1870.

CONTRIBUTIONS TO MEDICAL LITERARY HISTORY.

ADVERSARIA MEDICO-PHILOLOGICA.

BY W. A. GREENHILL, M.D. OXON.

PART X.

(Continued from vol. xlvi, *p.* 557.)

διαπνέω, *to suppurate,*[1] synonymous with πυοποιοῦμαι.[2]

διαπύημα, *the result of suppuration, an abscess,* or *purulent collection,*[3] and in this general sense synonymous with ἐμπύημα.[4]

διαπύησις, *the process of suppuration,*[5] synonymous with ἐκπύησις[6] and πυοποίησις.[7]

διαπυΐσκω, properly *to cause to suppurate,* but perhaps more commonly *to suppurate ;*[8] synonymous with ἐκπυΐσκω.[9] The passive διαπυΐσκομαι is joined by Hippocrates[10] with ἐμπυΐσκομαι, and signifies *to suppurate so as to penetrate* (a bone).

διάπυος, *suppurating,* as an ulcer,[11] or the liver.[12]

διαρθρόομαι, *to be articulated,* generally (probably almost always) by διάρθρωσις. Etymologically[13] it would seem to mean to *divide* by διάρθωσις, but it is almost always used to signify to *unite* by διάρθρωσις. It was used as synonymous with ἀπαρθρόομαι,[14] and is distinguished by Galen from συναρθρόομαι: *e. g.* the sternum συναρθροῦται to the ribs, and διαρθροῦται to the clavicle; and the ribs συναρθροῦνται to the sternum, and διαρθροῦνται to the vertebræ ;[15] though in another passage Galen applies the word διαρθρόομαι to the union of the ribs with the sternum[16], and says that sometimes in other parts of the body also one might doubt whether to use the word διαρθρόομαι or συναρθρόομαι.

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[1] Hippocr., 'Aph.,' iv, 82, tome iv, p. 532, ed. Littré.

[2] Theophilus, 'Comment. in Hippocr. *Aph.*,' in Dietz, 'Schol. in Hippocr. et Gal.,' tom. ii, p. 437, l. 1.

[3] Hippocr., 'Prognost.,' § 7, tome ii, p. 130, l. 3, ed. Littré.

[4] Galen, 'De Tumor. præter Nat.,' cap. 4, tom. vii, p. 716, ll. 1, 2; 'Comment. in Hippocr. *Prognost.*,' i, 40, tom. xviii B, p. 102, l. 10.

[5] Hippocr., ibid., tome ii, p. 126, l. penult.

[6] Galen, ibid., tome xviii B., p. 93, l. ult., p. 94, l. 7.

[7] Stephanus Athen., 'Comment. in Hippocr. *Prognost.*,' in Dietz, 'Schol. in Hippocr. et Gal.,' tom. i, p. 119, ll. 18, 25.

[8] Aretæus, 'Caus. Morb. Chron.,' i, 9, p. 100, l. 5, ed. Kühn.

[9] Galen, 'De Tumor. præter Nat.,' cap, 4, tom. vii, p. 716, ll. 2, 3.

[10] 'De Cap. Vulner.,' § 2, tome iii, p. 192, l. 9, ed. Littré.

[11] Aretæus, 'De Cur. Morb. Acut.,' ii, 2, p. 257, l. 10, ed. Kühn.

[12] Hippocrates, 'Aphor.,' vii, § 45, tome iv, p. 590, ed. Littré, rendered by Celsus, "si in jecinore vomica est." 'De Medic.,' lib, ii, cap. 8, p. 44, l. 33, ed. Daremb.

[13] From the force of διά in composition. See Liddell and Scott's 'Lexicon.'

[14] Hippocr., 'De Artic.,' § 30, tome iv, p. 142, l. 3, ed. Littré; and Galen's Commentary on the passage, tom. xviii A, p. 433, l. 7.

[15] Galen, 'De Anat. Admin.,' viii, 1, 7, tom. ii, p. 656, ll. 4, 6, 9, 10; p. 686, l. ult.; p. 687, l. 1.

[16] 'De Oss.,' cap. 13, tom. ii, p. 763, l. 14; p. 764, ll. 10, 16, 17.

διάρθρωσις, *a movable articulation*, synonymous with ἀπάρθρωσις,[1] and distinguished from συνάρθρωσις, *an articulation with little or no motion*.[2] Sometimes, when the motion is but slight, as in the case of the union of the ribs with the sternum, the words διάρθρωσις and συνάρθρωσις were used indiscriminately.[3] Three species of διάρθρωσις were recognised in Galen's time, viz. ἐνάρθρωσις, ἀρθρωδία, and γίγγλυμος, three words of comparatively recent origin.[4] (See Ἄρθρον in this Glossary.)

διάρροια, *diarrhœa, purging*, in the same wide sense given to the word in the present day.[5] It occurs in Hippocrates (who uses the phrase κοιλίης ῥύσις in the same sense),[6] and is rendered by Celsus *alvus cita*,[7] or *alvi dejectio*,[8] or simply *dejectio*,[9] and in Arabic by Honain once by ذرب *dharab*,[10] and elsewhere by اختلاف *ichtiláf*.[11] The word does not seem to have been adopted by any of the early Latin writers.   Cicero uses it, but in Greek characters;[12] Cælius Aurelianus writes in Latin characters, but calls it a Greek word, which he renders by *defluxio*.[13]   The names διάρροια εἰς οὖρα[14] (for οὐράνην) and διάρροια εἰς ἀμίδα,[15] *a flux into the urinal*, were applied to *diabetes*, the former name having originated with some one whom Galen calls παλαιός τις ἀνήρ, 'one of the ancients.'[16]   The phrase διάρροια σπέρματος, *a flux of semen*, is used by Moschion[17] as synonymous with γονόρροια applied to women, in the sense (probably) of *leucorrhœa*.

διαρροϊζομαι, *to suffer from diarrhœa*.[18]

διάστασις, *separation*, especially of immovable bones united by

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[1] Galen, 'Comment. in Hippocr. *De Artic.*,' ii, 6, tom. xviii A, p. 433, ll. 5, 6.

[2] Id., ' De Oss.,' procem., tom. ii, p. 735, ll. 6, 7.

[3] Id., ibid., cap. 13, tom. ii, p. 764, ll. 8, 14.

[4] Id., ibid., procem., t. ii, p. 735, l. 11.

[5] A definition of the word is given by Aretæus, 'De Caus. Chron.,' ii, 7, p. 107, ed. Adams; and by Galen, ' Ce Cogn. et Cur. Animi Morb.,' cap. 9, tom. v, pp. 46, 47 ; ' Defin. Med.,' cap. 268, tom. xix, p. 421, l. 16.

[6] ' Aphor.,' ii, 14; iii, 16, tome iv, pp. 474, 492, ed. Littré.   See Celsus, ' De Medic.,' ii, 1, p. 29, l. 31, ed. Daremb.

[7] iii, 22, p. 113, l. 5.   Compare Hippocr., 'Aphor.,' v, 14, p. 536.

[8] ii, 1, p. 28, l. 36; p. 30, l. 29.   Compare Hippocr., 'Aphor.,' iii, 21, 25, pp. 496, 498.

[9] ii, 8, p. 46, ll. 24, 30.   Compare Hippocr., ' Aphor.,' vi, 15, 17, p. 566.

[10] Translation of the 'Aphorisms,' iii, 21, p. 25, l. 6, ed. Calcutta, 1832.

[11] iii, 25, 30, p. 26, l. 6; p. 27, l. 10, and elsewhere.

[12] ' Epist. ad Div.,' lib. vii, ep. 26.

[13] ' Morb. Acut.,' iii, 22, p. 265, ed. Amman.

[14] ' Galen, ' De Symptom. Differ.,' c. 6, tom. vii, p. 81, l. 3 ; ' De Locis Affect.,' vi, 3, tom. viii, p. 394, l. 12; Theophanes Nonnus, ' Epit. de Cur. Morb.,' c. 178, tom. ii, p. 77, where see Bernard's note.

[15] Joannes Actuarius, ' De Diagn. Morb.,' i, 49, 51, in Ideler's ' Phys. et Med. Gr. Min.,' vol. ii, p. 409, l. 27 ; p. 411, l. 4.

[16] ' De Cris.,' i, 12, tom. ix, p. 597, l. 5.

[17] ' De Mulier. Pass.,' c. 138, p. 87, ed. Dewez.

[18] Alexander Aphrod., ' Phys. Problem.,' i, 98, in Ideler's ' Phys. et Med. Gr. Min.,' vol. i, p. 34, ll. 6, 13 ; Oribas., 'Coll. Medic.,' i, 49, tome i, p. 62, l. 11, ed. Daremberg.

suture (ῥαφή) or symphysis (σύμφυσις) ;[1] also *space, dimension*, in length, breadth, and depth.[2] It was used by some of the oldest medical writers, in their definition of the pulse, as opposed to συστολή, and synonymous with διαστολή,[3] *dilatation*. In the cognate sense of *distension* it is applied to the *veins* by Aretæus,[4] and also (in the common editions) to the *head* ;[5] but in the latter case Ermerins, in the 'Addenda et Corrigenda' to his edition (p. 445), says, "Edere debueram διατάσιες, quod jam alii Latine expresserunt."

διαστέλλω, *to dilate artificially*,[6] as by an instrument; *to expand naturally*, applied (perhaps) especially to the thorax ;[7] but most frequently found in the passive, διαστέλλομαι, *to be expanded or dilated*, as opposed to συστέλλομαι, *to be contracted.* It was applied, not only to the heart,[8] and arteries,[9] but also to the thorax,[10] and lungs,[11] the brain,[12] the stomach and abdomen,[13] and the uterus.[14]

διάστημα (plural διαστήματα), in Hippocrates, is translated by Littré *diastases*,[15] by Adams *diastases of bones*,[16] and more fully by Ermerins "ubi ossa, quæ naturaliter mutuo se contingunt, aliquo intervallo distant."[17] This last translation (or paraphrase) agrees with Galen's explanation, viz. a separation of two bones which naturally touch each other without diarthrosis.[18]

διαστολεύς, *a dilator*.[19]

διαστολή, *dilatation, diastole*, the opposite movement to συστολή, *contraction, systole*. It was applied especially to the heart,[20] and

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[1] Galen, 'Defin. Med.,' c. 475, tom. xix, p. 461.

[2] Id., 'De Puls. ad Tir.,' c. 2, tom. viii, p. 455, l. 2.

[3] Id., 'De Differ. Puls.,' iv, 8, 9, 17, tom. viii, p. 736, ll. 9, 17 ; p. 741, l. 5 ; p. 759, ll. 11, 12, 14.

[4] 'Caus. Acut.,' ii, 2, p. 29, l. 6, ed. Kühn.

[5] 'Cur. Chron.,' i, 3, p. 306, l. 1.

[6] 'Gloss. Hippocr.,' tom. xix, p. 92, l. 13 ; Paulus Ægin., vi, 78, p. 324, ll. 4, 15, ed. Briau.

[7] Galen, 'De Anat. Admin.,' viii, 2, 5, tom. ii, p. 657, l. 16 ; p. 659, l. 3 ; p. 676, l. 18 ; Theophilus, 'De Corp. Hum. Fabr.,' iii, 11, § 14, p. 105, l. 1, ed. Oxon.

[8] Galen, 'De Anat. Admin.,' vii, 14, tom. ii, p. 635, ll. 11, 15 ; 'De Usu Part.,' vi, 2, tom. iii, p, 412, l. 14.

[9] Id., 'De Anat. Admin.,' vii, 4, 14, 15, tom., ii, p. 597, l. 15 ; p. 635, l. 16 ; p. 640, l. 14.

[10] Id., ibid., viii, 3, 5, 10, tom. ii, p. 664, l. 6 ; p. 678, ll. 6, 12 ; p. 704, l. 10.

[11] Id., ibid., vii, 14, tom. ii, p. 637, l. 14 ; Theophilus, 'De Corp. Hum. Fabr.,' iii, 11, p. 103, ll. 2, 15, ed. Oxon.

[12] Galen, ibid., ix, 2, tom. ii, p. 717, l. 9 ; Theophilus, ibid., iv, 10, p. 142, l. 11.

[13] Theophilus, ibid., iii. 17, p. 116, l. 15 ; p. 117, l. 2.

[14] Galen, 'De Usu Part.,' xiv, 3, tom. iv, p. 146, l. 5.

[15] 'De Offic. Med.,' § 23, tome iii, p. 328, l. 6.

[16] 'Works of Hippocr.,' vol. ii, p. 486.

[17] Vol. iii, p. 220, l. 17.

[18] Commentary on the passage, tom. xviii B, p. 887, l. 8.

[19] Paulus Ægineta, vi, 78, p. 324, l. 14, ed. Briau.

[20] Galen, 'De Anat. Admin.,' vii, 4, 16, tom. ii, p. 597, l. 7 ; p. 640, l. 18 ; Theophilus, 'De Corp. Hum. Fabr.,' iii, 4, 11, p. 91, l. 9 ; p. 103, l. 9, ed. Oxon.

the arteries[1] in connection with the pulse, but also to the brain and its membranes,[2] and the thorax.[3]

διάστρεμμα (plural διαστρέμματα), in Hippocrates, is rendered by Littré[4] *petits déplacements des articulations,* by Adams[5] *distrainings,* and more fully by Ermerins,[6] " ubi ossa prope articulum . . . distorquentur." This paraphrase agrees with the explanation of Galen,[7] who, in distinguishing στρέμμα from διάστρεμμα, says that the former affects only the ligamentous parts, while the latter affects the joint, and causes a slight displacement of the bones.

διασφαγή does not seem to have been applied by Herophilus as a name to the umbilical fissure of the liver.[8] He only says that this part is compared, διασφαγί τινι, " to a sort of cleft in a rock," on account of the umbilical vein which passes through it.[9]

διάσφυξις, *a pulsation* (not necessarily a violent one), joined to ἀρτηρία by Aretæus,[10] and to φλεβές, in the sense of *arteries,* by a writer in the Hippocratic Collection.[11] The phrase διασφύξιες ἐγκεφάλου in Aretæus[12] will mean *pulsations felt in the brain.*

διάτασις, *extension,* in the case of a fractured or dislocated limb.[13] The word occurs not unfrequently in the general sense of *tension* or *expansion,* and is sometimes confounded with διάθεσις and διάστασις.[14]

διατμίζομαι (passive), *to have exhalation take place,* applied to the body.[15]

διάτρησις (plural διατρήσεις), *perforations, apertures,* applied to the holes in the cribriform plate of the ethmoid bone,[16] called also κατατρήσεις.[17] Διάτρησις ἐν τῷ δακτυλίῳ, *fistula in ano.*[18]

διατριταῖος (a word not found in Liddell and Scott's 'Lexicon,' and perhaps not in any Greek writer) occurs in the translation of Soranus by Cælius Aurelianus, who uses the phrase " diatritæum

[1] Galen, 'Synops. de Puls.,' cc. 7, 14, tom. ix, p. 447, l. 8; p. 469, ll. 4, 10.

[2] Id., 'Defin. Med.,' c. 205, tom. xix, p. 403, l. 1; Theophilus, 'De Corp. Hum. Fabr.,' iv, 10, p. 142, l. 12, ed. Oxon.

[3] Theophilus, ibid., iii, 11, 17, p. 103, l. 5; p. 115, l. 12.

[4] 'De Offic. Med.,' § 23, tome iii, p. 328, l. 7.

[5] 'Works of Hippocr.,' vol. ii, p. 486.

[6] Hippocr., vol. iii, p. 220, l. 18.

[7] Commentary on the passage, tom. xviii B, p. 887, l. 5; p. 889, l. 8.

[8] See Castelli 'Lex. Med.,' in *Diasphage.*

[9] Galen, 'De Anat. Admin.,' vi, 8, tom. ii, p. 570, l.14.

[10] 'Caus. Acut.,' ii, 2; 'Cur. Chron.,' i, 2, p. 33, l. 12; p. 295, ll. 3, 5, ed. Kühn. Also in 'Cur. Acut.,' ii, 7, p. 278, l. 9, where the old reading διάφυσις has been altered by Ermerins into διάσφυξις (p. 224, l. penult.).

[11] 'De Alim.,' § 48, tome iv, p. 116, l. penult., ed. Littré.

[12] 'Cur. Chron.,' i, 3, p. 306, l. 2, ed. Kühn.

[13] Hippocr., 'De Offic. Med.,' §§ 15, 16, tome iii, pp. 318, 320, ed. Littré; Galen, 'Defin. Med.,' c. 481, tom. xix, p. 462, l. 3.

[14] See Bernard's Index to Theophanes Nonnus; Ermerins's Index to Aretæus; Theophilus, 'De Corp. Hum. Fabr.,' ii, 8; v, 10, p. 71, l. 1; p. 201, l. 7, ed. Oxon.

[15] Aretæus, 'Cur. Acut.,' i, 1, p. 200, l. 8, ed. Kühn.

[16] Theophilus, 'De Corp. Hum. Fabr.,' iv, 12, p. 146, l. 3, ed. Oxon.

[17] See the corresponding passage in Galen, 'De Usu Part.,' viii, 7, tom. iii, p. 652, l. 4.

[18] Leo, 'Consp. Medic.,' v, 19, in Ermerins, 'Anecd. Med. Gr.,' p. 181.

tempus," as synonymous (apparently) with διάτριτος, signifying *the space of three days*.[1]

διάτριτος,[2] and διατρίτη,[3] *a three days' fast*, ordered by Thessalus and the Methodici at the commencement of a simple fever,[4] but without sufficient discrimination.[5] Cælius Aurelianus (who belonged to the sect of the Methodici) mentions "abstinentia usque ad tertium diem, quem Græci *diatriton* vocaverunt."[6] But he sometimes uses the word simply as *the space of three days*, or *the third day*,[7] and also (apparently) for *every third (or alternate) day*.[8]

διαφθείρω,[9] and διαφθείρομαι τὰ ἔμβρυα, or τὰ παιδία, *to miscarry*, a phrase used especially (perhaps exclusively) in the Hippocratic Collection.

διαφθορά, *corruption, decomposition*, as (probably) of food in the stomach,[11] or of the humours of the body.[12] In the Hippocratic Collection it signifies *abortion*,[13] being synonymous with ἀποφθορά, and the more Attic word ἄμβλωσις.[14]

διαφορέω, *to disperse, discuss*, not necessarily by perspiration;[15] passive, διαφοροῦμαι, *to be dispersed*, generally (perhaps) by perspiration.[16]

διαφόρησις, *perspiration*, in the modern sense of the word, and to be distinguished from διαπνοή, which, though more nearly corresponding to the word *perspiration* etymologically, is very different in signification.[17] The expression ἄδηλος διαφόρησις, *insensible perspiration*, occurs in Cælius Aurelianus, who renders it "disjectio occulta."[18]

διαφορητικός, *calculated to disperse or discuss*,[19] especially by per-

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[1] 'Morb. Acut.,' i, 3, p. 14, ll. 2, 3, ed. Amman.

[2] Galen, 'De Meth. Med.,' iv, 4, tom. x, p. 264, l. 5; 'Ad Glauc. de Meth. Med.,' i, 2, tom. xi, p. 6, l. 15.

[3] Id., 'De Rat. Vict. in Acut. sec. Hippocr.,' c. 4, tom. xix, p. 195, l. 9.

[4] Stephanus, 'Comment. in Gal. *Ad Glauc. de Meth. Med.*,' in Dietz, 'Schol. in Hippocr. et Gal.,' tom. i, p. 245, l. 6.

[5] Galen, 'Ad Glauc. de Meth. Med.,' tom. xi, p. 195, l. 15 sq.

[6] 'Morb. Chron.,' i, 3, p. 290, l. 7, ed. Amman.

[7] Ibid., i, 4; iii, 2, pp. 299, 438.

[8] "Cæteris trinis diebus, quas *diatriton* Græci vocaverunt," ibid., ii, 1, p. 350.

[9] 'Aphor.,' v, 53 bis, tome iv, p. 550, l. ult.; p. 551, l. 3, ed. Littré; 'Epid.,' vii, §§ 41, 73, tome v, p. 408, l. 13; p. 432, l. 19.

[10] Id., 'De Morb. Mul.,' i, §§ 21, 72, tome viii, p. 60, l. 5; p. 152, l. 12.

[11] Galen, 'De Locis Aff.,' ii, 1, tom. viii, p. 70, l. 5.

[12] Id., ibid., vi, 5, tom. viii, p. 422, ll. 10, 18; p. 423, l. 14.

[13] 'De Morb. Mul.,' i, 3, tome viii, p. 24, l. 1; 'Epid.,' vii, 97, tome v., p. 450, l. ult.; 'Præn. Coac.,' c. 31, §§ 505, 506, tome v, p. 700, ed. Littré.

[14] Galen, 'Comment. in Hippocr. *Epid. VI*,' i, 2, tom. xvii A, p. 799, l. 8; p. 801, l. 1.

[15] Id., 'De Meth. Med.,' xiii, 8, tom. x, p. 899, ll. 6, 8; 'De Compos. Medic. sec. Gen.,' vi, 13, tom. xiii, p. 923, ll. 8, 15; p. 924, l. 3.

[16] Id., 'Comment. in Hippocr. *De Salub. Vict. Rat.*,' c. 2, tom. xv, p. 180, l. 14. Leo, 'Consp. Medic.,' ii, 4, in Ermerins, 'Anecd. Med. Gr.,' p. 113. Aretæus, 'Caus. Chron.,' ii, 1, p. 94, l. 17, ed. Adams.

[17] Galen, 'De Meth. Med.,' xiii, 16, tom. x, p. 919, l. 16.

[18] 'Morb. Acut.,' ii, 32, p. 150, ed. Amman.

[19] Galen, 'De Compos. Medic. sec. Gen.,' vi, 13, tom. xiii, p. 925, l. 8 sq.

spiration,[1] *diaphoretic.* The word is found in Roman characters in Cælius Aurelianus.[2]

διάφραγμα, *a barrier* or *partition,* applied to the *cartilago septi* of the nose,[3] and to the *velum palati.*[4] It was, however, chiefly used to signify *the midriff* or *diaphragm,* which was called also φρένες,[5] διάζωμα[6] and ὑπόζωμα,[7] by the Latin writers *septum transversum,*[8] *præcordia,*[9] *discretorium,*[10] *discrimen thoracis ac ventris,*[11] or simply *discrimen,*[12]

and by the Arabic writers حِجاب *hajáb.*[13] Galen says[14] that this last use of the word was derived from Plato, who considered[15] that the *midriff* (φρένες) was a *barrier* (διάφραγμα) intended to divide that part of the soul in which resided courage, spirit, anger, and the like (τὸ θυμοειδές), and which was situated in the heart, from that part which was the seat of the desires and affections (τὸ ἐπιθυμητικόν), and which was situated about the liver. After Plato's time the word διάφραγμα was commonly used in this technical sense, and superseded to a great extent the ordinary term φρένες. Galen also states that both Aristotle and Plato considered the diaphragm to be merely a partition between the upper and lower viscera, and were not aware of its important use in the mechanism of respiration.[16]

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[1] Galen, ' De Meth. Med.,' xiii, 6, tom. x, p. 894, l. ult.

[2] ' Morb. Ac.,' i, 17 ; ii, 10, 36, p. 64, l. 10 ; p. 104, l. 2 ; p. 158, l. 24, ed. Amman.

[3] Rufus Ephes., ' De Appell. Part. Corp. Hum.,' p. 25, l. 23 ; p. 47, l. 22, ed. Clinch. Galen, ' Comment. in Hippocr. *Epid. VI,*' i, 4, tom. xvii A, p. 824, l. 2. Theophilus, ' De Corp. Hum. Fabr.,' iv, 13, p. 147, l. 17, ed. Oxon.

[4] ' Hippocr., ' Epid.,' ii, 2, § 24, tome v, p. 98, l. 10, ed. Littré.

[5] Hippocr., ' Aphor.,' iv, 18 ; vi, 18, tome iv, pp. 506, 566, ed. Littré. Galen, ' De Anat. Admin.,' v, 5, tom. ii, p. 503, l. 11.

[6] Aristotle, ' Hist. Anim.,' i, 16, § 16, p. 21, l. 10 ; i, 17, § 8, p. 23, l. 4 ; ii, 17, § 8, p. 46, ll. 2, 7, 14 ; ' De Part. Anim.,' iii, 10, § 1, p. 76, l. 1, ed. Bekker.

[7] Id., ' Hist. Anim.,' iii, 1, §§ 26, 29, p. 51, l. 12 ; p. 53, ll. 17, 22 ; ' De Part. Anim.,' ii, 16, § 11, p. 47, l. 16.

[8] Celsus, ' De Medic.,' i, procem., p. 7, l. 31 ; ii, 7, p. 43, l. 30 ; iv, i, p. 121, l. 7, ed. Daremb.

[9] Pliny, ' Hist. Nat.,' xi, 77, ed. Tauchn.

[10] Cælius Aurel. ' Morb. Chron.,' ii, 12, § 143, p. 398, ed. Amman.

[11] Id., ibid., v, 10, p. 582, l. 2.

[12] Id., ibid., ii, 11, §§ 127, 130, pp. 392, 393.

[13] Honain's translation of the 'Aphorisms' of Hippocrates, p. 31, l. 2 ; p. 55, l. 2 ; p. 65, l. 1, ed. Calcutta, 1832.

[14] ' De Locis Affect.,' v, 4, tom. viii, p. 327.

[15] ' Timæus,' p. 70 A, ed. Steph. (tom. vii, p. 73, l. 8, ed. Tauchn.).

[16] ' De Usu Part.,' iv, 14, tom. iii, p. 314 ; ' De Locis Affect.,' v, 4, tom. viii, p. 328.

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