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POLLUTION OF WATER-SUPPLIES.*

IN its report at the last meeting of the association your committee explained in brief the ground of its belief in the harmfulness of sewage in waters used as potable supplies, whether these were derived from wells or larger sources; whether the water-supply of an isolated dwelling or that of a populous city. Chemical analysis was shown to be in most instances inadequate to the detection of sewage, unless the sewage was present in unusual quantity or the water unusually free from other organic matters; and the conclusion was reached that the inability of the chemical methods is of no practical importance, as the presence of sewage in the water-supply can be determined by the sanitary inspector; and further, that for protective purposes the knowledge that sewage enters the water is all that seems to be required, because where there is sewage there is danger of typhoid infection.

Your committee desires to give special emphasis to the last stated clause, because it believes that the endemicity of typhoid-fever in our cities is in great part due to the sewage in the water-supply. Many of our public water-supplies contain sewage, and its harmfulness in a general way is unquestioned even by those who have a financial interest in them. Yet there appears to be a hesitancy to acknowledge the real, the specific, danger. Typhoid-fever is present in all our cities, giving annual death-rates of from 15 to 100 and over in every 100,000 of the population; but in the enumeration of its

* Report of the Committee of the American Public Health Association on the Pollution of the Water-Supply, at the Milwaukee meeting, November 20th, 1888.

causes its prevalence is ascribed to many unsanitary conditions before mention is made of the public water-supply. It is allowed in certain local epidemics to be propagated from wells which have become infected by an infected sewage, but the sewage in the public supply is seldom considered other than as a sentimental objection to the use of the water. It is allowed in many instances to arise from leaks in the plumbing of houses, by which exhalations from infected sewers reach the interior of the dwelling, but the water-supply into which the sewage of these very sewers is poured is used without a thought of its deadly qualities, unless, as in the case of Plymouth, Pa., the fact is forced upon the public mind that a public water-supply has as little disinfecting power over the germs of typhoid-fever as the private water-supply of an infected well. Health officers condemn the well, and generally it is closed as soon as it is found that sewage percolates through its area of drainage; they should condemn the public supply on the same grounds.

The large financial interests involved in the establishment of a public water-supply may be assumed to be at the bottom of this hesitancy to acknowledge the specific danger attaching to the presence of sewage. Millions of dollars, perhaps, have been invested in that water-supply, and many more millions would be required to replace it by water from a purer source. These large sums are alone considered, and not the vast and annually increasing totals of the loss by sickness and death that might have been prevented. A public or private well involves but a small sum, so small that it does not stand in the way of sanitary progress. It is closed, and with its closure one more possible centre of typhoid infection is removed; but the decreasing influence exercised by this on the annual rate of prevalence is small indeed if the public supply continue to disseminate the disease. The dollars and cents represented by the existing water-works may be regarded as a barricade to sanitary progress, or an altar on which typhoid-fever sacrifices its victims.

The efforts that have been made from time to time to quiet the public mind by demonstrating the destruction of sewage and the self-purification of the water which contained it, are in part attributable to these financial interests; but only in part, for many sanitary inquirers have been deceived by partial or imperfect observations. Unfortunately, however, those analysts who have had much practical experience in following the track of sewage in its passage down-stream recognize in this so-called self-purification only the results of sedimentation and dilution. Undoubtedly the natural processes of purification—the transformation of organic matter into ammonia, and the nitrification of the latter—operate in the current of a running stream ; but these account for but a small proportion of the seeming purification, and there is no ground for supposing that the infectious principle of typhoid-fever is given up to the action of these purifying agencies. We acknowledge that typhoid-fever is propagated by an infected sewage in a well-water when all organic trace of the sewage has disappeared through the instrumentality of the agencies referred to. There are two kinds of organic matter in the dangerous sewage—matter which, by the absence of life, is given up to decomposition and reduction to harmless inorganic forms, and matter which by its vitality is preserved from these influences ; and we acknowledge that in the well-water the former may be reduced, while the latter retains the full measure of its virulence. Analogy shows conditions of a similar character affecting our river-supplies, and the seeming apathy with which they are regarded can only be accounted for by assuming that individually we have fought against the barricade erected by the dollars and cents, and been defeated by its solidity and strength.

In this country the relation between the distribution of a water which contains sewage and the prevalence of typhoid-fever can be readily observed by any one who studies the mortality returns of our cities in connection with the *character* of their water-supply. The records in many instances are complete and trustworthy for the past twenty years. Brooklyn, New York City, Boston, Cincinnati, Philadelphia, etc., have a death-rate from typhoid-fever proportioned to the quantity of sewage which enters their water-supplies. Where the water-supply, as in the first-mentioned city, is free from sewage, the death-rate is low, about 15 in every 100,000 of the population, these cases being due to indirect infection and other local causes. When care is exercised in excluding sewage from the water-shed which furnishes the public supply, there is a corresponding freedom from typhoid-fever, as in New York, which has a rate of 25, and Boston, which loses about 40 annually for every 100,000 of her people. In Philadelphia and other cities, in which less attention is given to the purity of the public supply, the typhoid death-rates are correspondingly increased. Moreover, the records of some of these cities give interesting information when viewed in connection with the *history* of the water-supply. The city of Baltimore has had a steadily diminishing rate since its water-supply was first introduced, and this decrease has been more notable since 1880, when the supply was largely extended. And this same city of Baltimore shows that its improved condition is not due to the introduction of a system of sewerage, but to the use of a purer water than was formerly furnished by its infected wells. Ordinarily a sewerage system and public water-supply are contemporaneous improvements, and heretofore any benefit to the health of the community has been credited to the sewerage, although it seems as if the inflow of a wholesome water had really more to do with the lessened death-rate, for the small typhoid rate of New Orleans, La., cannot be attributed to the sewers of that city, since it has none; but it *may* be attributed to the water-supply, for that consists of rain-water, which is free from sewage, inasmuch as the cisterns in which it is stored are not sunk in the soil, but raised considerably above the surface.

Testimony of a similar character has recently been developed by the experience of Vienna. In that city, from 1851 to 1874, well water of an impure character was used to a large extent in addition to a systematized supply from the Danube. During this period the deaths from typhoid-fever ranged from 100 to 340 annually in every 100,000 of the population. In the last-mentioned year a spring-water was introduced, and the death-rate from typhoid-fever fell immediately to 50. Since then, by the disuse of impure wells and the extension of the new supply, the rate for the past three years has fallen to 11; and, inasmuch as the sewerage system was in existence during the period of high rates, the fall since 1874 is necessarily referred to the use of a water which is free from sewage. The fall in the typhoid rate experienced an interruption in 1877, when, owing to the freezing of some of the sources of the spring-supply, the water of the Danube had to be pumped into certain of the mains; and it is of importance to observe that the sections of the city which were chiefly affected by this epidemic were those in which the Danube water was distributed. According to Professor Nothnagel, typhoid-fever has become such a rarity since the introduction of the spring supply that when a case occasionally comes to hospital from outside the city he shows it to the students as one of unusual interest.

In the face of such testimony to the influence of a pure water on the typhoid rate, we cannot shut our eyes to the relation that exists between sewage in our streams and typhoid-fever in the cities that are supplied by them, no matter how great may be the financial interests that are involved or sunk in the contaminated supplies. Now comes the inquiry, What are the measures that have been or should be adopted to lessen the evil?

As a rule, the only effort made by our municipal authorities and water companies to purify our public supplies is by sedimentation. They select a pond which forms a natural sedimenting reservoir, or they throw a dam across a stream to form an artificial one, or, in the case of large water-courses, they pump directly from the stream into specially prepared basins. Primarily these basins or reservoirs were intended to facilitate distribution and guard against a temporarily inadequate flow in the stream which furnishes the supply; but they were found to answer the purpose of clearing, and to that extent of purifying, a turbid water, provided they were large enough to permit the water to remain undisturbed for the needful length of time. When it is proposed to have additions made to the water-supply of a city, the construction of new basins is usually implied. As an instance, there are now at the city of St. Louis, Mo., four settling basins, holding eighteen million gallons each. The floors are paved with brick on edge, and slope toward the centre and the river side. The sediment is floated off from the floor of each basin once in about four months, the quantity removed annually amounting nearly to 200,000 cubic yards. The wants of the city permit the water to settle only from eight to eighteen hours, while a period of thirty hours is required for a satisfactory subsidence.

On this account an extension of the work is at present in contemplation. Surveys have been made, and land purchased, for larger settling-basins and conduits to carry the water to the present high-service or clear-water pumping-plant. The estimated cost of these improvements is three and a half million dollars.

The storage of a turbid water in such basins undoubtedly tends to improve its quality. No argument is required to show that the St. Louis water is better with its suspended matters at the bottom of the reservoirs than choking the distributing pipes, collecting in every containing vessel in the city, or settling in the alimentary tract of the water consumers. The subsidence of the inorganic matters which constitute the mass of the turbidity carries down a considerable proportion of the associated organic materials, and the clear water gives markedly better results as well on chemical analysis as on bacteriological examination.

Chemically considered, the tendency of the cleared water is to further purification. Organic matter steadily diminishes in quantity, and is replaced by ammonia and nitrates; but as this is effected by bacterial agencies, biologically the stored water progressively deteriorates after it has become clear by sedimentation. The bacteria increase at the expense of the organic matters which they destroy. A water which every chemist and every bacteriologist would pronounce a fair sample of potable water will be found, after a week of storage, to be swarming with bacteria. Daily experience forbids the condemnation of a good water merely because it has been stored for a week; yet the bacterial colonies that may be developed from it are infinitely more numerous than those that are found in a water which is impure even to the senses. Indeed, the bacteria in an ordinarily pure water, after storage, may be vastly more numerous than in another portion of the same water intentionally contaminated with sewage or other impurity and similarly stored for the same length of time. This it is which deprives the bacterial cultivations of that value which but a short time ago they were expected to develop as indices of the wholesomeness or unwholesomeness of a water. A chemical evidence demonstrating a tendency to purification by the conversion of organic matter into nitrates, through the instrumentality of bacterial organisms, is more consistent with every-day observation than the bacteriological evidence which suggests unwholesomeness by demonstrating the numbers of the bacteria.

But although the general tendency is to the reduction of organic matter in stored waters, it often happens, particularly if the water is rich in ammonia or easily decomposed albuminoids, that vegetable growths other than bacteria will be developed, giving a bad taste or odor to the water, and perhaps causing diarrhœa in the consumers. These, which may be considered the accidents of storage, have been studied by many health boards and water companies; and the influence of heat, aeration, exposure to sunlight, etc., on their development, has been determined with practical benefit in many cases.

Sedimentation is sometimes an exceedingly slow process, particularly when the mineral particles consist of finely divided clay. A week or more is required in some instances to give a clear water, and this involves a large expenditure for storage-basins. Hence, many have turned their thoughts to filtration as a prompt and efficient means of purification. Filtering-beds are in general use in England, but in this country they have been constructed only by a few cities, and in an experimental way. The results do not appear to have been satisfactory. The expenses attending them are large, and the coldness of our winters begets difficulties which have not to be encountered in the milder climate of England.

But the failure of filtration on the large scale, and the imperfect results of sedimentation as carried on in the reservoirs, have given an impetus to the construction of filters for domestic use; and the success which has attended attempts to supply a clear water to manufactories and other large establishments has gradually led to more ambitious efforts. Of late some municipalities have investigated the means by which this filtration is effected; and the ability of the filters to supply a clear water on the large scale appears to have been demonstrated. As the method is patented, a certain hesitancy has been manifested by members of the Association in referring to it; but, patented or not patented, if it have a value above others in supplying a pure water, we should have full accounts from such of our members as have a practical knowledge of its operations in all their aspects. A member of the American Water-Works Association did not hesitate, at its last meeting, to invite attention to the success achieved at Atlanta, Ga. He expressed himself as knowing but little of the chemical improvement that took place in the quality of the water, but so far as the mechanical results of the filtration were concerned he was perfectly satisfied. The surface of the water in the impounding reservoir is nineteen feet above the layer of coke and sand which constitutes the filter-bed, through which it is carried by gravity into the clear-water basin. The reservoir water is generally so muddy from red clay and other suspended impurities that it is rarely fit for bathing or laundry uses; yet in the clear-water basin small objects may be plainly seen through it at a distance of twenty feet. The capacity is three million gallons daily, although the quantity actually filtered for distribution at the time of the report was only two million gallons. The cost of the filters and clear-water basin was $55,000, and the daily expenses eight dollars for alum and two dollars and fifty cents for labor.

So much experience has been gained in the construction of these filters that filtration can no doubt be effected more rapidly and economically under the supervision of the patentees, than on new plans which must be at first regarded as merely experimental. But if the attention of boards of health, water companies, and sanitary engineers were directed to the development of the best filtering plant, other and better methods might be suggested and carried into practice; or, if the patent process were proved to be superior to all others, the ability to express a prompt approval would be substituted for our present hesitancy. The passage of water through a filter-bed, the regular cleaning of the filtering material, and the addition of alum, iron, lime, or other precipitant, to the water, are the essentials of the process; but the patents necessarily cover only the specific mechanism by which these are brought into operation in that particular process. The natural laws of filtration, and of mechanical and chemical action, are open to the ingenuity of the world.

Recently Mr. L. H. Gardner, of New Orleans, has been experimenting on the large scale with solutions of iron, not as an adjuvant to filtration, but to hasten sedimentation in the settling basins. Iron as a precipitating or filtering agent has been used in various forms and to a considerable extent, on the large scale, as a water-purifier since Medlock, in 1857, patented a process in which water was treated by contact with metallic iron. Spongy iron attained even a popular repute as a filtering material, but at the present time in Europe it has been displaced by the Anderson process, which is said to be in successful operation at Antwerp, Ostend, Paris, and Vienna. The water in this process is first partially sedimented and then forced through a revolving purifier consisting essentially of a wrought-iron cylinder mounted on hollow trunnions, which serve for inlet and outlet pipes. Curved ledges, running lengthwise of the cylinder on its inner surface, scoop up and shower down fine borings of cast iron through the current of the water. By the combined action of the cylinder and the water-current every portion of the latter is brought into contact with the iron, the particles of which are kept constantly bright by friction against each other and the sides of the cylinder. After this the water is passed through sand filter-beds to remove excess of iron. The results claimed are that the organic matter is altered in its chemical nature, and the albuminoid ammonia lessened from one fourth to one half of its original amount; that the water is softened, the scale in boilers becoming greatly reduced, open, friable, and loosely adherent to the plates; and that the microscopic life of the water is, to a large extent, destroyed or removed. At Antwerp the quantity of water thus treated is two million gallons daily, and the engineer in charge of the works and the municipal authorities have expressed their satisfaction with the results attained.

The various methods of purification by iron that have been tried in Europe involve the contact of the water with natural or prepared ore or cast-iron borings or turnings, with a subsequent filtration through sand to eliminate any excess of iron; but Mr. Gardner has suggested the introduction of a solution of iron in the precise quantity needful for the desired purpose. He tried a solution of red hæmatite ore in hydrochloric acid on Mississippi water at the New Orleans water-works, and the clarified water gave satisfactory results to Professor Chandler, of New York, and other chemists. Later, he treated a body of thirteen million gallons in the St. Louis settling basins.

The solution used, the water in various stages of precipitation, and the clear resultant water, all met with favorable reports from the analysts. The action is chemical, not mechanical. The combinations of lime and magnesia in the Mississippi water become converted into chlorides by the chlorine of the iron solution, and the precipitated oxide of iron settles promptly, carrying the suspended matters with it, and leaving the water clear. A solution of the specific gravity 1.6 in the proportion of one part to 20,000, clarifies the muddiest of river waters without hardening them or leaving in them any excess of the precipitant. The Mississippi water at New Orleans can be thus clarified by a rest of eight hours in the reservoir at an expense of one cent for every thousand gallons. Mr. Gardner's object at the present time is to procure a cheaper iron solution.

In the efforts to attain to a prompt and efficient method of purifying water by sedimentation or filtration, with or without the use of precipitants, it is of the utmost importance that the object of the purification be kept steadily in view lest we fall into the error of supposing that the end has been accomplished when a clear water has been obtained. The agents of a certain patent filter place in the show windows of some prominent store two companion glass jars, one filled with an opaque and discolored turbidity overlying a stratum of heavy sediment, and labelled "Water taken this morning from the public mains;" the other, sparkling like a consolidation of dew-drops, and labelled "The public water after passing through so-and-so's filter." A glance at these gratifies the passer-by, by seeming to instil into his mind so much sanitary knowledge. They sow seeds of reflection which develop and multiply with bacterial fecundity, so that in a few minutes they have done the work of an octavo pamphlet on "Potable water: its impurities and the methods by which they are removed." But the sparkle of the filtered water, although honest in itself, hides a fallacy which undermines the whole of the suggested argument. It must be remembered that clear waters are not necessarily wholesome waters. Their sparkle is no proof of their purity. From the laundresses' point of view, or the paper-makers', the result is satisfactory; but the object of the filtration of a water-supply for domestic or public service is its wholesomeness when used for drinking, and its transparency gives no testimony on this subject.

During sedimentation the heavier and grosser particles of mineral matter readily subside, and carry down with them much of the flocculent organic matter which would otherwise continue in suspension for many days. The effect of sedimentation at St. Louis, Mo., has been mentioned, but it will perhaps be better appreciated when stated in other words. The lake supply of Cleveland, Ohio, which is usually of excellent quality, is occasionally turbid, particularly during the spring months. When in this condition of turbidity the twenty million gallons, which are distributed daily, contain ten and a half tons of suspended matters, and the odd half ton consists of decomposing organic substances. Who will say that the city of Cleveland would not be benefited if it did not have that daily distribution of half a ton of semi-putrefaction? But sedimentation does more than free the water from suspended matters. During the so many hours or days of its continuance the processes of nature are at work transforming the semi-putrefied matters into ammonia and nitric acid, both of which are harmless in the quantities present. The purifying influence of sedimentation may be easily determined by chemical analysis, and in many cases it is so marked as to render the process of infinite value in the absence of a better method.

Most surface waters, which are turbid from particles of mineral matter, contain the germs of nitrification, and the process of purification takes place in them during storage; but if these germs be absent, months may pass with but little improvement in the character of the stored water. Hence, cisterns which do not contain these bacteria have usually a less pure water, as judged by the ammonia and albuminoid ammonia which it yields, than those which do contain them. Where wooden tanks, as at New Orleans and other Southern towns, are used for storage, it is a common occurrence for the analyst to find water of poor quality in new or recently cleaned cisterns, while water of a much better quality is discovered in those that have not been cleaned for a year or two, and have a fermenting sediment a foot or more in depth covering their floor. The nitrifying agencies accumulate with the sediment, and, notwithstanding the sediment, they succeed in reducing the organic matter of the water to the inorganic condition. The sediment is thus an advantage, but the end is better accomplished by keeping it out of the cistern and introducing the bacterial workers through the medium of a layer of clean gravel or sand.

But withal, it must be remembered that it is only organic matter in a state of decay that is thus reduced to the inorganic condition, and only organic matter in a tangible form that is thus carried down by the heavier particles of the mineral sediment. Organic matters that are endowed with vitality remain uninfluenced by the destructive and reconstructive bacterial agencies that are operating in the water; and these, as has been seen, are the matters from which most is to be feared if sewage has unfortunately had access to the supply. The infected water which prostrated 1200 of the 8000 inhabitants of Plymouth, Pa., and killed 130 of those whom it prostrated, passed through three storage reservoirs on its way to accomplish its deadly mission.

Nor is filtration more efficient as a purifier when viewed from the standpoint which sees typhoid-fever disseminated by an infected sewage in the water-supply. A satisfactory filtration removes the haze or cloudiness which may pervade a sedimented water for days after the grosser particles have subsided, and in so far its results are better than those generally effected by sedimentation. The finer particles of clay, some no larger than barely distinguishable molecules under the ordinary working powers of the microscope, are removed, and with them organic shreds of similarly minute size, and even many of the bacterial germs which were present. A water thus freed from foreign matter in suspension seems to offer the lustre of its transparency as a voucher or visible symbol of its purity, and chemical analysis may show in it only the merest trace of organic matter in solution, for the processes of decomposition and recomposition of the organic elements take place with much greater rapidity when the water percolates through the pores of the soil, as in the natural process of filtration, than when it is merely stagnant in a reservoir or flowing in the current of a stream. It is now well known that the bacterial agencies which effect these changes have their habitat in the three or four feet of soil which constitutes the surface of the earth, and that in soaking through this layer the organic matters of a water are transformed into matters which the roots of living plants can absorb and assimilate. Chemical analysis may therefore show in such a water merely the small quantities of ammonia or nitric acid which are the results of this bacterial action, and the water may be claimed to be pure on much stronger evidence than can be advanced on behalf of any water which is massed on the surface in a lake, pond, river-bed, or settling basin, these surface waters having at work in them only those straggling bacteria that have been washed from their habitat in the soil into the current of the stream. In fact, so far as can be demonstrated by chemical tests, the naturally-filtered water may be free from everything of an organic nature.

In view of our knowledge of the conditions needful to a perfect natural filtration, it is impossible to allow that artificial means, operating after nature's methods, will ever produce as pure a supply as can be procured in suitable localities by digging a hole in the ground. Comparatively speaking, only a small quantity of rain falls on a stated area—a depth of so many inches during the course of a year—and of this a large proportion is turned aside for the general police of the surface, and, having fulfilled its mission, is carried off by surface channels to the ocean, while another part of the fall cools the overheated surface of the soil by its evaporation, and gives the air that proportion of moisture which is needful to the continuance of life under present conditions. Only a few inches of the annual rainfall penetrates the soil, and, escaping the roots of the living vegetation, collects on the surface of some impervious stratum as the surplus water poured into a flower-pot drains into the saucer below. Artificial filtration has neither the time nor the surface to effect percolation after nature's method. Filtering-beds of gravel are prepared which permit more water to pass through them in a day than nature percolates through the same area in a year, or special filters are constructed which transmit, under pressure, as much water in half an hour as nature purifies on the same area annually. The bacteria of nitrification cannot be harnessed to the work of artificial filtration, and hence the results of such methods, although manifesting a satisfactory freedom from suspended matters, can in no instance compare with the organic purity which characterizes the spring and well-waters that are found in the laboratory of nature. Since the bacteria of the artificial filtering-beds are unable to deal with the organic matters dissolved in the percolating water, it is needless to expect them to reduce the masses of organic matter which in progress of time clog the filter with their accumulated foulness, and lessen its efficiency as a filtering medium. The artificial filter cannot, therefore, furnish a water which will be as pure as a naturally pure water. In fact, artificial filtration amounts to little more than the mechanical separation of a water from its suspended particles, while the essential of natural filtration is the thorough nitrification of the albuminoids of the water, the removal of suspended matters being incidental and merely secondary.

The decay of once-living organisms, animal or vegetable, gives more or less taint of a putrefactive nature to the surface-waters of the earth, and this taint, when of sufficient strength, is known to induce diarrhœal tendencies in the human system. Moreover, among the fermentations which take place during the destruction of organic matter, is one which gives origin to an influence—the malarial—which is always disabling, and often deadly, to human life, pervading the surface-waters to a dangerous extent, particularly in warm climates and seasons. By the process of filtration nature removes both the putrescent and malarial taints from the water, yielding a supply which is held to be pure and wholesome by the ever-increasing testimony of the generations of the world. The malarial influence is attributed to a micro-organism. If this view be correct—and the tendency of medical science is to accept it as the only theory which gives a satisfactory explanation of the malarial phenomena—the vitality of the germ should preserve it from the putrefactive and nitrifying agencies, for these operate only on dead matter. It is therefore probable that only the mechanical part of the process of natural filtration is concerned in the removal of the malarial influence from a water, and that an artificial filtration which gives satisfactory mechanical results will be of value in the prevention of malarial disease.

Although the bacteria of the soil do their work so thoroughly that no chemical trace of existing organic matter can be found in the percolated water, it sometimes happens that this water is unwholesome. When collected at a distance from the haunts of man, it is as pure as it looks, for nature's methods always suffice for her necessities; but where the activities of human life create artificial conditions, such as result from the aggregation of individuals in cities and towns, her methods fail because they cannot be carried out. The soil becomes more and more contaminated by animal excreta, and the wells reservoirs in which are collected the leachings or washings of this impurity. If the impure soil be colonized by the infection of typhoid-fever, it is immediately converted into a breeding ground for the germs of that disease. The vitality of these germs preserves them from putrefactive agencies, and their size seems to offer no obstacle to their passage through the soil. They therefore drain into the well, and confer upon its clear waters powers of a most deadly character. In the records of sanitary science are to be found many epidemics of typhoid-fever chargeable to wells that have become contaminated by sewage. Indeed, the more the transmission of typhoid-fever is studied, the more evident it is that the water-supply is the main agency concerned in its propagation. Hence, sanitary officers have not only closed up wells into which sewage has entered, but those which, from their situation, are merely exposed to this danger.

Since natural filtration is powerless against the infection of typhoid, it is evident that artificial methods can give no guarantee of protection.

The purifying influence of precipitation by means of such chemicals as alum, iron, or lime can readily be demonstrated by chemical analysis. The hydrated alumina, ferric oxide, and lime carbonate, as they materialize into particulate existence from their solution in the water, entangle and carry down with them organic particles that would otherwise be less easily removed; and biological research shows that bacterial germs are swept from the water in like manner. That this operation is imperfect is demonstrated by the number of colonies which can be developed from the cleared water; that it is purely mechanical and not germicidal is indicated by our experimental knowledge of the action of such substances on various bacterial organisms, and by the fact that their presence does not exercise even an antiseptic influence on the bacteria of the water, as the number of these bacteria subsequently increases in the cleared water as rapidly as in a stored water which has had no such chemical treatment. The commercial interests concerned in artificial filtration invest these substances with the title of coagulants, as if the albuminoid constituents of inorganic life curdled into a bacterial *rigor mortis* as soon as the water became pervaded with the presence of the precipitant ; but there is no warrant for a belief in any protective virtue other than that connected with a mechanical entanglement and precipitation.

The processes of purification that have just been reviewed remove suspended matters and more or less of the dissolved saline and organic substances that are present in the water, but none of them can lay claim to the removal or destruction of the causative agencies of the acute infectious diseases that are known to be propagated by an infected water-supply. These processes have been closely studied by the English sanitary authorities, who long ago came to the conclusion that sewage in a water is harmful because it may contain the germ of cholera or typhoid-fever, against which the most efficient method of artificial filtration constitutes no effective safeguard. Hence, the object of sanitary legislation in England is not to preserve the rivers as a drinking-supply, but to prevent them from becoming a nuisance in their character of open sewers. The solids of sewage consist of a highly nitrogenized organic matter, the proper disposition of which in the economy of nature is as materials for the growth of the vegetable kingdom ; and if these be separated, the water may be purified by percolation and filtration and returned to the rivers. Sewage has accordingly been treated in various ways for the separation of the solids and the reclamation of its water. In country houses and small communities a cesspool can be provided for the deposition of solids, the liquid overflow being conveyed by drain-pipes into the soil. The effluent water in such cases may be as pure to chemical tests as that of the stream into which it is discharged. But as communities grow, the difficulties attending the disposition of their sewage are proportionately augmented.

Various methods of precipitation have been tried with the view of paying expenses by the sale of the solids as a fertilizing material, while the separated liquids are turned into the water-courses, with or without an intermediate filtration through the soil. Sewage irrigation has also been tried on the large scale, and in many instances with satisfactory results. The advocates of irrigation point with considerable enthusiasm to the purity of the effluent water, and consider that this system will ultimately settle the vexed question of the disposition of sewage; and, indeed, such is the purifying influence of the soil, that the clear water of the outflow gives relatively good results on analysis. But, as we have seen in speaking of sewage-polluted wells, the purity which is evidenced by chemical tests fails to give an assurance of protection from typhoid-fever, and it is this protection, not chemical purity, which is the object in view. These advocates claim that typhoid-fever does not prevail in the fields which receive the sewage of an infected city, but it is the propagation by drinking-water, not by exhalation, in which we are interested, and typhoid-fever is known to have prevailed on fields where the effluent water was used for drinking. Indeed, how could we expect otherwise when we know that typhoid-fever is propagated by an infected sewage in a well-water which has undergone a more efficient filtration through the soil than that to which the sewage is subjected in the irrigating fields, or when we remember that the spring-waters which occasioned the epidemic at Lauzen were derived from a sewage-polluted stream spread over the fields of an adjoining valley for purposes of irrigation?

In view of the considerations which we have thus briefly reviewed, we cite the opinion of the English commissioners, to give it greater emphasis as reaffirmed after the passage of years which have added much to our knowledge of the propagation of infectious diseases by means of the water-supply: "Of all the processes which have been proposed for the purification of water or of water polluted by excrementitious matters, there is not one which is sufficiently effective to warrant the use, for dietetic purposes, of water which has been so contaminated. In our own opinion, therefore, rivers which have received sewage, even if that sewage has been purified before its discharge, are not safe sources of potable water." A water to which sewage has access should from that fact alone be excluded from all further consideration as a possible water-supply for drinking purposes.

The introduction of a water-supply into a growing city is ordinarily only a question of money. Engineering difficulties fade into insignificance when surveyed from a satisfactory financial standpoint. It is often said to be beyond the power of money to purchase health, but the sanitary student can readily demonstrate that in many cases this is not so. Money expended in the distribution of a wholesome water-supply will purchase health for the thousands who otherwise fall victims to the fever which is endemic in our cities and towns. Typhoid-fever is a disease to which every one is exposed. The susceptibility to it is inherent in our constitutions, and, so far as we know, immunity can be purchased only by submitting to attack. Ordinarily the human constitution succumbs to its influence before maturity is reached, but if up to that period we fortunately escape, we have no assurance of future immunity. Uncertainty overhangs us like a cloud. Danger is as present with us in the daily routine of our peaceful lives as on the battle-field, only that the embodiment of evil is an invisible and intangible germ instead of a fast-flying bullet. Danger flows beside us in our streams, in our mains, from the taps in our houses. The germ of the disease may not be in this pitcherful or in that, in this tumblerful or in that, but it will find us some day if we continue to use the water which contains it. In a town of 50,000 inhabitants one victim is taken daily, and as the average duration of this disease is about a month, there are always in that city thirty persons whose lives are unnecessarily trembling in the balance.

What is the local suffering from yellow-fever in Jacksonville, Pensacola, or New Orleans, once in so many years, compared with the totality of the destruction caused by the steady progress of this general and ever-present scourge? Thirty thousand people die of typhoid-fever annually in the United States of America, and Vienna lowered her losses by this fever from 340 to 11 annually in every 100,000 of her population by introducing a spring-water supply instead of the sewage-tainted waters of the Danube. Calculate the loss by sickness associated with these 30,000 deaths—the loss of work, the unprofitable work of nursing, and the actual outlay necessitated by each visitation of the disease—and you will find that saving money by drinking sewage in the water-supply is a penny-wise policy that in the long run will fail to pay even for the funerals and the mourning goods.

In many instances it is, on this continent, an easy matter to obtain a suitable supply for a community. Some neighboring lake offers itself as a natural reservoir, requiring only the construction of conduits for the transmission of its waters; or an artificial reservoir may be formed by damming certain of the radicles of a neighboring stream. The drainage area of this supply must be kept under the closest supervision by the sanitary authorities of the community, for it is not enough to obtain a supply which is free from sewage; it must be kept so. Constant vigilance is the price of safety. The sanitary inspector should be ever on guard and familiar with every square yard of the surface, and the health authorities should be empowered to protect the many against the carelessness or wanton encroachments of the few. The question of water-supply is here reduced to its simplest terms: the raising of sufficient money to bring in the wholesome water, and the investment of the health officer with power to preserve the wholesome quality of the public supply and to prevent the use of water from sources which are known to be unwholesome.

In other instances, it is difficult to obtain a suitable water-supply. The whole face of the country has been more or less settled, and the natural drainage of every valley brings sewage and manufacturing waste into its outflowing stream. Nevertheless, now is the time to act, for these unfavorable conditions will increase and multiply in the future, so that what may be done now cannot be done then without a tenfold expenditure of time and money. Fortunately, when difficulties occur from the density of the settlement, there is also more wealth to meet the increased expenditure, but it is beyond the power of that wealth to give life to those who have in the mean time fallen victims, or consolation to the hearts that are in mourning. What is to be done should in all cases be done at once. It is *we* who are interested in this matter—now, in our own time and generation; for what does it avail us that the city is supplied with pure water ten years hence, if at that time it be remarked of us, Oh, yes, I remember him well; he died of typhoid-fever eight or nine years ago. And it is an easy matter to so arrange the financial burden that part of it shall fall on those who will hereafter participate in the benefits.

In well-settled sections of the country it may be impossible for the towns and villages to obtain a water free from sewage in their main streams or their neighboring tributaries, and equally impossible for any one of them to go to the nearest sources of pure water for a supply, but those favorably situated for combined action may easily perfect their arrangements for bringing in the water from long distances. Nor should it be forgotten that if water free from sewage is not to be obtained on the neighboring surface, it may sometimes be found beneath the surface, as at Brooklyn, L. I., or, more notably, at Memphis, Tenn., where, after a thorough investigation of the whole subject by a committee of citizens, it was ultimately developed that they had a source of the purest water within a hundred yards of their domestic hearths.

Many communities have a water-supply which was pure enough when originally introduced, but which has become dangerous by the subsequent growth and development of which it formed the nucleus. A water-bed or basin cannot be used for concurrent purposes of water-supply and sewage discharge. If the drainage area be given up to settlement and commercial enterprise, with their consequent sewage and manufacturing waste, the city must be prepared to find another source of supply for its daily wants, or pay the penalty of an increased death-rate from preventable disease. In the race for material prosperity this penalty is too often forgotten, and the endemic fever is regarded as one of those visitations of Providence that are inevitably consequent upon conditions of aggregation. Yet every intelligent medical man knows the fallacy of this reasoning, and that the progress of this malady can be checked by suitable measures as surely as exotic disease can be kept out of the country by properly enforced restrictions on commerce. To permit the citizen to enjoy life, which, according to the Constitution of the United States, is his right, the most stringent laws should be enforced to preserve the purity of the supply of drinking-water; or, if the settlements on the area are too valuable to be destroyed, a new source of supply should be obtained and guarded.

The protection of the citizen requires that every advantage be taken of our knowledge of the natural history of the typhoid infection, that it may be destroyed before reaching any of our water-courses. It is well enough to insist upon the purification of sewage by processes of precipitation, filtration, or irrigation before its water is delivered into the natural courses, for thereby the latter will be prevented from falling into the condition of open sewers, which is the lot of so many small streams in well-peopled districts; but these processes cannot be depended upon to remove the typhoid infection. This infection passes from the patient to our surface-waters directly by the sewers, or it drains through the soil with the subsoil water, and reaches the surface on some lower level. Of course in either case it may be lost in the mass of water in which it is diffused, but it was not so lost at Plymouth nor at Lauzen. To protect the citizen and stamp out this fever, it should be made the duty of every medical man who attends a case of fever to see that the excreta are disinfected before being consigned to the sink, cesspool, or sewers, and the utmost care in this regard should be taken in cases occurring on a water-shed which is utilized for a public supply. So far as our knowledge goes, sewage would be deprived of that which, under ordinary conditions, constitutes its only dangerous element, were this system of bedroom disinfection efficiently practised.

Local authorities, such as water companies and boards, citizens' committees, health boards, and commissioners, should exercise a jealous guard over the public water-supply; but in many instances these would be powerless without the intervention and co-operation of the authorities of the State. Massachusetts, Illinois, and Minnesota have already taken steps in this direction. In the first-mentioned State the Board of Health is invested with the general supervision of the water-supplies. No sewage, drainage, excrement, or other refuse or polluting matter of such kind or amount as—either by itself or in connection with other matter—will corrupt or impair the purity of a water used for domestic purposes, is permitted to be delivered into a water-course or any of its feeders within twenty miles above the point where a water-supply is taken. Upon the application of a city or town to the Supreme Court, alleging the pollution of its water-supply in violation of law, an injunction may be issued, or the polluting substances required to be so cleaned or purified that they shall no longer be deleterious. The limit of twenty miles in this law is a defect, but sanitary legislation is a thing of slow progress, and our friends in Massachusetts undoubtedly secured as much as was possible for them to obtain at the time.

The board is required to examine the waters from time to time, for the purpose of ascertaining whether they are adapted for use as domestic water supplies, or are likely to impair the interests or imperil the health of the public. It is required to conduct experiments to determine the best practicable methods of purification, of drainage, and of the disposal of refuse, and to recommend measures for the preservation of the purity of the waters. Moreover, it is the legally constituted adviser of cities, towns, corporations, firms, or individuals, in matters pertaining to the introduction of water supplies or sewerage systems, making use of its knowledge and facilities on their behalf in regard to source and quality of water and methods of sewage disposal, having regard to the present and prospective needs and interests of other communities or individuals that might be affected thereby. The approval of the board is a legal requirement to the consideration by the Legislature of any application for authority to introduce any system of water supply or sewerage.

The board is also empowered to consult with and advise those engaged, or intending to engage, in any manufacturing or other business as to the best practicable method of intercepting, purifying, or disposing of any drainage or refuse that might result from the business to the detriment of the waters of the State. It is required to bring to the notice of the attorney-general all instances which may come to its knowledge of omission to comply with existing laws respecting the pollution of water supplies and inland waters, and to report to the Legislature any specific cases not covered by the provisions of existing laws which, in its opinion, call for further legislation. Finally, and very materially, the board is provided with funds to sustain the corps of engineers, chemists, and inspectors, whose labors are needful to the proper performance of its duties.

The report of the board's proceedings under these heads, submitted to the Legislature in January of this year, shows the excellent work that may be accomplished in this way. Eleven applications from cities and towns for advice concerning water supplies were received; eleven for advice concerning sewerage; two soliciting action to prevent the contamination of particular water supplies; and one from a manufacturer for advice concerning the disposal of drainage from certain works which he purposed establishing. The important question of a water supply for the cities of Boston, Chelsea, and Somerville, and the town of Everett, was one of those that came before the board. There are 123 sources of public water supply in the State; but over 200 samples are investigated chemically and biologically every month, the samples being from rivers, ponds, and other sources that may be utilized in the future. Experiments are also in progress on methods of sewage disposal, which will add considerably to our knowledge of the results which may be obtained in that direction.

With the aid of the State, the local authorities in their efforts to obtain and preserve a wholesome water supply would experience no difficulty that could not be overcome by the expenditure of the necessary funds. The twenty-mile limit will in progress of time be blotted out, and the waters of the State be sharply divided into those which may be used as sources of domestic supply and those which carry off the waste water. The water-supply and sewerage systems of the State —of the country—should be as distinct as those of every household, and the sooner this is accomplished the sooner will the rates of sickness and death be decreased among our people.

Your committee, therefore, urge a livelier interest in this important matter on the part of State boards of health, an interest which is not satisfied with discussing and subscribing to sanitary views on the subject, but which will leave nothing undone that will tend to invest them with power to act for the preservation of the public health. With all our boards operating, each within its domain, there would be no need of a committee of this Association to investigate the subject of water pollution. In concluding, we submit the following resolution:

Resolved, That it is the well-considered belief of this Association that it is an imperative necessity, especially in the more populous States, that State Legislatures should give their boards of health that financial support which would enable them to act intelligently on all questions pertaining to the public water supplies, investing them at the same time with the supervision of the said supplies, and with power to preserve these waters from contamination by sewage or other injurious matters.

CHARLES SMART.
S. W. ABBOTT.
G. C. ASHMUN.
W. W. DANIELLS.
EDWARD PLAYTER.

"THE FUTURE OF THE NEW YORK WATER-SUPPLY."—A CORRECTION.

Editor of THE SANITARIAN:

In an editorial in your December number on the "Future of the New York Water-Supply," p. 545, you quote from a paper by me addressed to the New Aqueduct Commissioner, who had called for my opinion on the advisability of the construction of the Quaker Bridge Reservoir; but you do me an injustice in stopping short in the quotation without giving the very point for which my article was written—viz., the means through which it was proposed that disease germs could be prevented from dangerous extension, and the waters of the Croton basin of 362 square miles rendered safely potable. I had before me at the time a copy of THE SANITARIAN of June, 1885, wherein Dr. Edson, of the New York Health Department, reports upon the outbreak of typhoid at Plymouth, Pa., where from the dejecta from a single patient thrown upon the surface of the snow, no less than 1200 individuals suffered, ten per cent proving fatal. Dr. Edson puts a paragraph in italics in his report, which I had in mind when writing the article from which you quote. I beg leave to repeat it here. "*Neglect on the part of attendants to disinfect the stools of persons suffering from infectious enteric diseases should be made a criminal offence.*" I did not quote this, but say "that the only sure method of destruction (of disease germs) is clearly within the province of the attendant physician to carry out under the authority of intelligent health boards," and close with the statement of the opinion "that there is no danger to health, now or in the hereafter, in the use of impounded Croton water, which an intelligent application of the means at our disposal will not suffice to render harmless."

I am free to confess that with your view of the danger to be anticipated from human remains I may have undervalued the possible extent of pollution of the water from the Croton shed—or of any water-shed used for gathering a public water-supply, which embraces in its area settlements, villages, or even farms, where private cemeteries are in use; but unless the same legislative authority to which Dr. Edson would appeal to prevent the spread of infectious diseases be invoked, to compel cremation in all cases, very difficult of attainment on isolated farms, I fail to see any practicable remedy for pollution of the water-supply of New York short of abandoning the Croton entirely, and going to the wilderness of the upper Hudson, the Adirondack. This scheme is entirely practicable, including a supply for all the towns on the Hudson, including New York and Brooklyn, a water-shed of 3000 square miles of area, and over 50 square miles of lakes and reservoirs from 15 to 18 feet deep, the drainage into which can ever be retained virtually as a wilderness.

Dr. W. W. Laman advocated this scheme before the Legislature of New York for several sessions, and at one session it would have passed but for an unexpected adjournment of the Legislature, and only his death, over a year since, prevented the ultimate incorporation of the "New York and Hudson Valley Aqueduct Company," with a capital of $50,000,000. Dr. Laman's enthusiasm in the cause was unbounded, and his perseverance knew no pause, and he had persistently advocated a measure which was conceived in the sanitary and manufacturing interest of one half of the total population of the State; and had he lived it would have become a law ere this, and the benefits which the carrying out of the scheme would have conferred will yet, it is believed, lead to the revival of the project.

Assuming 40 inches of rainfall on the upper Hudson yearly, and a waste of one half, or 20 inches, by floods, evaporation, and processes of nature, leaves 20 inches, which would equal a mean daily flow of 2,856,000,000 gallons. In times of extreme drought this might be reduced 20 per cent, or leaving 16 inches of the annual rainfall as available, equalling 2,285,-000,000 gallons daily; from this, estimating 6¼ inches (892,-000,000 gallons) as applicable to the canals and manufacturing interests, leaves 9¾ inches, or 1,392,000,000 gallons daily as available by means of adequate storage in the mountain lakes for draught in times of low water for the supply of the towns and cities of the Hudson Valley. The grade line of the open conduit after leaving the upper Hudson (from 350 to 200 feet above tide level) is so high upon the hills as to pass back of and above the villages of the Hudson Valley, giving ample head for service, and relieving the water from danger of pollution from this source, and the valleys opening into the Hudson would be passed by iron pipes.

I can see nothing which looks to getting rid of the kind of pollution to which you refer of water-supply to the city of New York and its adjoinings, comparable in thoroughness to this. It has been well worked out in all its details, including surveys of the lakes in the Adirondacks, by an engineer of prominence, J. T. Fanning, who has twice reported at large on the subject; and to show you how near it came to succeeding, I send you a copy of the bill of incorporation. I should observe that, to my knowledge, Dr. Laman had secured the promise from capitalists of all needed financial aid to the carrying out of his scheme. J. W. ADAMS.

THE ORIGIN AND PREVENTION OF TUBERCULOSIS.*

By D. E. SALMON, D.V.M., Chief of the Bureau of Animal Industry, Department of Agriculture, Washington, D.C.

THERE can be little doubt in the mind of the thoughtful sanitarian that questions relating to the origin and prevention of tuberculosis will, for years to come, be among the most important subjects that will attract his attention.

* Read before the American Public Health Association, Milwaukee, November 22d, 1888.

In the census of 1880 there were reported for the year 91,551 deaths from consumption in the United States. We find it necessary to make a correction here in order to give the actual mortality from this disease. The total number of deaths from all causes reported to the census officers for that year amounted to but 15.1 per 1000 inhabitants, while they admit that the actual number of deaths was between 17 and 19 per 1000 inhabitants; or, as nearly as could be ascertained, 18 per 1000. Thère were consequently 3 deaths per 1000 inhabitants that were not reported, and to obtain the correct number we must increase the figures as given in the census to the extent of 20 per cent.

Admitting now that the number of deaths from consumption should be increased in the same proportion as the general death-rate, and we find that the mortality from this disease in 1880, instead of being 91,551, was actually 109,861.

Since 1880 the population of the United States has increased from about fifty millions to over sixty millions of people. If, therefore, we desire to know the actual mortality from consumption in this country at the present time, we must increase the figures given for 1880 by at least 20 per cent. This gives us as the present annual mortality 131,833.

Now consumption, as we know, is but one form of tuberculosis. The bacillus of this disease, instead of selecting the lungs for its habitat, may prefer the brain or the abdominal organs, or other portions of the body. It may well be doubted if the number of deaths from these different forms of the malady can be calculated from existing data with even approximate accuracy; but I think it would be a moderate estimate to place the total annual number of deaths now caused in the United States by the bacillus tuberculosis at 150,000.

We are so accustomed to using large numbers in this generation, that there are few of us who stop to ask ourselves a question as to the significance of this enormous number of deaths in our country each year from this malady. It means that for every hour of the day and night not less than seventeen of our people fall victims to the attacks of this insatiable microscopic destroyer. It means that within the brief space during which I occupy your attention this evening more victims will be claimed in the United States by this ever-present demon than have fallen by the hand of the notorious White-chapel fiend during the weeks that the world has been horrified by his crimes. And while in the latter case we would be inexpressibly shocked at any neglect on the part of the authorities which would tend to increase the number of deaths by a single victim from the slums of London, we see this other enemy of human life entering the homes of the high as well as the low, striking down indiscriminately the brightest, the loveliest, the most useful of our citizens, and what are we doing to arrest its ravages? And to make the matter still worse, we know where the destroyer lives, and we have his photograph in our possession.

The blame for this apathy is not all to be placed upon sanitarians, however; we may be guilty with the rest of our people, but without a strong and enlightened public sentiment to support our boards of health, what can they do in a work of this magnitude, which will largely increase their expenditures and which demands the exercise of arbitrary powers?

Such a public sentiment is rapidly being formed, there is an increasing demand for adequate measures for the prevention of this disease, and I venture, therefore, to take up the matter in a general way, hoping that discussion will lead to further consideration, and that in the end our ideas may become better defined and that action may be agreed upon which will mitigate if it does not control the losses from this plague.

I assume that it is unnecessary, before this Association, to enter into any arguments to demonstrate that tuberculosis is a specific, communicable disease, that it is caused by the well-defined germ which we know as the *bacillus tuberculosis*, and that without the presence of this particular germ the specific disease in question cannot be developed. With this admitted, it is extremely important for us to inquire where this micro-organism lives and multiplies, how we come in contact with it, and by what channels it gains an entrance into the bodies of men and animals.

The careful investigation that has been made by scientists of the life-history, characters, and conditions of growth required by this microbe make it apparent that in our climate, at least, its multiplication does not occur outside of the human or animal body to a sufficient extent to demand the consideration of sanitarians. Its reproduction and development take place within the body, and every individual who is affected with it has obtained it either directly or indirectly from some other person or animal that was previously affected with it. These statements must be accepted as axioms by sanitarians before we can hope for substantial and satisfactory results in the prevention of this terrible malady.

The contagiousness of tuberculosis among cattle is so apparent that it was admitted on all sides by veterinarians long before Koch discovered or cultivated the parasite. With people, as you know, the case is different, and its contagiousness has been strongly contested, and it is only recently that sanitarians have generally admitted that it may occur in a limited number of cases. From a study of the facts which bear upon this question, it appears to me that the greater contagiousness in the one case is due simply to the conditions of life. We know that when the lungs are affected the sputum contains myriads of the peculiar germs of this disease, and that the dissemination of the germ from the diseased person must be chiefly through this medium.

On the other hand, experiments make it reasonably plain that the germ must find its way into the body either by the respiratory organs, the alimentary canal, or through wounds on the surface of the body. It is apparent, therefore, that with the conditions of life under which we live in this country, it is not to be expected that the contagiousness of tuberculosis can be made very clear except with persons in such relations as husband and wife, where saliva may be transferred in the act of kissing. But judging from the newspaper accounts of domestic infelicities, we should not be astonished at the rather rare cases which have been recorded where the disease was evidently contracted by the wife from the husband or by the husband from the wife. Perhaps a more conclusive reason why such recorded cases are rare is the fact that the contagiousness of tuberculosis has not until recently been accepted by physicians, and even now a considerable proportion of all those who graduated longer ago than five years reject this doctrine and have serious prejudices against it. As a result, I am convinced that many clear cases of contagion have not been referred to this cause.

Contagion from dried sputum, or that which is partially dried, would pass unnoticed, because people are nearly as much exposed to consumptives outside of their families as within them. Who has noticed the wholesale use of unwashed drinking-cups at our hotels, railway stations, and other public places without seeing there a means by which the bacillus tuberculosis can be widely scattered by sputum or saliva without the remotest chance of tracing the contagion? Again, when we see how tuberculosis sputum is distributed over our streets and sidewalks to be dried by the winds, ground into powder by the feet, and then carried by currents of air into our mouths and nostrils, how can we expect to trace the entrance of this germ into the body and determine by observations upon people whether it is or is not contagious from man to man? We are all more or less exposed to contagion from persons *outside* of our families, and if we do not contract the disease and die of it, it is probably because nature has endowed us with a degree of immunity which enables us to resist the dose of these germs which we are accustomed to take, and for that reason we are spared.

When we observe this disease as it occurs among cattle we find it much simpler to trace the contagion. Different herds of such animals are practically isolated, and an outbreak of tuberculosis in a herd can usually be traced to the introduction of an affected animal. Owing to the opportunities for contagion, feeding out of the same mangers, eating forage soiled by saliva, drinking from the same vessels, the infectiousness of the disease is frequently extremely well marked. I know herds in which the malady has persisted for years. There is one instance in my mind where the introduction of a tuberculous cow in a thoroughbred herd affected nearly every animal, breaking up the herd, and causing a loss of from twenty to thirty thousand dollars. Instances where this disease is introduced and spreads through whole herds are now so frequent that every veterinarian I am acquainted with, who has a cattle practice, is thoroughly convinced not only that the malady is contagious, but that it is easily transmitted.

This brings up the question as to the identity of human and animal tuberculosis, and I unhesitatingly answer it in the affirmative. Not only are the germs in the two cases indistinguishable under the microscope, but their growth in different culture media and their other biological characters are identical. Again, the infection of swine, rabbits, fowls, etc., from man produces the same lesions as when these animals are infected from the bovine species. The infection of man from cattle is a proceeding which can hardly be undertaken experimentally except in rare instances. It is said to have been successfully accomplished, however, in one case. What is of more consequence, we have the observations which now begin to accumulate connecting tuberculosis in man with the use of milk from tuberculous cows.

Admitting the identity of tuberculosis in man and animals, and many important questions suggest themselves to us in regard to the propagation and prevention of this disease. What animals have we to fear? What are the media of communication? How can we guard against infection? What momentous questions are these!

I can only answer in general terms. The time at my disposal is too brief for details. Notwithstanding the fact that swine are very susceptible, as shown by experiments, tuberculosis in these animals appears to be a rare disease. This is probably in some degree because hogs are slaughtered at from six months to two years old, and there is not with them the opportunities for the development and propagation of a disease so slow in its progress. The same remark may be applied to fowls, so that for practical purposes it is the bovine species to which we must direct our attention as the one most frequently affected, and from which most danger is to be apprehended.

I am unable to give you data to show the proportion of the cattle in this country which are affected. The disease is probably no greater than in other countries, but its widespread prevalence is certain. I have encountered it from the Atlantic Ocean to the Rocky Mountains, and having been no farther west I cannot speak for the Pacific slope. It is most frequently seen in milch cows, but often also in beef cattle. An inspection of about half a million head of cattle, mostly dairy cows, which has been made during the last two years by the Bureau of Animal Industry, in the work of eradicating pleuropneumonia, has brought herds affected with tuberculosis very frequently to my attention, on account of the difficulty which sometimes is met with in making a differential diagnosis.

Experiments upon other animals show that the contagion is contained in the tuberculous matter, in the liquids expressed from the affected organs, often in the milk, and sometimes at least in the blood and in the juices expressed from the muscular tissue. Whether butter and cheese may serve as infecting material has never to my knowledge been determined. That oleomargarine, butterine, and similar mixtures, which contain oleo oil, a substance expressed at a low temperature from tissues frequently tuberculous, may also be infecting, goes without saying, if we accept the results of the experiments to which allusion has just been made.

The effects of cooking upon tuberculous material has not been worked out as carefully as is desirable. The experiments of Toussaint and others, however, show that the disease is produced by infectious substances even after they have been subjected to a boiling temperature for a considerable time. The inference is that beef cooked according to prevailing ideas, and particularly when very rare, has not been subjected to a sufficient temperature to destroy the germs.

We conclude, therefore, that from a sanitary point of view bovine tuberculosis is dangerous to the public health, and that the contagion may be conveyed in either the beef or the milk.

With all these facts before us, what action is indicated to lessen the mortality caused by this disease? I have my doubts if direct contagion from affected people is a sufficiently important factor in the production of tuberculosis to warrant such action as would be needed for its prevention. Sputum might be disinfected more often than it is without causing hardship to any one. It appears out of the question to isolate affected persons, and I certainly have not the hardihood to attack the time-honored practice of kissing, even when restricted to husband and wife. And when it comes to kissing among lovers, and even among members of the fair sex when they meet and part, I must leave it to some of the older members of the Association to make recommendations. Drinking vessels at water fountains and about public places might be kept cleaner than at present, and public sentiment created against their use in common to the extent now seen.

The most important matter, however, which presents itself to me is to guard the food supply from contamination. The carcasses of tuberculous cattle or of other animals should be condemned and destroyed. Our dairy cattle should be inspected regularly and every animal affected with this disease should be slaughtered and put beyond the possibility of doing harm. If you ask for the details of this work, to whom it is to be intrusted, where the money is to come from, how marked the results will be upon human tuberculosis, I am not in a position to give satisfactory answers. My idea is, that as public sentiment develops the boards of health will gradually cover this ground, and that all will see the value of the work is greater than its cost. The complete eradication of tuberculosis may be a dream, but it is none the less a duty to protect the public health against its fatal contagion in every practicable way, and to stop its dissemination by tuberculous cattle appears to me the easiest and one of the most promising steps in this direction.

INDIA-RUBBER PAVEMENT.—The authorities of the city of Basle, says the *India-rubber and Gutta-percha Journal*, intend repaving their principal thoroughfares, and are now considering the material best suited for the purpose. In one street a trial was given to wood pavement, but somehow it does not give satisfaction. The decision, therefore, turns upon asphalt or India-rubber. The latter was invented by the German engineer, Busse, in Linden, near Hanover, and was first practically used about fifteen months ago for paving the roadway over the Goethe Bridge in Hanover, which required about one thousand square metres of material. This first experiment proved so successful that during the present year another street in Hanover was paved with India-rubber, to the extent of fifteen hundred square metres. Berlin is already considering the advisability of availing itself of the same pavement, and has given it a fair trial by laying it down over a considerable distance near the Lützow Bank, which example is being followed by Hamburg. The India-rubber pavement is said to combine great elasticity with the hardness of stone, to be completely noiseless, and to suffer neither from cold nor hot weather. Moreover, it is not slippery, like asphalt, and is more durable.

THE YELLOW-FEVER INFECTION, AND THE PROPOSED METHOD OF THE DISINFECTION OF THE U. S. S. "BOSTON."

OFFICIAL CORRESPONDENCE.

NAVY DEPARTMENT, OFFICE OF DETAIL, WASHINGTON,
December 29, 1888.

Editor of THE SANITARIAN :

. . . By direction of the Secretary I send you herewith a copy of the report asked for, accompanied by a copy of Admiral Gherardi's letter of transmittal, and the various indorsements placed thereon in the Navy Department.

I also forward a letter from Norman Wiard, Esq., bearing upon the same matter, and have to request if the report of the Board is published that the other papers may be published also, in order that a clear understanding of the reasons governing the Department in its decision may be arrived at.

J. G. WALKER,
Chief of Bureau.

U. S. S. "BOSTON," SECOND RATE, NAVY YARD, NEW YORK,
December 4, 1888.

SIR: In compliance with your order of the 3d instant, to "make a careful and thorough investigation of all the circumstances attending the recent outbreak of yellow-fever on the U. S. S. 'Boston,'" and to state if in our opinion "further disinfection of the vessel is necessary or not, with such recommendations, if any, as you may deem requisite to submit," we beg to make the following report :

The U. S. S. "Boston" sailed from Sandy Hook, October 4th, at 5 P.M., and arrived at Port Royal, Jamaica, October 10th, finding a prevailing temperature at that place of 90° F. On the following day the ship was "swung," and on the morning of the 12th was hauled into the coal wharf at Port Royal, and coaled all that day and night, and the morning of the 13th, taking about 295 tons of Cardiff coal and patent fuel ; none of the crew of the ship being employed in any way in the labor of coaling, except as tally-men. She was hauled out from the wharf to a buoy, and sailed at 3 P.M. of the 13th for Livingston, Guatemala.

During her stay at Port Royal this place was reported perfectly healthy, and only telegraphic communication was had with Kingston. Nothing but fruit and mess-stores were taken on board, and officers only went on shore. On the passage down there was difficulty with the condensers, which made the condensed water not potable, and only water brought from New York was used for drinking.

At Port Royal, by recommendation of the Health Officer, 2000 gallons of water from a Government spring, which was found to be of excellent quality, were taken on board and used for drinking until the ship's return to New York.

The transition to the heated and enervating climate of Port Royal caused the firemen to become so exhausted that a daily ration of spirits was supplied to them, and at Port Royal fifteen gallons of rum were taken on board, and served out to the men of the engineers' force (firemen and coal-heavers) as they came from watch in the fire-room. It is significant that none of these men became ill at any time during the cruise.

The ship arrived at Livingston, Guatemala, October 17th, and found that place also healthy (the thermometer at noon being 76° F.; from 5 to 9 P.M. it was 80°), but damp from protracted rains. Only fruit and poultry were here taken on board.

Leaving Livingston on the 20th, wet weather was experienced until the 23d, when at 6 P.M. the ship anchored at the Corn Islands, opposite Bluefields, and about sixty miles from Greytown, remaining there until the evening of the 24th. These islands were stated to be perfectly healthy, a mild form of benign remittent-fever occasionally prevailing, never fatal, and limited to drinkers of impure well water.

Greytown was reached at 10 A.M. on the 25th, and opportunity was taken of the sunshine to thoroughly dry the vessel and its contents. A canoe came off twice. Only a few oranges were taken on board.

On the 28th she sailed for Port Royal, steaming against a fresh trade wind, and arriving on the afternoon of the 31st, having had considerable rain on the passage.

The Health Officer again reported the town and harbor perfectly healthy, as was also the case at Kingston.

The ship was again coaled, 380 tons of Cardiff coal and patent fuel being taken on board, the men on this occasion aiding in receiving the coal from laborers who brought it to the wharf, and delivering it to other negro laborers who were employed in the bunkers stowing and trimming it. The coal-sheds from which this coal was obtained are established on a sandy peninsula exposed to a sea breeze, and the coal kept under cover.

Several officers and stewards visited Kingston for periods never exceeding two hours. Of these officers and servants Dr. Simon was the only person who at any time subsequently became sick. Only a few mess-stores were taken on board.

The ship sailed from Port Royal at 6 A.M. November 4th, with no sick list of any consequence, and arrived at Port au Prince on the evening of the 5th, anchoring in the outer harbor about two miles from the landing, but in a direct line to leeward of the nightly land breeze, and having the vessels in the inner harbor between her and the town. The nearest ship, a French man-of-war, "Le Bison," was three-quarters of a mile distant. She remained at Port au Prince until daylight of the 16th, no officer or man being allowed outside the vessel except on duty. Captain Ramsay himself was on shore every day, sometimes twice, for short periods, and only on one occasion, Sunday, November 11th, was detained after dark by an interview with the authorities lasting from 2 to 9 P.M. Of the officers who at various times accompanied him none ever became sick. The steam cutter, having a crew of five men, none of whom ever became sick, was used for all of the work of the ship, except that on the night of November 11th, when Captain Ramsay was detained, and the officer in charge fearing that an accident might have occurred to the steam launch, despatched the second whale-boat, which did not land, but anchored off the cutter and was towed back by the latter. The apprentice boy, Kelly, who was taken ill on the 15th, four days later, and died on the 20th, was one of this boat's crew.

During the stay of the "Boston" at Port au Prince the Minister and the Vice-Consul-General, Dr. Torres, a physician of thirteen years' residence in the place, insisted that there was no fever; but Dr. Torres subsequently admitted that this simply implied "no fever cases to-day."

The "Bison" had been at anchor three months in the harbor, making occasional trips to sea, and her commanding officer declared there had been no sickness on board that vessel.

Prior to the occurrence of the two cases of Kelly and Dr. Simon on the 15th, Captain Ramsay declares that, wearied with the diplomatic delays of the Haytian officials, he had determined to sail on the following morning, and so announced to the Minister, who then, recognizing his decision as final, admitted that in a conversation with Dr. Torres he had learned that there was a very malignant type of fever prevailing among the shipping of the inner harbor, and consequently directly to windward of the "Boston" (about a mile and a half distant) during the land breeze, which ordinarily prevailed from 11 P.M. to 11 A.M. or noon of the following day, when the sea breeze alternated from the opposite direction.

On the night of the 14th it was learned that a man had died of yellow-fever on board the steamer "Haytian Republic," which was in the inner harbor close to the landing.

Captain Ramsay and Ensign Hines were on board this vessel twice, for short periods, none of the crew visiting her, and his boat laying off during his visits.

Notwithstanding Dr. Torres's declaration that there was no prevailing fever, he strongly recommended as a sanitary precaution that none of the crew should be allowed to sleep on the exposed decks under awnings, or to keep watch there, and this advice was so strictly observed that a man was punished for exposing himself in this way, although not asleep.

Careful scrutiny of the medical journal of this vessel show, that:

(1) On Thursday, November 8th, *Cassimir Laissi*, cabin boys rated cook, was admitted to the sick list with headache, malaise, muscular pains, anorexia, and vomiting, but without fever being noted, and was discharged on the 12th.

(2) On Friday, the 9th, *Albert Lassiter*, a berth-deck cook, was admitted with headache, backache, suffused eyes, temperature 103° F., and was not convalescent until the 28th.

(3) On Wednesday, the 14th, *McSharer*, a coal-heaver, was admitted with headache, etc.

(4) On the morning of Thursday, the 15th, the boy, *Kelly*, a gun-deck sweeper, was taken on the list with fever, etc., stating that he had felt badly on the 14th.

(5) The medical journal shows a record of the admission on the same day of *Finch*, a landsman, with "febris intermittens," attended with malaise, pains, etc., similar to the others.

(6) On the afternoon of this day, November 15th, the surgeon of the ship, *Dr. W. J. Simon*, was compelled to relinquish duty and to go upon the sick list with fever.

At 2 P.M. of this day Passed-Assistant-Surgeon Lumsden went on shore for a bill of health, and then learned from Dr. Torres that the health of the place was "very bad." He was nevertheless given a clean bill of health.

On his return to the ship Dr. Lumsden informed the commanding officer of the bad condition of things on shore and in the harbor, and of the occurrence of the new cases on board, and recommended that the ship go to sea as soon as possible. Captain Ramsay informed him that he had already determined to sail the next morning. The thermometer was then ranging from 76° to 87° F. The ship sailed at daylight of Friday, the 16th, getting the northeast trades at six o'clock that evening. The extremes of temperature were 76° and 86° F.

(7) On Saturday, the 17th, *Thrapp*, a seaman apprentice, second class, was admitted to the list with unmistakable yellow-fever, and died on the 20th. The thermometer still ranged from 77° to 82° F., the trades blowing fresh.

(8) On Sunday, the 18th, *Frank Thomas*, seaman, reported himself sick, having a temperature of over 100° F. and pulse of 120°.

(9) On this same day two marines were admitted with yellow-fever, *Uzelmin*, who died on the 21st, and

(10) *Ritzel*, who died on the 23d.

(11) An ordinary seaman named *Van Pamelin* was admitted to the sick list the same day with headache, malaise, epigastric pain, etc.

The temperature still ranged from 74° to 77° F.

(12) On Monday, the 19th, *Charles Mitchell*, ordinary seaman, and

(13) *McKenna*, a landsman, were admitted with headache, malaise, epigastric pain, great debility, etc.

(14) On the same day also a landsman named *Crank*, as having "intermittent-fever," with headache, malaise, epigastric pain, and

(15) An apprentice named *Ailmer* with the same symptoms.

On this day, 19th, *Kelly* declared himself much better, but became delirious and died a few hours later. The range of the thermometer was 72° to 75° F.

No cases of any kind appeared after this date.

Thrapp died on Tuesday, the 20th; Uzelmin on Wednesday, the 21st; Ritzel on Friday, the 23d; and Surgeon Simon on Monday, the 26th.

On the 20th it commenced blowing, and the ship was in a gale until her arrival at New York. The temperature rapidly fell to 47–55° on the 22d, 39–51° on the 23d.

The "Boston" arrived at New York at 3 A.M. the 24th, and at 9.45 P.M. of the 26th Dr. Simon died, the last fatal case.

Of the fifteen cases specifically referred to, the two marines were berthed on the port side of the forward compartment of the berth-deck; Mitchell down on the forward orlop; Cassimir Laissi aft on the starboard side of the gun-deck, and all the others on the gun-deck, most of them relatively near each other. Kelly and Thrapp slept close together.

The Board are of opinion that all these fifteen cases were of *yellow-fever infection*, of varying degrees of intensity; the result of exposure to the strong land breeze every night coming directly from the infected port and shipping in the inner harbor, and sweeping through the vessel riding head to it; and they attribute the escape from more serious consequences to the prompt departure of the vessel, and to the very thorough and effective sanitary precautions practised throughout the whole cruise.

Relative to the second question submitted to them, the Board find that the ship was visited soon after her arrival at Quarantine by the health authorities of the port of New York. The two mild cases of enlisted men were removed to the Quarantine Hospital on the 27th. Surgeon Simon's condition had not previously warranted it.

The apartments occupied by the sick, excepting Dr. Simon's stateroom, have been washed with mercuric chloride solution, and fumigated with sulphur dioxide, but the Board are of opinion that while there is no danger of any further outbreak of fever at this season, or in this port, dependence cannot be placed on its non-reappearance should the vessel return to yellow-fever habitats. They accordingly recommend as a matter of additional precaution that she be sent to the Navy Yard at Boston ; that her entire crew and officers be temporarily transferred to the receiving ship at that yard ; that as much of the coal as possible now in her bunkers be used up on the passage, and if there be any remaining coal, that it be burned at Boston ; that all other stores be removed from the vessel and placed in sheds at the Navy Yard, where they may be freely aerated ; that the sides, ceilings, decks, and interiors of all apartments, store-rooms, and bunkers, one after the other, be first thoroughly washed with a solution of mercuric chloride, one to one thousand, and after with soap and hot water ; that a strong solution of mercuric chloride be thrown into the bilges, pumped out, and replaced with water containing no sewage ; that all bales of woollen goods, felting, and similar fabrics be sprayed with mercuric chloride solution ; and that finally the ship be permeated, one compartment after another, with superheated steam of 220° F., after which the stores may be replaced and the men and officers return on board.

The Board do not wish to imply that this work might not be safely done at this station, but it is believed that greater conveniences at Boston will permit it to be more expeditiously done, and with less inconvenience to other persons.

Very respectfully,

ALBERT L. GIHON,
Medical Director U. S. Navy.
DELAVAN BLOODGOOD,
Medical Director U. S. Navy.
EDW. Y. BOGERT,
Medical Inspector U. S. Navy.

REAR-ADMIRAL BANCROFT GHERARDI, U. S. N.,
Commandant U. S. Naval Station, New York.

COMMANDANT'S OFFICE, NAVY YARD, NEW YORK,
December 6, 1888.

SIR : I have the honor to forward herewith the report of the Board appointed to investigate the recent outbreak of yellow-fever on the U. S. S. "Boston." The report and recommendations are approved, except as noted below, in regard to sending the vessel to Boston.

I am informed by the commanding officer of the "Boston" that before again proceeding to sea it will be necessary that certain work be done on her boilers. Crown-sheets and back-tube sheets must be scaled, and leaky tubes re-expanded. Four of the boilers can be got ready in two weeks' time, and all of them in three or four weeks.

The vessel has now in her bunkers 100 tons of coal; of this amount 80 tons is New River coal put in before leaving New York, the balance is part Cardiff and part patent fuel received during the cruise. The daily consumption at present for heating, dynamos, etc., being 4½ tons, more than half the amount on board would be consumed before the vessel could be got ready for sea.

The berthing capacity of the receiving ship here being so great, and other facilities being equal for carrying out the recommendation of the Board relating to fumigation, I can see no reason why the vessel should be sent to Boston.

Although the matter of pecuniary expense should not be taken in consideration with that of obtaining perfect safety in the future, still I feel it my duty to call attention to the expense that will be involved in carrying out the recommendation of the Board, in the proposed introduction of steam in the different compartments of the vessel. The inside wood-work, ceilings, panelling, etc., being all of kiln-dried wood, will probably be warped, twisted, and torn from its fastenings to such an extent as to render it necessary to remove and replace it, and, in fact, in some cases entirely renew it.

Very respectfully,

BANCROFT GHERARDI,

Rear Admiral, Commandant.

HON. W. C. WHITNEY,

Secretary of the Navy,

Navy Department, Washington, D. C.

First Indorsement.

NAVY DEPARTMENT, OFFICE OF DETAIL, WASHINGTON, December 13, 1888.

Respectfully referred to the Chief Constructor for his information, and for such statement and recommendation as he may think proper.

By direction of the Secretary.

J. G. WALKER,

Chief of Bureau.

Second Indorsement.

BUREAU OF CONSTRUCTION AND REPAIR,
December 13, 1888.

Respectfully returned to the Office of Detail.

Referring to that part of the report of the Board where they recommend "that finally the ship be fumigated, one compartment after another, with superheated steam of 220° F., after which the stores may be replaced and the men and officers return on board."

This bureau suggests that the recommendations of the Board to turn superheated steam into the several compartments of the vessel be dispensed with, if possible. The greater part of the wood-work in the living quarters of the officers is of hardwood veneer, and the remainder of the wood-work—*i.e.*, ceiling overhead in ward-room, steerage, cabin, etc., is pine panelled, the ceiling between decks in the superstructure, and wood-work of magazines, shell-rooms, and all store-rooms are made of kiln-dried lumber, and the damage that would be caused by turning steam into these compartments is at this time impossible to estimate. As the most of this wood-work would have to be taken out, repaired, and in many cases entirely renewed, the expense involved would be very great.

T. D. WILSON,
Chief Constructor, U. S. N., Chief of Bureau.

Third Indorsement.

OFFICE OF DETAIL,
December 14, 1888.

Respectfully referred to the Surgeon-General for his information, and for such statement and recommendation as he may think proper.

By direction of the Secretary.

J. G. WALKER,
Chief of Bureau.

Fourth Indorsement.

NAVY DEPARTMENT, BUREAU MED. AND SURG., WASHINGTON,
December 14, 1888.

Respectfully returned to the Office of Detail.

Referring to the report of the Board, this bureau respectfully suggests as follows :

As the work can be done at the Navy Yard, Brooklyn, it is recommended that the officers and men be transferred to other quarters; the stores and coal removed, the coal to be consumed as soon as practicable (not to be placed on any vessel); that the ship, in every portion, be subjected to sulphur fumigation, followed by a thorough application of a solution of bichloride of mercury, one to one thousand; that the bilges be pumped out until no sewage is perceptible, and then be washed out with the mercuric solution; that all bales of woollen goods, felting, and like fabrics be placed in a room where they can be subjected to the fumigation process, and, if necessary, sprayed with the mercuric solution.

The bureau respectfully recommends that Assistant-Surgeon William Martin, U. S. N., be ordered to report to the Commandant of the Navy Yard, New York, for duty in charge of the disinfection of the "Boston."

J. MILLS BROWNE,
Surgeon-General U. S. Navy.

Fifth Indorsement.

NAVY DEPARTMENT, WASHINGTON,
December 15, 1888.

The best evidence obtainable is to the effect that the disinfection can be made effective without resorting to the use of steam at 220° F. Such, I am informed by the Surgeon-General, is the opinion of Assistant-Surgeon William Martin, whose experience in the matter of yellow-fever is perhaps the largest in our navy, and this opinion is concurred in by the Surgeon-General. It would not be wise for us to adopt a method likely to cause so great an injury to the ship as would occur from the use of superheated steam, unless absolutely necessary, and I therefore concur in the recommendation of the Surgeon-General.

W. C. WHITNEY.

ST. JAMES HOTEL, WASHINGTON,
December 19, 1888.

MY DEAR SIR: I notice in one of the papers to-day a statement that it is proposed to continue the disinfection of the "Boston" by injecting steam into her compartments. It will be most dangerous to the integrity of her hull partly immersed in cold water, while all her deck-beams, sides, and other steel parts are heated even to the lowest temperature of steam, 212° F., will generate a force by unequal expansion that will certainly do great damage, if it does not destroy her altogether. If you will take the trouble to confer with Mr. Melville, of the Engineer Bureau, I doubt not he will confirm my statements. I know him to be familiar with such subjects. The unequal expansion caused by unequal heating and the obverse is the evil genius of metal structures of large dimensions, such as iron and steel ships, steam boilers, and cannon. I hope my suggestions will not come too late.

Very respectfully,
Your obedient servant,
NORMAN WIARD.

HON. W. C. WHITNEY,
Secretary of the Navy,
Washington, D. C.

THE COOLEST TOWN IN THE WORLD.—In the Berlin *Meteorologische Zeitschrift* for June, so says *Nature*, Dr. Hann gives an interesting account of the winter temperature of Werchojansk (Siberia), deduced from several years' observations. The town, which lies in the valley of the Jana, about nine feet above the level of the river, in latitude 67° 34′ N., longitude 133° 51′ E., and at a height of about three hundred and fifty feet above the sea, has the greatest winter cold that is known to exist upon the globe. Monthly means of —58° F. occur even in December, a mean temperature which has been observed nowhere else in the polar regions; and minima of —76° are usual for the three winter months (December–February). In the year 1886, March also had a minimum —77°, and during that year December and January never had a minimum above —76°, while in January, 1885, the temperature of —89° was recorded. These extreme readings are hardly credible, yet the thermometers have been verified at the St. Petersburg Observatory. To add to the misery of the inhabitants, at some seasons the houses are inundated by the overflow of the river. The yearly range of cloud is characteristic of the climate; in the winter season the mean only amounts to about three tenths in each month.

THE OHIO STATE SANITARY ASSOCIATION.

ABSTRACT OF THE PROCEEDINGS OF THE SIXTH ANNUAL MEETING, HELD AT CANTON, NOVEMBER 14TH AND 15TH, 1888, G. C. ASHMUN, M.D., HEALTH OFFICER OF CLEVELAND, PRESIDENT.

THE sessions were held in the Assembly Hall of the High School.

The first paper read after the usual formalities of opening the proceedings was by Dr. R. Harvey Reed, M.D., Secretary of the Association, of Mansfield, on

" How to Prevent the Spread of Typhoid-Fever."

"Typhoid-fever," he said, " is an acute febrile affection, particularly characterized by stupor and low muttering delirium, accompanied with diarrhœa and a peculiar eruption of the skin. It is undoubtedly a communicable disease, being capable of direct and indirect communication from one person to another, through a proper medium, such as water or milk, but not a contagious disease like small-pox, measles, or scarlet-fever. It is caused by the swallowing of a germ peculiar to typhoid-fever. This germ usually finds its way into wells, springs, rivers, and creeks which are used as a water supply.

" Deep wells cannot always be trusted or looked upon as a safeguard against typhoid-fever, as was clearly proved by the Dudlow Lane well near Liverpool, England, which had a total depth of 443 feet, yet it was fouled by the percolation from cesspools. Surface wells surrounded by cesspools or stables, hog-pens, manure piles, sewers, or any kind of surface filth, in all stages of decomposition, are still more dangerous and objectionable. Typhoid-fever is a preventable disease, and can be prevented by the use of pure water. There are six facts to bear in mind :

" 1. Typhoid-fever is caused by the introduction of a specific germ into the alimentary canal.

" 2. That this specific germ multiplies in the alimentary canal and in turn is throw off in the stools of the patient.

"3. That its vitality is much greater than at first supposed.

"4. That the germ may be communicated from one person to another, by water, milk, foods, and air.

"5. To prevent its spread all the dejecta should be burned at once or thoroughly disinfected.

"6. If the water supply is of a suspicious character, thoroughly boil it before using, and then place it where there is no possibility of its becoming infected."

At the afternoon session the most important subject was a paper by Mr. Josiah Hartzell, of Canton, on "Canton's Water Supply." He said:

"The water used in Canton for drinking and culinary purposes is derived from four sources: Cisterns, an artesian well, surface wells, and Nimishillen Creek.

"In a comparatively few ways where rain-water is used, cisterns always made of brick and cemented are provided with filters which are made in various ways. The usual way is to have a box filled with sand or coke near the surface of the ground through which the water must pass before entering the cistern. Such water is strained rather than filtered. The principal disadvantage of a brick-wall filter is that the organic matters held back by it cling to its sides, remaining under water long enough to admit of chemical changes which produce new compounds that the brick filter is powerless to arrest.

"About 250 families get their drinking water from an artesian well which was bored in 1884, under the superintendence of Mr. C. W. Chapman, in quest of natural gas. Its depth is 2720 feet, but the water that flows out at the surface was struck at a depth of 110 feet. The water from this well first attained its very considerable popularity by its obvious purity and its gratefully pleasant taste.

"The water supply of the city is driven through the mains by two Worthington direct-acting pumps of two millions and three millions daily capacity respectively. Over twenty-five miles of cast-iron mains are in use. The attachments number 1625 in all, of which 200 have been made since March 1st last.

"Water was first supplied to the city by the Canton Water Works in 1870. From that date until 1881 the supply was obtained from Meyer's Lake. In 1881, owing to the subsidence of the water level and the threatened consequent impair-ment of the property for amusement purposes, the proprietors of the lake got out an injunction against the further use of the lake as a source of city water supply.

"As a source of supply for drinking water, Meyer's Lake must be sanitarily considered a stagnant pool. The water, it is true, arises from deep springs sources, but during a portion of the year above named, this supply is not sufficiently abundant to keep good the surface evaporation. The water furnished to the city has, since the lake source was abandoned, been obtained from the west branch of the Nimishillen Creek. This is a spring stream. In respect to quantity it is very safe for a city considerably larger than Canton. The need of purer water is generally recognized. During the past summer the water-works trustees have caused to be bored an artesian well near the pumping station. This well passed through about 40 feet of alluvium and 160 feet of rock. Flowing water was reached in loose sand rock at the depth of 140 feet. The fact that the water-bearing stratum at this point is found relatively at the same depth as in the Chapman well, and considering the similarity of the rock formations in which the water is found, the probability of their common origin easily suggests itself. Two more wells of larger diameter are to be sunk near the first with a view to ascertaining whether a supply adequate to the wants of the city can thus be obtained."

The evening session was the occasion of a public reception and a large attendance, Dr. Murdock, Chairman, *pro tem.* Hon. John F. Blake, Mayor of the city, welcomed the Association, and as the head of the municipal government, extended to them the freedom of the city. The response was made by Dr. Ashmun, President of the Association. He accepted with thanks the hospitality of the city, and followed with an address on "What is Sanitation?" He gave the gist of his practical experience as the health officer of Cleveland for many years; pointed out the relation of the medical profession to sanitation, with special reference to the prevention of infectious diseases by reporting the first cases; and the relation of municipal governments to sanitation, with special regard to cleanliness of soil, air, and water.

At the conclusion of Dr. Ashmun's address, Dr. Slusser, of Canton, stated that the matter of "Hot Air *vs.* Steam for the

Heating and Ventilating of Dwellings and Public Buildings," would next come up for discussion, the discussion to be opened by Thomas Hubbard, M.D., of Toledo. But Dr. Hubbard's paper, instead of presenting the subject in both of its aspects, according to the impression of his purpose which had before obtained, confined himself wholly to the advantages and superiority, in his mind, of the "Hot Air" process, and especially of the *Smead* method, so fully described by Mr. Isaac D. Smead, the proprietor, at the previous meeting of the Association (SANITARIAN, vol. xx., p. 213). This, according to the gist of his paper, so pre-eminently fulfilled all the conditions of heating and ventilation, that he seemed to notice other methods only for the purpose of showing their inferiority.

At the conclusion of Dr. Hubbard's paper, the chairman indorsed the views that had been expressed as being in full accord with his own, and proceeded to call upon several members of the same way of thinking, which, for the time, seemed to create some dissatisfaction. But Dr. Ashmun, of Cleveland, being called upon, at once remarked that he was opposed to the hot-air process. Indeed, it seemed to have been well known that he had repeatedly so declared himself, and that recently an extended interview with him appeared in a Cleveland paper, in which interview he pronounced the hot-air system in the Cleveland schools a failure, and gave expression to the assertion that it was dangerous to a locality to have disease germs from a dry-air closet sent out of a flue in a thickly populated part of the city ; but his remarks did not carry out these impressions of the auditors. He stated in substance that he was opposed to hot air, particularly the system in use in the Cleveland schools ; but, nevertheless, said that the system had been acting admirably, hence his objections in that instance were not sustained. In one school in Cleveland the dry-closet system was in use, but the defects in it were caused by the foul-air flue being lower than some portions of the building. The flue was extended and the system was working properly.

Mr. Oby, a leading steam and gas-fitter of Canton, followed. He stated that he had an impression that the society had arranged for the subject to be handled by its members, after which would come a general discussion. He now saw that he was in error. He knew much of steam as a heating agency, but he felt he could not do the subject justice without preparation. He would have been glad to have prepared a paper on the subject if he had received notification of the matter. As it was, he would have to defer it until a later day.

Dr. Reed, of Mansfield, was sorry that the steam men were not prepared to discuss this matter with those in favor of hot air. He thought there was nothing like hot air. He had made exhaustive research into the matter, and came to his decision only after the conclusion of his research. He then gave an interesting account of a thorough investigation he made of the heating and ventilating of railroad sleeping cars.

Mr. Geswein, of the Board of Education, asked the question whether or not the system of dry closets was preferable where there was a perfect system of sewerage. He was informed by Mr. Oby that the dry-closet system, if placed properly, was as efficient in its work as a system of sewerage.

Secretary Paul Field, of the Canton Water Works, asked Mr. Oby if it would not be an improvement on the present system in use in the high school building if the closets were disconnected from the ventilation of the building.

Mr. Oby thought not, if the system was placed in the building in a proper manner.

Mr. Field proceeded to state that he was not a scientist; he was only an observing youth. In the matter of the system in use at the high school building, he had to go on only the old saying that "fools and children tell the truth." He heard from the school children that the system was a rank failure. Odors were found throughout the building, disagreeable odors, and from the closets in the basement. Those in charge grew greatly alarmed over the matter, and finally placed it to odors from the laboratory, when, in fact, at that time there was not a chemical in that room. When it was found this wouldn't do, the odor was placed to the removal of a vault at the Aulthouse property. These odors were noticed for weeks after. He wanted to know if there had been a wholesale removal of vaults in that neighborhood. He could not see how a furnace, made up of small pieces and puttied together, could give satisfaction. In view of the frequent trouble had with the system in this city, he was surprised to hear no voice raised against it by those present.

Dr. ——, of Cleveland, stated that he had tried various systems in schools, and found the steam system of heating the best. In the schools there had been put in a hot-air system, the Smead system, and there was continual trouble with it. He pronounced it a failure. On Friday afternoon the fires in the furnaces would be permitted to die down and remain out until Monday morning. By this the rooms were filled with obnoxious gases from the closets, a menace to the health of thousands of scholars.

Mr. Robert Cassidy gave a lengthy history of how the School Board had come to purchase the Smead system. He was a member of the Board at the time. The points as given by him are familiar to every citizen of Canton, they having been kept green in the memory by the long-continued warfare recently ended in the Board of Education, on the system of heating and ventilating for new buildings. He had heard much concerning the system in use in this city, but believed it to be the best. From the adverse comment on the system in this city the past year he had expected to hear the steam men tear the system to pieces, figuratively speaking, and place the matter in such a light that nothing but steam would hereafter be used. He was disappointed.

Mr. A. McGregor thought the system a failure. He thought it wrong to imperil the health of the children by its use. Not only this, but it had been decided upon for a number of new buildings without those pushing the matter waiting to see whether it were true or false. He appealed to the people of Canton if the system was not a failure, and putting the system in other buildings under the circumstances was a rank failure.

At this moment Mr. Joseph A. Bour, member of the Board of Education, and Attorney J. J. Clark arose, but Mr. Bour was given the floor. Mr. Bour relinquished the floor to Mr. Clark, and that gentleman spoke as one having authority to speak, he having been instrumental in securing this system of heating and ventilating. He quoted Scripture frequently, drawing a parallel case between the horde who cried "Crucify him, crucify him," to those who were now fighting the Smead system. He stated that there was no more justice exhibited in one case than there had been in the other.

Dr. James Fraunfelter arose to a point of order. He stated that the subject was Hot Air *vs.* Steam, but that those participating had made it Smead *vs.* Steam.

The president sustained him, but stated that as the question was of unusual interest locally, the speakers were not held to such strict accountability as they otherwise would be.

Judge Underhill didn't see what could be gained by this discussion. It was merely assertions. One faction said the Smead system was defective, the other said it wasn't. He advocated a microscope, as with it could be told whether there were any disease germs about.

Joseph A. Bour scorched the system. He wanted to know how one could get pure air when the source was impure. He asked the chairman whether in building a house he would attach his water-closets to the house ventilation or have them separate. The chairman would have them separate. He said it was the same with the schools, only in one case there were only a few affected, while in the other case hundreds were in danger. The closets at the Central High School building had gravel bottoms where they should be cemented. Another thing was the gravel bottom closets were only a short distance from the school pump from which the drinking supply was received.

Dr. T. Clark Miller, of Massillon, didn't see that the system made any difference. The air had to be heated, and it was not particular just how it was heated. The one point was not to make the heat red-hot. He thought the Smead system a good one, but not perfect, by any means. He scoffed at theidea of disease-breeding germs falling from the foul-air flue in buildings where the hot-air and dry-closet system wasin use. He thought that Smead was doing all he could to perfect his system.

Dr. Hubbard closed the discussion by giving some estimates on the quantity of air passing from a building and the quantity passing into a building under a perfect system of heating and ventilating. The meeting then adjourned.

At the second day's sessions, Professor J. J. Burns, principal of the Canton schools, read a paper on the "Contagion of Health." Mr. Burns's article was full of wit and humor, and it was much appreciated by the audience.

Professor Staley, of Cleveland, followed with a paper on "Sewers for Small Towns."

The forenoon was principally occupied in the discussion of the sewerage question. Professor A. W. Smith, of Cleveland, read an essay on "The Water Supply of Cleveland."

Other important papers read, of which we regret the want of space for abstract, were: "Heating and Ventilation," by Mr. Francis C. Bodine, of Mansfield; "Fraud in Dressed Meats," by Lewis Slusser, M.D., of Canton; "Meteorology as Related to Morbility," by E. R. Eggleston, M.D., of Mt. Vernon; and "Cousin Marriages Unobjectionable," by E. S. McKee, M.D.

The following officers were elected for the ensuing year: President, Dr. E. H. Bechtel, of Cleveland; Vice-Presidents, Mr. Josiah Hartzell and Dr. Lewis Slusser, of Canton, and Professor E. A. Jones, of Massillon; Treasurer, Dr. J. M. Weaver, of Dayton; Secretary, Dr. R. Harvey Reed.

The next place of meeting will be at Dayton, but the Executive Committee will fix the date at a future time.

HOW TO USE CANNED GOODS.—An "expert," writing to the *Grocers' Chronicle*, well says that canned goods should be turned out and eaten as soon as possible. If kept at all, the food should be covered up and put in a cool place—always, however, turned out of the original tin. The liquor around lobsters, salmon, and all vegetables, excepting tomatoes, it is desirable to strain off and throw away. Lobsters and prawns are improved by being turned out into a sieve, and rinsed with clear cold water. Never on any account add vinegar, sauces, or any kind of condiment to tinned foods while they are in the tins, and never leave such mixtures to remain an hour or two, if from forgetfulness it is done. All tinned goods are put up as fresh as it is possible to be, but, unless corned or salted, will not keep if turned out, as freshly cooked goods will, and certainly not longer, as many thoughtlessly suppose or expect they will. Sardines, if preserved in good oil, and if of good quality, will be an exception; as long as the oil is good, the fish can be kept in the tins. But seven days is long enough to trust these before eating. Consumers should not buy larger packages of canned goods than they can consume quickly; if they should, most of the fish and meats can be potted after recooking, sauces and seasoning being added. If the nose and eyes are properly used, it is as impossible to partake of an unsound tin of canned food of any kind as to partake of bad meat, fish, or vegetables from a shop.

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

SUBSCRIBERS will please conform to conditions of detachable order on advertising page xv.

TYPHOID-FEVER IN BROOKLYN.—The *Medical and Surgical Reporter*, in a recent number, says:

"It is reported from Brooklyn that there is an epidemic of typhoid-fever in that city, and this report has led to an explanation by Dr. Charles F. Chandler that the cases of typhoid-fever are to be attributed to water drunk by the patients at a distance from the city, and that it is not attributable to the drinking of Croton or any river water. It is interesting to note this important discovery at a time when typhoid-fever is prevailing in what is practically a part of New York City, in view of the well-known fact that when typhoid-fever occurs in more than minimum proportions in the city of Philadelphia, our neighbors in New York rarely let slip the opportunity to charge the outbreak upon the maligned but patient Schuylkill."

By this it appears that the *Reporter* is so ignorant of the topography of New York and Brooklyn as not to know that the water supply of New York is as distinct from that of Brooklyn as it is from the Schuylkill. The statement is the more erroneous because it implies that typhoid-fever is less liable to occur as the result of drinking *river* water than of that which is derived from other sources—a conclusion based, apparently, upon the "Sanitary Chemistry of Waters," etc., as given by Professor C. F. Chandler (*Public Health*, vol. i., p. 533), quoting, with apparent approval, the sentiments of the late Dr. H. Letheby, Medical Officer of Health to the Corporation of London, twenty-five years ago. Dr. Letheby contended against water pollution as the means of propagating cholera, and held that river water was so self-purifying that it might contain one twentieth part of its volume of sewage and yet, after flowing a distance of ten or twelve miles, be absolutely pure and wholesome—*because he and other chemists were not able to detect the impurities.*

But with the progress of sanitary knowledge since that time, the well-recognized results of drinking water polluted with sewage are regarded as conclusive evidence of the danger of such pollution, whether detected by the chemist or not. Yet we would not by any means be understood as denying that typhoid-fever is, taking one year with another, increasingly prevalent in Brooklyn, and that it is, in our judgment, probably due for the most part to sewage pollution of the intensest and most loathsome kind—*the seepage of graveyards.*

The subsoil water of Long Island, from which the Brooklyn supply is taken, is well known to be a *moving* volume from the "backbone" of the island toward the seashore. This process of filtration through the sand, discovered by the surveys preliminary to the Brooklyn Water Works, thirty years ago, was regarded as a guarantee of purity—fortified by the negative results of chemical analysis. Deemed to be free from sewage pollution, little or no account was taken of the seepage of cemeteries and numerous small graveyards within the scope of this moving volume of water, and some of them in dangerous proximity to the reservoirs.

Moreover, *dangerous* proximity in this case, considering that the dead bodies are placed at a depth conveniently exposed to the subsoil water current, carefully protected from contact with the earth by the coffins until long after the access of water to them; that cases are on record in which typhoid-fever has been traced to the seepage of sewage through soil more than a mile in extent; the specially favorable nature of the soil and course of the subsoil current, and that there are several graveyards within a quarter of a mile of the reservoirs—surely such conditions are alike dangerous and revolting.

The danger of sewage pollution of drinking water and the nature of sewage, in the ordinary acceptation of the word, are so thoroughly described in the leading paper of this number, that every reader's attention is invited to it. Graveyard seepage is sewage intensified. In its nature it is essentially the same as the very small proportion of putrescible matter of the mass of ordinary sewage. Like it, it consists of all that is soluble of putrescible organic matter, but in a more concentrated form; and, unfortunately, as just above shown, the putrescible dead bodies are so placed as to afford the greatest possible facility for the soluble portion to be taken up by the subsoil water-courses and conveyed to the storage supply—scarcely less effectually, indeed, than if the dead bodies were at once cast into the water-courses, after the manner of the ancient Hindoos, and with scarcely less fatal results.

Remarkable, indeed, it is that the increased prevalence of typhoid-fever, diphtheria, and some other filth disease in Brooklyn, in recent years, bears a much closer relation to the population and proximity of the graveyards to the reservoirs than it does to the increased energy of the health service for the prevention of such diseases. And we regret that, in so far as the excellent paper to which we have just called attention, on other pages of this number, cites the purity of Brooklyn's water supply as measured by the typhoid-fever standard, Brooklyn is given a rank which she does not deserve.

Health Commissioner Griffin, in his annual report for 1888, for the eleven months ending with November, under the head of typhoid-fever remarks that:

"In the fall of each succeeding year, with unfailing regularity, an increase from month to month in the number of cases and in the mortality dependent thereon takes place. Beginning with August, there is a progressive increase to October, and then a gradual subsidence. The causes which lead to this seasonable outbreak are indeterminable and at best but the subject of speculation. . . . If, as no doubt happens, the germs of the disease are always present in the city, whether dependent on sewer emanations or pollution of the water supply, no explanation can be afforded of the failure to show an increase during the prevailing high temperature of summer, which should be most influential in the growth and development of disease-bearing atoms. . . .

"The total number of deaths from typhoid-fever in Brooklyn, during eleven months of 1887, was 128, while during the corresponding portion of 1888 there were 127, notwithstanding that there has been a very marked increase of population in the latter year, probably reaching 33,000. The total number of cases reported for the year up to date has been 445, with a mortality of 127."

It is common to most infectious diseases to have their seasons of special prevalence. Typhoid-fever is no exception in this regard. This condition doubtless depends upon some natural characteristic or stage of growth of the infective germ when it is the most potent—a condition, indeed, common to all organic bodies.

There is good reason to believe that the number of cases of typhoid-fever *reported* is far from the total number that occur. Estimating by the rate of mortality common to this disease (about eight per cent), there were in Brooklyn during the last twelve months not less than seventeen hundred cases.

Diphtheria, in relation to filth generally—not excepting polluted water—is a congener of typhoid-fever; it chiefly depends upon the same conditions. Neither one is created by filth, in polluted water or otherwise. But water polluted with sewage, equally with unhealthful surroundings, foul air from overcrowding and sewer-gas, are the breeding-places of the germs of these and other infectious diseases. Such conditions do create, however, a general condition of ill-health; impair the powers of resistance to and combat with the infectious germs, contracted by contagion or otherwise, and promote fatal results. Of this disease, the commissioner reports the whole number of cases for the year 3297, of which 888 were fatal.

Scarlatina, too, or, at the least, its fatality, is greatly promoted by the same conditions; but, like diphtheria, eminently contagious. Of this disease the whole number of cases reported in Brooklyn for the year 1888 was 2672, of which 445 were fatal.

Inferentially, every cemetery and graveyard on Long Island is susceptible of such drainage as will effectually deprive them of danger to the living. And it should go without saying that the Brooklyn Department of Public Works is equal to the suggestions of the Health Department in all measures for the protection of the public health.

THE NEW MAUSOLEUM COMPANY.

MADISON SQUARE BANK BUILDING,
NEW YORK, January 5, 1889.

Editor of THE SANITARIAN:

In behalf of the company which I represent, please accept my thanks for your favorable mention of the mausoleum plan for the disposal of the dead, in your December number, in connection with the sanitary condition of the Croton Valley water-shed, and permit me to state that the reason why we have not presented the subject to the public is because we have preferred to seek first the approval of the medical profession, of sanitarians, and of other leaders of opinion. The approval of THE SANITARIAN was especially desired, and your words give us courage in the encounter with an old but unsatisfactory custom.

It is proposed to erect in or near this city an elegant structure which shall be absolutely fire-proof, and, beyond any other building, time-proof—a grand tomb of fine proportions to contain at least ten thousand spaces, each adapted to the reception of the remains of a lost friend. These spaces will be arranged in compartments or singly, as may be desired. As each space is filled and sealed dry air is forced in, thus facilitating the elimination of the fluids and gases of the body, and the desiccation of the solid matter until it becomes odorless and harmless, although the figure retains its accustomed form for a period of time which cannot be measured. Experiments now being conducted in the University Medical College demonstrate the feasibility of desiccation, even when applied to a large body in the heat of midsummer. None of the horrors of the festering tomb take place. "The small cold worm that fretteth the enshrouded form" is unknown in desiccation. The gases and fluids are drawn to a central furnace placed in a sub-cellar far from the spaces allotted to the loved ones, and they are there rendered wholly harmless before they are conducted to the atmosphere. Let me further state that the proposed building will be of concrete, and that the thousands of spaces and all the arched halls and corridors will be built up in conjunction with the outer walls, forming in that way an almost perfect monolithic structure that will outlast any contemporaneous building, memorial, or vault. For the sake of ornamentation the concrete can, within and without, be faced with granite or other time-defying stone.

Similar buildings would, in my opinion, solve the burial problem in the Croton Valley water-shed, as well as elsewhere; and your mention of the new plan in that connection is, I assure you, highly appreciated.

Respectfully,

CHARLES A. HARVEY, *Secretary.*

THE RÔLE OF INFECTIVE MICROBES AND THE ADVANTAGES OF WOOLLEN CLOTHING.

NEW YORK, January 5, 1889.

Editor of THE SANITARIAN :

Two subjects have been themes of especial interest to me for the last two years—to wit : the rôle of microbes in disease, and the Dr. Jaeger theory of sanitary clothing. For this reason, as well as others, I have read with peculiar interest your article entitled "*Some Observations on Yellow-Fever and its Habitudes,*" in the December number of THE SANITARIAN.

On page 505 you say : "Impatient at the continued delay and increasing prevalence of the disease, the writer took the responsibility of having every person on board the 'Delaware,' except necessary keepers, washed and dressed in *new flannel suits* (sailors' shirts and pants), procured for the purpose, and transferred to the hospital, where he provided them quarters, and *from that time there was not another case of fever among them*, though there were five cases on the day before. So much for *elimination* as against development under changed conditions."

Of course, such an assumption of responsibility was not without scientific grounds, or the warrant of some precedent. Will you permit an earnest student to ask what those grounds were, and what the *rationale* of the preventive efficacy of the flannel clothing?

Respectfully yours,
R. C. RUTHERFORD, M.D.

The Rôle of Infective Microbes is to battle with the physiological powers of the system which they enter, and to put it upon the defensive immediately that they are distributed to the tissues of the body, by means of the blood which carries them to every part. If the system they enter be weak from any cause, constitutionally so, or feeble from recent disease ; by reason of unhealthful surroundings, such as a foul atmosphere, sudden exposure to excessive heat or cold without sufficient protection ; deprivation of sleep ; deranged digestion or mental disturbance ; above all, by debauch ; in short, if by anything which disturbs bodily vigor, the microbes have the advantage—and they never fail to avail themselves of it—and generally overcome the power of resistance. It is not because they are cowards and only attack the weak; they attack the strong and the weak alike on every opportunity, but the strong—with all the functions of the body maintained in a state of vigorous health—are able to cope with microbes and overcome them. The feeble, on the other hand, are taken at a disadvantage, and the more if the circumstances of their enfeeblement are in any degree maintained.

"The future of preventive medicine," said Professor Ray Lankester, in a lecture which he delivered at the London institution recently, "is the education of the white blood corpuscle." A corpuscle is a minute cell of protoplasm which floats in the human blood. "This minute creature eats, and lives, and flourishes, and dies almost like a human being. Its special function," said the lecturer, "is to eat up the poisonous element which finds its way into the blood. When a wound heals it is because these indefatigable corpuscles have found their way to the sore and have eaten away the injured part. When bacteria get into the system the duty of the corpuscles is to go for them and eat them up. If they succeed, the patient recovers. If they are out of appetite, or the bacteria too tough a morsel for them to attack, the patient dies. Sometimes, with unconscious heroism worthy of Marcus Curtius, they purify the bodies in which they live by eating up poisonous particles and then ejecting themselves, thus sacrificing their own lives. But such heroic self-immolation is not necessary, if you educate your corpuscle. His education proceeds by inoculation. By accustoming your protoplasmic cell to a low diet of mildly poisonous matter, such as the vaccine lymph, it becomes acclimatized, as it were, and is strong enough to eat up without inconvenience the germs of small-pox, which would otherwise prove fatal. It is these invaluable corpuscles which enable confirmed arsenic eaters to swallow with impunity a dose sufficient to kill six ordinary men." Professor Lankester is of the opinion that they can be trained so as to digest the most virulent poisons and deal with a great number of diseases.

With the foregoing suggestions it is apparent that the indications in dealing with the microbe (infectious disease) are to strengthen the power of resistance to and combat with it in conjunction with the use of every available means of preventing and destroying the conditions favorable to its existence, both within and without the human body.

The conditions most favorable to the propagation of yellow-fever, as also of other infectious diseases, were painfully familiar to us long before the event referred to; and not to have applied the best means of resisting it with which we were acquainted, under the circumstances, would have been criminal negligence.

Woollen Clothing is so well known as the best possible means of protecting the wearer against the ill effects of sudden changes of temperature; of preserving the equable temperature of the body while it admits of thorough ventilation of the surface with the least risk from exposure; as a means of absorbing perspiration as fast as it is emitted, and—if unrestrained by overclothing of other material—allowing the perspiration to pass off into the atmosphere insensibly almost as fast as it is generated, and thus keeping the skin dry even in the hottest weather, and warm in the coldest; and as a gentle stimulus to the skin, removing scurf, keeping the pores open and clean, and promoting its healthy action for the promotion of health or the elimination of disease: for all these reasons, and more might be cited, woollen clothing commended itself to us on the occasion referred to, as it has on many other occasions more or less similar, where it has before been *neglected*, and by this we mean as the most healthful apparel for the strong and well, as well as for the sick and feeble, under all circumstances—it invigorates the white corpuscles.

THE YELLOW-FEVER MICROBE—GOT HIM?—Dr. Paul Gibier was appointed by the French Government to investigate the whole question of yellow fever. He has been doing the most of his work in Cuba. He claims to have discovered in the black matter always found in the intestines after death of a yellow-fever patient, a bacillus presenting many points of resemblance to the so-called comma bacillus of cholera. It is generally curved, and in some cultures occurs in a spiral form. It also possesses the property of liquefying gelatine. When this bacillus is cultivated in certain medicines, as, for instance, in peptonized broth, it blackens the sides of the tubes in which the culture is made. All the cultures of this bacillus have a characteristic odor. A moist heat of 60° C. destroys them in a short time. Dr. Gibier believes this to be the reason why inland districts are exempt from the scourge—the comparative dryness of the air destroying the virus. He believes that yellow-fever is due to the development of the microbe in the intestines—the affection being therefore purely a local one.

DR. JAMES E. REEVES, of Chattanooga, is also reported as having cornered the yellow-fever germ. His recognized fame as microscopist is, to say the least, a sufficient guarantee that he has discovered something unusual—probably hitherto unrecognized. Verifications by other microscopists are in order, and will be looked for with hope; but the probabilities are not very encouraging.

BED-ROOMS which have been, as too commonly, occupied as sitting or sewing-rooms during the day, should be thoroughly flushed with air before the hour of retiring, cooled to a temperature of about 60° F., and ventilation provided for during the sleeping hours. An excellent means of ventilation is by a closely fitting strip of board under the lower window sash. Thus provided, the lap of the sash in the middle excludes rain or snow and admits the air with an upward current, and thereby never exposes the occupant to draught.

SETTING WASH-BASINS.—S. B. inquires of the *Metal Worker:* Will it ever be known what reason some so-called plumbers have for joining wash-basins to marble slabs by the use of common putty? Marble will absorb oil about as rapidly as a sponge will water. The writer has stopped at a number of hotels where the "plumbing" has been done by native talent. The marble work in the wash-room may be as elaborate as can be, even to a large silver-plated tablet that informs the washer that the marble work was done by the boss gravestone artist of the town. So far, the work may be well done, but where the wash-basins join the marble, there is where the trouble comes in, for, by using putty as a cement, the marble has been discolored for three or four inches about the basin, giving the work a very unsightly appearance. To set a wash-basin properly, it should be ground so as to make a close joint with the marble, and the basin held in place by three brass clamps, the bolts to hold which are to be leaded into the marble slab. The joint between the slab and basin should be made tight by means of plaster-of-paris. With some, it is customary to fit the wash-basins into a board which forms the top of the wood-work that supports the marble slab. If a number of basins were to be set, and they were to be held in place by a board, it might not be convenient to use plaster-of-paris, for fear the plaster would become hard before the slab could be placed in position. On this account it may be thought necessary to use putty, as every one knows it dries slowly enough to accommodate most any one. By setting the bolts in lead, the brass clamps can be applied, and the basin held in position without it being necessary to have a board on top of the wood-work to serve as a support for the basin.

THE DURHAM HOUSE DRAINAGE COMPANY, of New York, is at present fitting up the following buildings with its patent system of screw-joint wrought-iron pipe house drainage: Eight-story building for the New York Life Insurance, at Montreal; ten-story building for the same company, at St. Paul, Minn.; the State House, Columbia, S. C., and four new school-houses for the New York City Board of Education.

The Durham System of House Drainage has required five or six years, since it was first introduced, to overcome prejudices and superficial objections urged against it by some manufacturers of cast-iron pipe, plumbers, and others for interested motives, but we are gratified to learn that its excellence is more and more appreciated, as it is certain to be by all who will take the trouble to examine it.

PRACTICAL ILLUSTRATIONS OF THE NEGLECTS AND BENEFITS OF VACCINATION.—In Paris, where the law requiring vaccination is feebly enforced, the mortality from small-pox ranges from 136 to 10.1 to the 100,000 inhabitants, while in the principal German cities, where the vaccination laws are rigidly enforced, the death-rate is but 1.44 to the 100,000 inhabitants. London, under compulsory vaccination, has a death-rate from small-pox of but .6 to the 100,000 inhabitants. On the other hand, in the Canton of Zurich, in Switzerland, since the compulsory vaccination law was repealed in 1883, the death-rate from small-pox has risen steadily from 8 to 85 to the 100,000 inhabitants.

A report lately published by Mr. Ritchie, President of the British Local Government Board, with reference to the recent epidemic of small-pox in Sheffield, shows that of the children under ten years of age, 95,000 were vaccinated and 5000 were not. Among the vaccinated there were 189 cases of small-pox with 2 deaths; among the unvaccinated there were 172 cases and 70 deaths. Keeping these proportions, if all the children in Sheffield had been vaccinated, there would have been 200 cases of small-pox among them and a fraction more than 2 deaths; if none of the children had been vaccinated, there would have been 3337 cases and 1330 deaths, 600 times the mortality with universal vaccination.

TEN GOOD THINGS TO KNOW.—1. That salt will curdle new milk; hence in preparing milk porridge, gravies, etc., the salt should not be added until the dish is prepared.

2. That clear boiling water will remove tea stains and many fruit stains. Pour the water through the stain and thus prevent it spreading over the fabric.

3. That ripe tomatoes will remove ink and other stains from white cloth; also from the hands.

4. That a tablespoonful of turpentine boiled with white clothes will aid in the whitening process.

5. That boiled starch is much improved by the addition of a little sperm salt or gum arabic dissolved.

6. That beeswax and salt will make rusty flat-irons as clean and smooth as glass. Tie a lump of wax in a rag and keep it for that purpose. When the irons are hot, rub them first with the wax rag, then scour with a paper or cloth sprinkled with salt.

7. That blue ointment and kerosene mixed in equal proportions and applied to the bedsteads is an unfailing bedbug remedy, as a coat of whitewash is for the walls of a log-house.

8. That kerosene will soften boots or shoes that have been hardened by water, and render them as pliable as new.

9. That kerosene will make tin tea-kettles as bright as new. Saturate a woollen rag and rub with it. It will also remove stains from varnished furniture.

10. That cool rain-water and soda will remove machine grease from washable fabrics.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000 : Reports 66 deaths during November, of which 26 were under five years of age. Annual death-rate, 19.8 per 1000. From zymotic diseases, 13, and from consumption, 7.

CALIFORNIA.—The Secretary of the State Board of Health reports the number of deaths during the month of November, 1888, from 68 localities, comprising a population of 654,400, 997, representing an annual death-rate of 18.00 per 1000. Consumption caused 142 deaths—over one seventh of the total mortality. Zymotic diseases, 137—diphtheria and croup, 53 ; typhoid and typho-malarial fevers, 40 ; cerebro-spinal-fever, 9 ; small-pox, 1—in Merced.

San Francisco, 300,000 : Deaths during the month, 562 ; from zymotic diseases, 64. Consumption, 78.

Los Angeles, 80,000 : 69 ; from consumption, 9 ; zymotic diseases, 12.

San Diego, 30,000 : 21 ; from consumption, 3 ; zymotic diseases, 1.

Sacramento, 35,000 : 41 ; from consumption, 9 ; from zymotic diseases, 3.

CONNECTICUT.—The Secretary of the State Board reports for November, 1888, the total number of deaths returned by 166 towns, comprising a population of 733,626, 850, representing an annual death-rate of 13.9. Deaths under five years, 149—17.5 per cent. Deaths from consumption, 115 ; from zymotic diseases, 162—typhoid and typho-malarial fevers, 37 ; diphtheria and croup, 58.

"There was only one small town in the State from which no report has been received. The total deaths reported in November—viz., 850, and the total in October, 959, shows a diminished mortality of 116 and a death-rate of 13.9 against 15.7 of the previous month. The difference is due very largely to the diminished fatality from typhoid-fever, diarrhœal diseases, and consumption. In October there were 62 deaths from typhoid-fever, and only 29 in November. There were 46 from diarrhœa, and only 18 in November, and there were 128 in October from consumption and in November only 115. From diphtheria there were exactly the same in each month, 58. The lessened mortality from typhoid-fever is very marked. The health of the State is exceptionally good. The death-rate is less than in any previous month in the year."

FLORIDA AND YELLOW-FEVER.—Dr. John C. L'Engle, Chairman of Sanitary Committee, reports to the Surgeon-General, United States Marine Hospital Service, from Jacksonville, November 13th, 1888, as follows:

"By referring to the topography of this city, you will notice that it is situated on the north bank of the St. John's River, the river turning at right angles and passing to the east of a portion of the city recently added to the corporation; that this tract of country is low and flat, much of the land being marshy; that we have a creek on the west passing partially around to the northwest; another on the east extending to the northwest. This country lying between these two creeks is low and flat, and has never been thoroughly drained, and the water, in some places for acres, could be found a foot deep, with plank-walks through the yards and to the outhouses, and with wells containing only surface water or drainage from the seeping. The marshes and low lands along the sides of these creeks also emitted miasmatic stench deleterious to health, or supposed to be, and all demanding attention. The area of fever has been five miles from east to west, and ten miles from north to south, and the outlying district, where this condition existed, is inhabited by the lower classes, principally negroes, who have had a large share of fever and are now having it."

Dr. J. F. Hartigan reports the condition of Enterprise, under date of December 17th, 1888, as follows:

"Over its territory are scattered numerous ponds and marshes, generally without an outlet or an attempt at one. Perhaps the most pernicious of these is just west of the hotel. In it is dug a pit about fourteen feet by ten, lined by boards, which has been a receptacle for the hotel sewage. The intention was to regularly mix this with dried muck and use it as a fertilizer, but it had not been properly carried out, and the matter for a long time kept leaking through, as was evident from the surrounding exhalations.

"I found the streets and vacant lots generally overgrown with weeds and decaying vegetation; here and there were scattered heaps of all kinds of garbage; the drains were obstructed, and there was no system of disinfection or removal of excreta. Perhaps the worst death-trap that was ever found in a Christian community existed here. In the court-house yard the jail was situated; almost adjoining the latter a privy-house was built over a cesspool ten feet square and four feet deep, with a six-inch pipe communicating. Not only was this intended for the excrement from the jail, but it was an open place where the passer-by entered. On account of the porosity of the soil, the fluids percolated, and there was hardly ever an overflow. Two and a half years ago this pest-hole was established by authority! having been permitted to exist since. Of course it was a subject for early attention."

The epidemic is suspended.

ILLINOIS.—*Chicago*, 800,000: Reports 1061 deaths during November, of which 422 were under five years of age. Annual death-rate, 15.92 per 1000. From zymotic diseases, 253, and from consumption, 111.

MARYLAND.—*Baltimore*, 431,879: Reports 539 deaths during the four weeks ending November 24th, of which 180 were under five years of age. Annual death-rate, 16.21 per 1000. From zymotic diseases, 84, and from consumption, 83.

MASSACHUSETTS.—*Boston*, 415,000: Reports 732 deaths during November, of which 238 were under five years of age. Annual death-rate, 21.1 per 1000. From zymotic diseases, 117, and from consumption, 112.

MICHIGAN.—The Secretary of the State Board of Health has just issued his fifteenth annual report. The first part is taken up with an abstract of the work of the board during the fiscal year, and includes the remarks made by the members of a committee of the board before the Regents of the University urging the necessity of a laboratory of hygiene at the State University.

The second part of the report consists of eleven papers, abstracts, and reports.

Probably the most important part of this report may be divided into two general heads: The first quarterly report of the Michigan State Laboratory of Hygiene, by Professor Victor C. Vaughan, M.D., Ph.D., Director of the Laboratory, and the Study of the Causation of Diseases, by Henry B. Baker, M.D., Secretary of the Board.

Professor Vaughan's investigations with tyrotoxicon are treated of in an article by him on "The Chemistry of Tyrotoxicon: Its Action Upon Lower Animals, and Its Relation to the Summer Diarrhœas of Infancy." This article gives the experiments by which the identity of tyrotoxicon and diazobenzol is established, and contains rules for the prevention of the formation of tyrotoxicon in milk, and the prevention of cholera infantum and summer diarrhœas.

Professor Vaughan's report includes three subjects: (1) The important results of the investigations into the "Causation of Typhoid-fever," stating the details of the experiments whereby the "germs"—the bacilli of typhoid-fever—were proved to be in the water supposed to have caused the typhoid-fever at Iron Mountain, Mich., in October, 1887; and whereby, through the injection of the "germs," a disease in some respects similar to typhoid-fever was produced in an animal, and, through injection of a ptomaine formed by the germs, and chemically separated from the germs, an abnormal rise of body temperature was produced in an animal. (2) The complete account of the four cases (three fatal) of tyrotoxicon poisoning near Milan, Mich., in September, 1887, and the experiments indicating that the poison may be generated in soil saturated with decomposing milk. (3) The investigations which exposed a fraud which was putting into the hands of pharmacists and physicians a drug claimed to be a harmless product of the honey locust-tree, but which was found to be a dangerous mixture of cocaine and atropine.

Dr. Baker's studies of the causation of disease are contained mostly in three articles: (1) "Principal Meteorological Conditions in Michigan in 1886," (2) "Contributions to the Study of the Causes of Sickness"—a statistical report based on weekly reports of sickness in Michigan during the year 1886 and preceding years, and (3) a paper combining these two lines of study, and entitled "The Causation of Cold Weather Diseases." This important paper includes a study of the principal diseases of the air-passages and those communicable diseases which are most prevalent in cold weather. Over forty-one thousand weekly reports of sickness and over one hundred thousand observations of atmospheric temperature are gathered together in tables and graphically represented in diagrams showing that diphtheria and scarlet-fever follow inversely the curve for temperature. Similar large numbers of facts are grouped together in the same way, showing that influenza, tonsilitis, and bronchitis are related to the atmospheric temperature in the same way—rising as the temperature falls and falling as the temperature rises.

Dr. Baker states the facts which lead him to believe that the non-volatile salts of the blood exuded in excess into and upon the mucous surfaces of the air-passages are capable of causing an inflammation which is called "influenza," "tonsilitis," or "bronchitis," according to the portion of the respiratory tract involved. Other things being equal, the non-volatile salts are left by evaporation on the mucous lining of the air-passages, in proportion to the dryness of the air inhaled. Inasmuch as the absolute dryness of the air ordinarily depends upon its coldness, the inflammations of the air-passages should be expected to rise as they do after the cold, dry weather, and fall after warm, moist weather. The reason why the communicable diseases increase after the cold months is believed to be because of the greater susceptibility of the air-passages in those months, and this is the reason why the curves representing the rise and fall of these communicable diseases follow the curves for influenza, tonsilitis, and bronchitis.

A report by J. H. Kellogg, M.D., on Dangers in Gasoline embodies facts collected by him, including the views of leading insurance agents, etc., concerning the dangers in the use and storing of gasoline, and giving rules to be observed in handling this substance, declared to be "more dangerous than gunpowder."

Among the most concise articles in the report may be mentioned the President's annual address by Hon. John Avery, M.D., which gives a good presentation of the work of the board in the past, a forecast of its future work, and the economic value of public-health work.

For the month of November, 1888, compared with the preceding month, the reports indicate that tonsillitis increased, and that typho-malarial-fever, diarrhœa, dysentery, cholera morbus, and cholera infantum decreased in prevalence.

Compared with the preceding month, the temperature in the month of November, 1888, was lower, the relative humidity was more, the absolute humidity and the day and the night ozone were less.

Compared with the average of the month of November in the nine years, 1879–87, diphtheria, intermittent-fever, consumption of lungs, typhoid-fever, pneumonia, typho-malarial-fever, whooping-cough, and remittent-fever were less prevalent in November, 1888.

For the month of November, 1888, compared with the average for corresponding months in the nine years, 1879–87, the temperature was slightly higher, the absolute humidity was slightly more, the relative humidity was about the same, and the day and the night ozone were much less.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of November, 1888, at twenty-six places, scarlet-fever at forty-one places, typhoid-fever at twenty-three places, measles at six places, and small-pox at seven places.

Reports from all sources show diphtheria reported at ten places less, scarlet-fever at nine places more, typhoid-fever at twenty places less, measles at one place less, and small-pox at seven places more in the month of November, 1888, than in the preceding month.

Detroit, 230,000: Reports 244 deaths for November, of which 51 were under five years of age. Annual death-rate, 12.90 per 1000. From zymotic causes, 57, and from consumption, 29.

MINNESOTA.—The Secretary reports the distribution and mortality of specified diseases in Minnesota, for the month of October, 1888:

Measles and scarlatina slowly increasing, diphtheria markedly so. There were from the last 64 deaths in 24 localities and 19 counties, in September, while for this month there are reported 80 deaths in 27 localities.

Croup, 9 deaths in September, 20 in October.

Typhoid-fever, 84 deaths last month to 114 in October. In 19 localities then to 29 now. We repeat the warning of last month, and call earnest attention to the circular published then, and the further notice below. Send for as many copies of the circular as you can use for distribution.

Erysipelas, slight mortality, but 4 deaths and in 4 localities.

Puerperal diseases, same as last month.

Diarrhœal diseases of children, a very large reduction, 187 deaths in September to 52 in October.

Infectious diseases reported during the month of October: Diphtheria, 118 cases, 39 deaths; scarlatina, 21 cases, 2 deaths.

Diseases of animals: Cases of glanders remaining isolated or not accounted for, 35; reported during the month, 7; killed, 10; released, 1; isolated, 3. Remaining November 1st isolated or not accounted for, 31. Most of these are cases exposed, and isolated for further observation.

St. Paul, 175,000: Reports for November 138 deaths, of which 57 were under five years of age. Annual death-rate, 9.39 per 1000. From zymotic diseases there were 53 deaths, and from consumption, 7.

MISSOURI.—*St. Louis*: Annual report of G. F. Dudley, M.D., Health Commissioner for the fiscal year ending April 9th, 1888. Population, 420,000. During the calendar year 1887:

Births reported (exclusive of 740 still-births "not included either in the mortality or in the births"), 10,443—"nearly 9000 of which were reported by midwives; but one conclusion can be drawn from this fact, and that is that physicians do not report all births occurring in their practice; and it is highly probable that many physicians neglect altogether this important duty."

Deaths, 9155—3795, or 41.4 per cent, of which were of children under five years of age. From consumption, 829—8.94 per cent of total; from zymotic diseases, 2549—27.84 per cent. From the chief zymotic diseases, respectively, the number of deaths was: Measles, 40; scarlatina, 48; diphtheria, 927; whooping-cough, 12; typhoid-fever, 116; diarrhœal diseases, 477. Seventeen cases of small-pox occurred during the year, but they were so promptly reported and excluded as to prevent the spread of the disease, from which there was no death.

Thomas G. Kaye, Inspector of Dairies, reports that of 371 dairies inspected—exclusive of places where from one to three cows are kept—"166 were found to be connected with the sewers, and all the filth of these dairies is emptied into the sewers, and in many cases, I have no doubt," he remarks, "have much to do with stopping up or choking the sewers; 105 were found where the cows are kept continually confined, . . . 223 feed swill, and last fall, when the price of feed was high and the pastures very bare, swill formed the main part of the feed of many dairies. . . . The work of inspecting the dairies is too much for one person to do, if the work is done as it should be. . . . It is impossible for one person to visit them more than once in every sixty days."

That diphtheria and typhoid-fever should be especially prevalent with such conditions is surely no matter of surprise.

Thomas Cleary, Superintendent of the Poor House, reports the continued overcrowding of that institution, the antiquated, worn-out structures and appurtenances, and the consequent increased misery of the occupants.

Dr. H. C. Dalton, Superintendent of the City Hospital, reports 6479 admissions against 5960 during the preceding year; general improvement in the results of treatment since adopting antiseptic methods in the surgical wards during the latter part of the year; some improvements by way of repairs, but more needed with regard to worn-out flooring—inconsistent with thorough antisepsis. He urges a dynamo-plant for the purpose of electric lighting, and better protection against danger from fire.

Dr. W. B. Dorsett, Superintendent of the Female Hospital, reports 1701 admissions against 1644 the year previous, but 101 were children not ill in the care of their mothers. This institution appears to be especially affected with chronic decay, complicated with overcrowding and disgraceful neglect of proper provision for nurses—135 deaths against 119 the year previous, and 272 births against 280. "Puerperal fever, that above all dreaded in hospitals, cannot be successfully kept down with the accommodations we now have for lying-in women."

Dr. Le Grand Atwood, Superintendent of the Insane Asylum, reports 763 patients—516 at the beginning of the year and 247 admissions since. Percentage of deaths on the whole treated, 3.84; recoveries, 11; on those admitted during the year, 25. "All of the evils heretofore represented in fifteen consecutive annual reports, as affecting this institution through overcrowding, continue and are intensified." Altogether, the general results comprehended in this report are creditable to the officers in charge, but disgraceful to the civil authorities responsible for the inadequate force for the protection of the public health and for the dilapidated and death-dealing provision for dependent persons.

Reports for November 614 deaths, of which 236 were under five years of age. Annual death-rate, 16.74 per 1000. From zymotic diseases, 118, and from consumption, 56.

NEW HAMPSHIRE State Board begins the year with an official organ of twenty-four pages, under the title of "The Sanitary Volunteer." It is filled with a useful excerpt of sanitary literature, but no reports of State sanitation.

"Our object is," it says salutatorily, "to produce a publication that will educate the people to a higher appreciation of the means of preventing disease, and to a better understanding of its causes; to point out the dangers that come from unhealthful surroundings, conditions, etc., and to give information and instruction in matters pertaining to health that will be of practical service to all. The evils of unhygienic environments should be known by all classes." Irving A. Watson, A.M., M.D., editor. 50 cents a year. Concord, N. H.

NEW JERSEY.—*Hudson County*, 270,232: Reports for November 469 deaths, of which 178 were under five years of age. Annual death-rate, 20.8 per 1000. From zymotic diseases, 105, and from consumption, 52.

Newark, 176,969: Reports for November 287 deaths, of which 102 were under five years of age. Annual death-rate, 19.45 per 1000. From zymotic diseases, 48, and from consumption, 31.

NEW YORK.—Official *Bulletin* of the Secretary reports 6987 deaths during the month of November (7292 in November, 1887), representing an annual death-rate per 1000 population of all reporting localities of 17.80, that of the cities and larger villages and towns specified being 20.80; the actual and relative mortality is materially less than in October. The percentage of deaths under five years of age is nearly the same as in November, 1887, and lower than that of last month. Zymotic diseases caused 17.45 per cent of the total number (19.63 in October and 20.00 in November, 1887). There is a notable diminution in the death-rate of typhoid-fever, and also of whooping-cough. Scarlet-fever shows an increase (2.45 per cent of all deaths—1.59 last month). Diphtheria also shows a marked increase (7.68 per cent—5.48 last month, but 11.56 in November, 1887). Single cases of small-pox were reported, to December 26th, from Troy, Fort Edward, and Frankfort, the two last of very mild type. Consumption caused 12.75 per cent of all deaths, and 18.30 per cent of deaths above the age of five years. Fifteen per cent of all deaths were from acute respiratory diseases.

Severally, the populations and death-rates are as follows:

Maritime District.—New York City, 1,526,081, 21.52; Brooklyn, 757,755, 19.67; Gravesend, 5000, 24.00; New Utrecht, 4742, 30.31; Long Island City, 21,000, 25.14; Newtown, 10,000, 24.00; Oyster Bay, 12,000, ——; Hempstead, 18,000, 17.84; North Hempstead, 8000, 28.50; Huntington, 8100, 14.81; Jamaica, 10,089, ——; Southold, 7267, 13.20; Sag Harbor, 3000, 20.00; New Brighton, 15,000, 10.40; Edgewater, 12,000, 21.00; Northfield, 7014, 18.85; Westfield, 7000, 20.57; Yonkers, 27,500, 21.85; Westchester, 6900, 13.71; Sing Sing, 6500, 12.92; New Rochelle, 5500, 15.27; Port Chester, 4000, ——.

Hudson Valley District.—Albany, 102,000, 21.30; Cohoes, 20,000, 13.80; Troy, 65,000, 23.50; West Troy, 13,000, 12.93; Hoosick Falls, 6000, ——; Lansingburg, 10,000, 24.00; Green Island, 5000, 24.00; Greenbush, 8000, 21.00; Coxsackie, 4000, 15.00; Catskill, 4500, 16.00; Hudson, 10,000, 7.20; Kingston, 21,000, 16.00; Ellenville, 3000, 8.00; Marbletown, 4000, 3.60; Esopus, 4736, 8.00; Saugerties, 4000, 21.00; Poughkeepsie, 20,200, 14.25; Fishkill, 10,732, 13.26; Wappinger Falls, 5000, 16.80; Newburg, 20,000, 21.60; Port Jervis, 9500, 11.35; Middletown, 10,000, 21.80; Goshen, 4387, 21.87; Ramapo, 5000, 26.40; Haverstraw, 7000, ——.

Adirondack and Northern District.—Greenwich, 3861, 21.75; Argyle, 3700, 10.00; Salem, 3500, 24.00; Fort Ann, 4267, 2.81; Fort Edward, 4880, 19.68; Glens Falls, 10,000, 15.60; Crown Point, 4287, ——; Malone, 9000, 19.75; Potsdam, 4000, 18.00; Ogdensburg, 11,000, 19.64; Gouverneur, 5500, 15.28; Plattsburg, 7000, 10.28; Watertown, 12,200, 15.74; Lowville, 3188, ——; Clayton, 4314, 8.40; Ellisburgh, 4811, 12.50.

Mohawk Valley District.—Schenectady, 20,000, 10.80; Schoharie, 3350, 7.13; Cobleskill, 3371, ——; Middleburgh, 8376, ——; Amsterdam, 14,000, 8.40; Johnstown, 6000, 10.00; Gloversville, 10,000, 10.80; Little Falls, 7200, 23.33; Herkimer, 3000, 12.00; Ilion, 4200, 11.43; Utica, 43,000, 22.05; Rome, 12,045, 15.00; Boonville, 4000, 6.00; Camden, 3400, 21.18; Waterford, 5400, 13.33; Ballston Spa, 3200, 7.50; Saratoga Springs, 10,000, 22.80.

Southern Tier District.—Binghamton, 30,000, 16.00; Owego, 6000, 10.00; Candor, 4323, ——; Waverly, 3000, 16.00; Hornellsville, 10,000, ——; Elmira, 25,000, 12.98; Horseheads, 3500, 6.88; Bath, 3500, 17.14; Corning, 8000, 12.00; Olean, 8000, 16.50; Salamanca, 6000, 6.00; Jamestown, 14,000, 16.00; Westfield, 3000, 12.00.

East Central District.—Walton, 3540, 16.88; Delhi, 3000, 4.00; Cooperstown, 3000, 8.00; Oneonta, 7000, 24.00; Worcester, 3000, 12.00; Cazenovia, 4363, 11.00; Brookfield, 3685, 13.00; Hamilton, 3912, 3.06; Baldwinsville, 3000, ——; Skaneateles, 4866, ——; Syracuse, 80,000, 13.65; Cortland, 9000, 10.67; Homer, 3000, 8.00.

West Central District.—Auburn, 26,000, 12.46; Ithaca, 10,000, 9.60; Groton, 3450, 3.48; Waterloo, 4500, 16.00; Hector, 5000, 9.60; Manchester, 4000, 3.00; Phelps, 7000, 5.14; Canandaigua, 6300, 7.61; Geneva, 6000, 18.00; Penn Yan, 4500, 2.67; Dansville, 3700, ——; Batavia, 7000, 6.85.

Lake Ontario and Western District.—Oswego, 24,000, 13.00; Richland, 4000, 3.00; Fulton, 4000, 27.00; Clyde, 3000, 20.00; Lyons, 6000, 16.00; Newark, 3500, 7.00; Palmyra, 4800, 20.00; Rochester, 110,000, 13.86; Brockport, 4500, 10.67; Medina, 4000, 15.00; Albion, 5000, 19.20; Buffalo, 230,000, 15.64; Tonawanda, 4900, 14.40; Amherst, 4578, 8.00; Lockport, 15,000, 8.80.

NORTH CAROLINA.—Official summary of the mortality returns for fourteen towns, giving a total population of 85,700, for the month of October, 1888: There were 8 deaths from typhoid-fever, 15 from malarial-fever, 8 from diphtheria, 4 from pneumonia, 14 from consumption (5 white and 9 colored), 6 from heart disease, 5 from brain disease, 1 from Bright's disease, 7 from neurotic disease, 15 from diarrhœal disease, 1 from accident, and 33 from all other diseases.

The mortality rates of the chief towns were: Of Durham, white, 13.3, colored, 24; Charlotte, white, 9.06, colored, 32; Fayetteville, white, 2.06, colored, 19.2; Goldsboro', white, 4.02, colored, 10.90; New Berne, white, 3.6, colored, 12.4; Raleigh, white, 22.5, colored, 27.4; Tarboro', white, 9.2; Washington, white, 15, colored, 37.5; Wilmington, white, 7.9, colored, 24; Henderson, white, 6.7, colored, 27.9; Oxford, white, 39.9, colored, 15.

OHIO.—Official *Monthly Record* of the Secretary reports 1111 deaths during the month of November, representing an annual death-rate per 1000 population of 52 cities and towns of 12.92. Deaths under five years of age, 275. From zymotic diseases, 238—chiefly croup and diphtheria, 141; typhoid-fever, 50; diarrhœal diseases, 15; scarlatina, 10; whooping-cough, 6. Deaths from consumption, 137. Severally, the populations and death-rates were as follows:

Akron, 30,000, 4.40; Alliance, 7000, 15.41; Ashtabula, 6500, 14.77; Ashley, 800, 45.00; Bellaire, 12,000, 11.00; Bellevue, 3500, 20.57; Bloomingburg, 800, 30.00; Canton, 25,000, 6.72; Chagrin Falls, 1400, 17.13; Chillicothe, 14,000, 13.71; Cincinnati, 325,000, 13.69; Cleveland, 225,000, 11.57; Clyde, 3000, 12.00; Columbus, 101,000, 7.47; Cuyahoga Falls, 2800, 17.14; Dayton, 52,000, 13.39; Defiance, 7000, 10.28 ; Delaware, 9000, 8.00 ; East Liverpool, 10,000, 8.40 ; Galion, 6000, 22.00 ; Galipolis, 5000, 9.60 ; Hamilton, 20,000, 8.60 ; Hartwell, 2000, 18.00 ; Kent, 3750, 19.48 ; Mansfield, 15,000, 7.20 ; Marion, 8000, 7.50 ; Middletown, 7000, 20.93 ; Mt. Sterling, 950, 50.52 ; Mt. Vernon, 6000, 22.22 ; Monroeville, 1500, 40.00 ; Nelsonville, 5000, 4.80 ; North Amherst, 1600, 22.50 ; Oberlin, 4000, 6.00 ; Piqua, 10,000, 13.20 ; Plymouth, 1500, 16.00 ; Portsmouth, 14,000, 8.57 ; Ravenna, 4000, 6.00 ; St. Mary's, 2500, 28.80 ; Shawnee, 4000, 6.00 ; Shelby, 2500, 9.60 ; Springboro', 500, 72.00 ; Toledo, 80,000, 9.50 ; Urbana, 8000, 7.50 ; Versailles, 1900, 12.63 ; Wadsworth, 2500, 9.60 ; Washington Court-House, 5200, 18.42 ; Wapakoneta, 3300, 10.91 ; Warren, 8000, 7.50 ; Winchester, 1000, 84.00 ; Wooster, 8500, 5.63 ; Xenia, 10,000, 10.80 ; Youngstown, 24,300, 7.90.

PENNSYLVANIA.—*Philadelphia*, 1,016,758 : Reports for four weeks ending November 24th, 1356 deaths, of which 421 were under five years of age. Annual death-rate per 1000, 17.4. From zymotic diseases, 181, and from consumption, 185.

Pittsburgh, 230,000 : Reports for four weeks ending November 24th, 270 deaths, of which 111 were under five years of age. Annual death-rate, 15.75 per 1000. From zymotic diseases, 52, and from consumption, 19.

RHODE ISLAND.—Official *Bulletin* of the Secretary reports the health of the State generally, so far as relates to acute diseases of importance, as good during the month of November as the average of the same month in previous years. During the last part of the month typhoid-fever increased with more than usual rapidity in the city of Providence and along the eastern borders of the towns of Johnston and Cranston.

Scarlet-fever was prevalent in rather unusual numbers in Olneyville and vicinity, but elsewhere the State was unusually exempt.

Diphtheria, measles, and whooping-cough exist in small numbers only, from places reported.

Bronchitis and pneumonia, as was to have been expected, were increasing in number and fatality, but to no unusual degree.

The number of deaths recorded in the different towns and cities from which returns have been received was 380. Under five years of age, 106. Deaths from consumption, 43. The towns making returns represent an estimated population of 268,540. The *annual* death-rate upon the estimate given is 16.2 in every 1000 of the population.

Investigation of infectious diseases of domestic animals was made on thirteen different days. Eight horses were destroyed because of having glanders.

TENNESSEE.—Official *Bulletin* reports for the month of November the principal diseases named in the order of their greater prevalence: Malarial-fever, catarrhal troubles, pneumonia, consumption, bronchitis, tonsillitis, and rheumatism.

In the chief cities the respective annual death-rates for the month per 1000 of population are reported as follows:

Chattanooga,	white,	8.00;	colored,	18.46 :	11.40
Clarksville,	"	4.80;	"	12.00 :	7.50
Columbia,	"	12.00;	"	.00 :	7.20
Knoxville,	"	9.20;	"	11.45 :	9.66
Memphis,	"	16.41;	"	31.99 :	21.94
Nashville,	"	15.48;	"	20.58 :	17.29

VIRGINIA.—*Richmond*, 100,000: Reports for November 171 deaths, of which 48 were under five years of age. Annual death-rate per 1000, 20.52. From zymotic diseases there were 22 deaths, and from consumption, 21.

WISCONSIN.—*Milwaukee*, 195,000: Reports for the month of November 225 deaths, of which 54 were under five years of age. Annual death-rate per 1000, 13.8. From zymotic diseases there were 38 deaths, and from consumption, 18.

CANADA.—*Montreal* health report for the year 1887, by Dr. Louis Laberge, Medical Health Officer, exhibits an example of executive skill, conciseness, and lucidity of sanitary service and statistical results, by which the health officers of many cities of the United States would do well to profit. Under the head of

Relative Contagiousness of Different Diseases, "it will be seen that diphtheria exhibits a greater tendency to spread than the other diseases mentioned, with the exception of measles. In 72 per cent of the houses infected by this disease, only one occupant was attacked ; but in 16.72 per cent, 2 cases occurred ; in 6.64 per cent, 3 cases ; in 2.22 per cent, 4 cases ; in 1.18 per cent, 5 cases ; in 0.35 per cent, 7 cases, and in 0.11 per cent, 9 cases.

"In 82.14 per cent of the houses in which diphtheritic croup prevailed, only one occupant was affected ; in 14.28 per cent, 2 cases occurred, and in 3.75 per cent, three members of the same family contracted the disease.

"One occupant in 76.92 per cent of the houses invaded by scarlatina was affected ; 2 in 15.38 per cent ; 3 in 5.12 per cent ; and 4 in 2.56 per cent.

"Only one occupant in 93.96 per cent of the houses where typhoid-fever occurred suffered from the disease ; 2 in 3.93 per cent ; 3 in 1.83 per cent ; and 4 in 0.26 per cent.

"With diphtheria, in its liability to spread, may be ranked measles. In only 57.22 per cent of the houses where this disease existed one occupant was attacked ; in 16.11 per cent, 2 ; in 13.77 per cent, 3 ; in 8.33 per cent, 4 ; in 5 per cent, 5 ; and in 0.55 per cent, 6."

Of the diseases here referred to, the number of cases reported was as follows : Diphtheria (including 208 "croup"), 1448 ; scarlatina, 104 ; typhoid-fever, 413 ; measles, 341 ; varicella, 7—2313.

Under an order of the council requiring enforcement of the statute "which requires the production of a certificate of vaccination in the case of children over three months of age," vaccinators were appointed, who proceeded to inspect, index, and execute the work. There was not a case of small-pox in the city during the year.

Upon the 1st of July, 1887, the estimated population of Montreal was 189,051 (exclusive of 6803 of a newly annexed ward two months later) ; births, 8249—43.63 per 1000 of population ; marriages, 1984—10.46 per 1000 ; deaths, 5286—27.96 per 1000 ; 58.81 per cent of the entire mortality was of children under five years of age. From zymotic diseases, 31.08 per cent ; from consumption, 8.08 per cent.

Deaths during the month of November, 427. Under five years of age, 234. From zymotic diseases, 151—chiefly diphtheria and croup, 121 ; typhoid-fever, 7. From consumption, 31. Annual death-rate, 27.10.

HAVANA, 200,000: Deaths during the month of November, 532. Under five years of age, 130. From yellow-fever, 42; pernicious-fever, 10. Consumption, 111. Annual death-rate, 31.5.

SMALL-POX.—Deaths reported from this disease in foreign cities, at the most recent dates, as follows: Four weeks ending December 8th: Ostend, 7; Anvers, 1; Jemappes, 2; Quaregnon, 6; Paris, 17; Havre, 4; Prague, 50; Trieste, 23; Lemberg, 4; Bucharest, 14; Warsaw, 27. During the month of November: Marseilles, 16; Bordeaux, 1; Amiens, 34.

OBITUARY.

EDWIN MILLER SNOW, A.M., M.D., of Providence, R. I., died on Saturday, December 22d, 1888. He was born in Pomfret, Vt., May 8th, 1820; received academic education at New Hampton, N. H.; collegiate education at Brown University, R. I., from which he graduated in 1845, and received his degree of A.M. in 1848. He pursued his medical course at the College of Physicians and Surgeons, New York, graduating in 1849. Soon thereafter he began the practice of his profession in Holyoke, Mass., but removed to Providence, R. I., the following year. He was married in Providence, May 2d, 1850. During his practice in Holyoke in 1849, and in Providence in 1854, he saw about 150 cases of cholera and became much interested in the study of its causes, which laid the foundation of his devotion to the study of preventive medicine, to which he gave almost exclusive attention in the subsequent years of his life, contributing many useful reports and papers to its promotion, particularly on vital and social statistics. He was for many years Superintendent of Health of Providence, and more recently Registrar of Vital Statistics and up to the time of his death. He was also, from time to time, State Prison Inspector, Health Officer of Quarantine, Member of the State Board of Charities and Correction, Chairman of the Board of Cattle Commissioners, etc. In 1872 he was State Delegate to the International Prison Congress in London, and one of the United States official delegates to the International Statistical Congress at St. Petersburg.

He was a member of the Rhode Island Medical Society, and at different times secretary, vice-president, and president; of the American Medical Association; of the American Public Health Association, vice-president and president; American Statistical Association, and other scientific bodies, in all of which he was, as he also was in private life, and by all who knew him, highly esteemed for his quiet, unassuming life and congenial fellowship.

NATHAN ALLEN, A.M., M.D., LL.D., of Lowell, Mass., died January 1st, 1889. He was born in Princeton, Mass., April 25th, 1813. He was a graduate of Amherst College in 1836, received his M.D. from the Pennsylvania Medical College in 1841, and his LL.D. from his *Alma Mater* in 1873. He settled in Lowell in 1841, where he continued to reside up to the time of his death. He became a member of the Massachusetts Medical Society in 1842, and has since that time contributed many papers and special reports to its proceedings on subjects of local and professional interest. He was for many years Member of the State Board of Charities and Correction; State Commissioner of Lunacy; Examining Surgeon for Pensions, etc.; Member of the American Medical Association; American Academy of Medicine; American Public Health Association, and a frequent contributor to their proceedings; besides writing many essays on social statistics, physiological, psychological, and sanitary subjects; and only last year compiled a volume of 350 octavo pages of his essays, with the title of "Physical Development, or the Laws Governing the Human System." He was particularly devoted to the subject of physical exercise, and among the foremost advocates of its general introduction into educational institutions. As a trustee of Amherst College he took special interest in the introduction of physical education in that institution, and made it the subject of several essays. Dr. Allen was, indeed, a profuse essayist, and all readers of THE SANITARIAN are more or less familiar with the general trend of his writings. He was married to Sarah H. Spaulding, daughter of Dr. Thaddeus Spaulding, of Wakefield, Mass., in 1841, who died without issue in 1856; and in 1858 to Annie W. Waters, daughter of Captain William C. Waters, of Salem, Mass., who survives him with four children.

LITERARY NOTICES.

THE PREVENTION OF CONSUMPTION: A MODE OF PREVENTION FOUNDED ON A NEW THEORY OF THE NATURE OF THE TUBERCULAR BACILLUS. By C. CANDLER, Melbourne, Victoria. 8vo, pp. 246. London: Kegan Paul, Trench & Co., 1 Paternoster Square. The author of this work unequivocally accepts the discovery of the tubercle bacillus of Koch, and declares his conviction that consumption is due to it; but he rejects Koch's definition of the conditions and growth of the bacillus. Koch's premises are that "the tubercle bacillus can grow only at the temperature of (the blood) 30° to 41° C., and that in its process of development it is limited to the animal body, and is, moreover, not an accidental, but a pure parasitic, and can only originate in an animal organism. . . . That this parasitic organism only finds conditions suitable for its existence in the animal body, but cannot, as the bacillus anthracis, outside of it, exist under ordinary natural conditions."

These conclusions, the author of the work before us thinks, were reached on insufficient grounds, are inconsistent with the true botanical position of the tubercle bacillus, and therefore untenable, which he proceeds to show, and with such success as to justify the title of his book. And here it may be premised that Koch's discovery, as noted prefatorily, has been practically useless, save in the matter of diagnosis; whereas if the conclusions of our author are as sound as they are plausible, "the prevention of ordinary pulmonary consumption, at all events, is," as he remarks, "well within the domain of practical hygiene."

The pure parasitism of the tubercle bacillus seems to have been inferred by Koch without critical examination of its nature. In common with pathologists generally, in the progress of knowledge on pathophytes, having discovered the relation of this one to tubercle, he there rested, and drew his inference without undertaking to investigate its autonomy apart from the relations in which he found it. This our author very clearly points out, and proceeds to show the botanical relations of the tubercle bacillus under conditions favorable to its existence in spores or otherwise under such a variety of circumstances as to leave little or no room for doubt that consumption is almost invariably caused by the presence of the bacillus in the air breathed—by a *local bacilliary malaria*—"from matrices external to the body."

The premises which lead to this conclusion are examined with much care, and authors on the relation of phthisis to heredity and other conditions are cited in their verification. The environment of consumptive families and heredity is given its due position, and found to be in no way inconsistent with this conclusion, but rather fortifies it; pretty clearly demonstrates that houses which have been occupied by consumptives—perhaps for generations—and so constructed or neglected as to exclude an abundance of fresh air and sunshine, are no less likely to retain tubercle bacillus than the bacilli of other diseases well known to be fostered by such conditions.

The required conditions of the tubercle bacillus fostered by certain occupations predisposing thereto, the predisposing relations of debilitated persons, and the deprivation of light, are also logically considered and shown to be consistent with the nature of the bacillus as described by the author: *all* conducing to the practical bearing of the concluding and longest chapter—that which gives title to the book.

We urgently commend the work to the medical profession, and to sanitarians in particular, as one of the most important contributions to preventive medicine recently published.

MEDICAL DIAGNOSIS: A MANUAL OF CLINICAL METHODS. By J. GRAHAM BROWN, M.D., Fellow of the Royal College of Physicians of Edinburgh, late Senior President of the Royal Medical Society of Edinburgh. Second edition. Illustrated. Eleventh volume of the Series of Medical Classics. 8vo, pp. 285. Cloth, $2.75. E. B. Treat, Publisher, 771 Broadway, New York.

This work appears to be a thorough embodiment of the labors of Dr. Brown, of Edinburgh, who has won a just celebrity as one of the ablest of medical diagnosticians. The subject is divided into eight chapters. First, the General Aspect, and following this the several systems—circulatory, respiratory, integumentary, etc.—taking up the leading symptoms in each and tracing them in various diseases. The work is remarkable for its completeness and clearness, and is a handbook of great utility to every medical practitioner.

EATING FOR STRENGTH. By M. L. HOLBROOK, M.D., Professor of Hygiene in the New York Medical College and Hospital for Women, Editor of the *Herald of Health*, Author of the "Hygiene of the Brain," "How to Strengthen the Memory," "Parturition without Pain," etc. 12mo, pp. 236. New York: M. L. Holbrook & Co.

This is a particularly useful little manual for vegetable, fruit, and pastry feeders; gives a fair representation of the physiological requirements in a state of health; a good summary of alimentary products, and many good recipes, but makes the popular mistake with regard to the nutritive value and the proper mode of cooking rice, which, instead of being defective as an article of diet, as here taught, is one of the most valuable and useful of foods; pound for pound, it is greatly superior to potatoes, and is the chief food of some of the best specimens of physical manhood in the world; though the author of the book before us suggests that "it is possible that the small stature of many Hindoos, who live largely upon rice, is owing to its lack in tissue-building material." He thinks it well suited to invalids, but errs as greatly in his directions for preparing and eating it with cream and sugar or for puddings as he does in his estimate of its nutritive value. He would do well, on getting out a new edition, to refer to Professor Atwater's "Chemistry and Nutrition of Foods," in last year's *Century*, and to Miss Parloa's "New Cook Book."

NEURASTHENIA, by LANDON CARTER GRAY, M.D., Professor of Nervous and Mental Diseases in the New York Polyclinic, is a clear elucidation of the subject, a pamphlet reprint from the New York *Medical Journal*.

PUBLIC HEALTH RESORTS *vs.* INSTITUTIONS FOR THE TREATMENT OF BACILLARY PHTHISIS, by PAUL H. KRETZ-

SCHMAR, M.D., Brooklyn, N. Y., a pamphlet reprint from the *Medical Register*, practically illustrates the superior benefits of out-door air and recreation for consumptives over medication and hospital treatment.

CATARACT EXTRACTIONS, WITH ONLY THE EYE OPERATED UPON CLOSED BY ADHESIVE STRIPS; and the Great Value of an 0.25 D Cylinder in the Relief of Headache and Eye Pains. By JULIUS J. CHISHOLM, M.D., Professor of Eye and Ear Surgery in the University of Maryland, and Surgeon-in-Chief of the Presbyterian Eye and Ear Charity Hospital of Baltimore. Reprints from the *Journal of the American Medical Association*. Two pamphlets of practical use to ophthalmologists.

PHYSICAL CULTURE. Price, ten cents. Philadelphia: A. J. Reech & Co. A pamphlet of seventy-two pages, with numerous illustrations of apparatus and how to use them in exercises promotive of healthy development.

A PRACTICAL TREATISE ON HEADACHE, NEURALGIA, SLEEP, AND ITS DERANGEMENTS, AND SPINAL IRRITATION. By J. LEONARD CORNING, M.A., M.D., Consultant in Nervous Diseases to St. Francis Hospital; Fellow of the New York Academy of Medicine; Member of the New York Neurological Society, etc. Author of "A Treatise on Hysteria and Epilepsy," "Local Anæsthesia," "Brain Exhaustion, with some Preliminary Considerations on Cerebral Dynamics," "Carotid Compression," "Brain Rest, being a Disquisition on the Curative Properties of Prolonged Sleep," etc. Price, $2.75. New York: E. B. Treat.

This is a practical work of much importance, replete with suggestions deduced from an unusually large field of personal observations and a thorough knowledge of the subjects treated of; of interest to all medical practitioners. To the importance of the subject the author adds a lucidity and force of expression well calculated to awaken thought, as well as to impart information.

THE CANADIAN PRACTITIONER has made a new departure significant of the success which has been the reward of its general excellence in matter, management, and make up, as among the foremost representatives of medical progress, and particularly in the Dominion. Beginning with the new year, it will hereafter be published *semi-monthly* instead of monthly, as hitherto, but at the same price, $3 per annum in advance. Toronto, Can.: J. E. Bryant & Company.

CALENDARS for the year appear in great variety and of various degrees of beauty and utility. Among the *most beautiful* is the issue by the Smith & Anthony Stove Company, of Boston, manufacturers of the celebrated Hub ranges. It is in six sheets, tied together by a ribbon, each sheet being a fac-simile of a delicate water-color drawing, by Miss L. B. Humphrey, of Boston, and made especially for this purpose.

The designs consist of six charming sketches of child life, drawn in Miss Humphrey's happiest way, together with delicate landscape scenes, and which are simply exquisite in coloring and treatment.

The set of six sheets can be had by sending 25 cents in stamps or currency to the above address. Our readers will be fortunate if they secure a set of these art gems.

The *most useful* is "*The Don't Forget It*," by E. B. Treat, Publisher, 771 Broadway, New York: a monthly turn-table of every day in each month, with sufficient space for recording matters to be attended to on time according to previous appointment; besides which it has marginal readings of special interest to physicians.

THE MEDICAL BULLETIN VISITING LIST possesses some advantages not common to other visiting lists, by which it is rendered much less bulky for the same amount of useful memoranda than any other which has fallen under our notice. For example, instead of a whole page for each weekly record of the month, after the first week the pages are clipped longitudinally, retaining the head-line figures of the days of the week only, has a column for ledger page, and is adapted to continuance till full without regard to time of beginning or ending. For 70 patients, Monthly or Weekly, $1.40; for 105, $1.50. Philadelphia: F. A. Davis.

GRIMSHAW'S BOILER CATECHISM is the title of one of those practical books for practical men which should find a convenient place for reference among all those who have anything to do with boilers. The many questions relating to the construction, placing, or management of boilers are herein appropriately and concisely answered, and with numerous data and tables all carefully arranged and conveniently indexed. The book presents a ready means for the uneducated to obtain necessary information, and offers a handy reminder to those who have forgotten their acquired knowledge. Price, $2. New York : Practical Publishing Company, 21 Park Row.

INEBRIATE ASYLUMS AND THEIR WORK. By T. D. CROTHERS, M.D., Superintendent of Walnut Lodge, Hartford, Ct.; Editor of the *Journal of Inebriety;* Secretary of the American Association for the Cure of Inebriates, etc. A lecture delivered before the Young Men's Christian Association at Toronto, Canada, October 2d, 1888.

REPORT OF A CASE OF LAPAROTOMY WITH EXSECTION OF A PORTION OF THE ILIUM ; and the Description of a novel Operation for the Cure of Urethra-Rectal Fistula. By JOHN A. WYETH, M.D., Professor of Surgery in the New York Polyclinic ; Visiting Surgeon to the Mt. Sinai Hospital, etc.

MINERAL AND THERMAL SPRINGS OF CALIFORNIA. By W. F. MCNUTT, M.D., M.R.C.S., Ect L.R.C.P., etc., San Francisco. Pamphlet reprint from "Transactions of the Ninth International Congress."

THE PREFERABLE CLIMATE FOR PHTHISIS. By CHARLES DENISON, A.M., M.D., Professor of Diseases of the Chest and Climatology, Medical Department of the University of Denver ; author of "The Rocky Mountain Health Resorts," etc. Pamphlet reprinted from the "Transactions of the Ninth International Medical Congress." A cogent statement of the advantages of altitude, dryness, coolness, sunshine and variability for the prevention and cure of phthisis.

FAILURE OF DR. J. B. THOMAS'S TREATMENT OF URETHRAL STRICTURE BY ELECTROLYSIS. By ROBERT NEWMAN, M.D., New York. Pamphlet reprint from the *Journal of the American Medical Association.*

MEDICAL EXCERPT.

CLIMATIC TREATMENT OF PULMONARY TUBERCULOSIS.—Dr. Knight, of Boston, in the *Medical News* of November 24th, gives the results of his considerable personal experience. High altitudes (4000 to 6500 feet above sea level) he believes to be indicated ; in subjects presenting the earliest physical signs of tuberculosis of the apex, who have as yet shown little, if any, general disturbance from the disease, and who complain only of morning cough and expectoration ; those with more advanced disease, showing some consolidation, but no excavation, nor any serious constitutional disturbance ; hemorrhagic cases without marked febrile reaction, or much physical evidence of disease ; convalescents from acute pleurisy or pneumonia, in whom the eruption of tubercle is dreaded ; patients in whom the tubercular process has seriously invaded the larynx, provided they can have the benefit of good local treatment.

High altitudes are contra-indicated ; for patients over fifty years of age ; those of neurotic temperament ; in advanced disease, with cavities or severe hectic symptoms (the existence of a small cavity, in a case in which the disease had become quiescent, would not contra-indicate high altitude) ; patients in an acute condition ; cases of so-called fibroid phthisis or interstitial pneumonia in patients over fifty, or with dilated heart, or great bronchial irritation, producing harassing cough ; those with cardiac dilatation or disease of the large blood-vessels, and in diabetics.

THE TRUE RELATIONS OF FILTH TO DIPHTHERIA.—"Diphtheria is a contagious disease. There is probably no spontaneous origin of diphtheria, any more than there is a spontaneous origin of cholera or scarlatina. When an attack of diphtheria has made its appearance, it is well enough to examine the hygienic condition of the house, *with its deteriorating influences on the general health of the inmates, and to look after the source of the case* in the persons of friends, attendants, and help."

In my "Remarks on the Nature and Treatment of Diphtheria," made by invitation before the Section of Diseases of Children of the British Medical Association, August, 1888 (*British Medical Journal*, September 22d, 1888), there are found the following sentences: "*Foul air and sewer-gas do not create diphtheria;* they do create dysentery and typhoid, or such a condition of general ill-health and malaise as to afford the diphtheritic virus a ready resting-place. There were plenty of malodorous privies and foul smells fifty years ago, but no epidemic of diphtheria. Besides, and mainly through the careful observations of English physicians, such as are contained in Dr. George Turner's report on diphtheria in lower animals and many others, the sources from which diphtheria may come are very many. Pigeons, fowls, turkeys, chickens, pheasants, cats, horses, sheep, cows, are just as many sources of diphtheria for man. Foods of all kinds, vegetables and milk, will transmit it. It sticks to furniture, floors, and wall-paper, railroad cushions and school desks. No spontaneous generation is required to explain its ravages."—*A. Jacobi, M.D., Archives of Pediatrics.*

ALIMENTARY REGIMEN FOR THE GOUTY.—Gouty patients may eat all kinds of meat, especially white meats. Use in moderation, eggs, fish, mollusks, crustaceans, and fatty foods. Vegetables should constitute a large part of their diet, excepting gooseberries and spinach, which contain large proportions of oxalic acid. Use with care, nourishing nitrogenous vegetables, such as cabbage and cauliflower; starchy grains, such as peas, beans, and lentils. For bread, potatoes should be substituted. Fruits are all admissible, and raisins may mitigate the condition of the feet. As a beverage, water, and particularly water which is slightly alkaline, to dilute light Bordeaux wines and slightly alcoholic white wines. No champagne, gaseous water, strong beer, or alcoholic beverages are allowed. Coffee should be drunk very weak. No tea is allowed, as it contains a large proportion of oxalic acid. The bowels should be kept in proper condition by the use of mineral purgatives. The stomach should be emptied every two hours. Lotions of the body, massage, and exercise in all forms are advised.—*Dujardin-Beaumetz in Revue Internationale des Sciences Medicales.*

CIGARETTE SMOKING.—Professor Dudley (*Medical News*) rejects the popularly held opinion that the baneful effect of cigarette smoking is due to the adulteration of the tobacco with noxious drugs, and by experiments on mice shows conclusively that the toxic agent is carbonic monoxide, which, however, results alike from the combustion of tobacco, whether consumed in cigarette, pipe, or cigar.

A spectroscopic examination of the blood of three mice, dying after a very brief exposure to an atmosphere of cigarette smoke, showed an entire conversion of oxyhemoglobin into carb-oxy-hemoglobin, the cause of death being CO poisoning. As is well known, CO is exceedingly poisonous, and in contact with blood converts the life-supporting oxyhemoglobin into the lethal carb-oxy-hemoglobin, a non-oxygen-carrying compound, difficult of oxidation, which may cause death by suffocation, although there may be free entry of pure air into the lungs.

Cigarette smoking is only more harmful than cigar or pipe smoking because those addicted to the first habitually inhale the smoke, drawing into the greatest depth of the lungs the poisonous CO, the result of the combustion of the tobacco.

[A consideration of Dr. Dudley's experiments suggests that a wide difference exists between the effects of tobacco smoked and chewed, and that if the latter habit is filthier it is far less harmful. It is to be regretted that the evil resulting from smoking is not limited to the consumer of tobacco, but must extend to those who are unfortunate enough to be in the smoker's proximity. Patients should be cautioned against remaining in unventilated apartments in which smoking is going on, for the air in such places must soon become vitiated by the noxious CO. The ill effects of an atmosphere of tobacco smoke on young children and delicate females is thus explained.]—*The Polyclinic.*

EFFECTS OF LANOLIN ON MICRO-ORGANISMS.—The results of Gottstein's experiments on this subject are thus given in the *Deutsche Medical Zeitung*, Berlin : (1) The bacteria which effect a spontaneous decomposition of glycerine fats belong presumably to the class of anaërobes ; a number of aërobe germs (even the putrefactive) perish on a medium containing fat. But the term of continuance of this retrogressive metamorphosis is decided by the proportion of fat to the other ingredients of the nutritive medium. (2) Free fat contains anaërobes for some days after it is exposed; but lanolin has under similar circumstances neither aërobe nor anaërobe germs. (3) Glycerine fats may be so impregnated with bacteria that the latter can pass through the fat to the lower-lying infectible substances, while lanolin cannot be permeated by bacteria. It acts, therefore, as a preventive of decomposition when laid over infectible substances.—*British Medical Journal.*

"MATZOON."—This is the name given to a fermented milk food largely used in Armenia and the adjacent countries. For some reason it does not seem to be used as a food to any extent elsewhere. We have been unable to purchase it in Great Britain, Germany, France, or Switzerland, yet it is made in New York City, but as far as we can learn there is only one producer there who supplies the States. Its use appears to be largely confined to the Oriental countries. The average makers there, like our bread-bakers here, only know that if "Matzoon," which is to them what our yeast is to the bakers, is placed in warm cow's milk and kept at the temperature of the hand for a few hours more "Matzoon" will be produced.

We learned by making four cultures from "Matzoon," that the ferment is Penicillium Glaucum. By placing a small colony of these hyphomycetes in two ounces of warm milk, kept at a temperature of the living body for twenty-four hours, we had a pure "Matzoon" produced. By placing one tablespoonful of this into a quart of warm milk kept at about 100° F. for eight hours, we had the entire mass transformed into a semi-liquid condition; at this stage it must be placed and kept in a cool medium to prevent further fermentation. Unlike "koumys," it is almost free from carbon-dioxide, which fact permits of its use in cases of indigestion that are associated with weak hearts. We have found it tolerated by patients suffering from gastro-intestinal catarrh when no food other than the liquid meat foods were borne. Some children can digest "Matzoon" when cow's milk is rejected.—*Professor Samuel G. Dixon, M.D., University Medical Magazine.*

SALOL IN DYSENTERY is the subject of a communication to the *Medical Brief*, by R. B. McCall, M.D., of Georgetown, Ohio, reporting cases in which he used the remedy with such success as to warrant its further trial. Of an extreme case he reports:

"In all my experience I never saw the efficiency of a medicine so unmistakably portrayed by characteristic results, the effects following close in the wake of the cause. Dose for first two days was two grains every three hours, increased to three grains, and continued at that as the maximum for three days longer; after which it was given for five days longer in diminishing quantities till left off.

"In about ten days nearly two hundred grains were taken, by a child five years old, and that without the least sign of oppression, disturbance of any kind of stomach, heart, or kidneys, or of brain or mind. I believe salol is perfectly safe to be used in suitable doses at any age, and am persuaded from the above case and from a little experience in summer diarrhœas, wherein its influence was unquestionably kindly and effective, that it is destined to be a valuable agent.

"I am desirous to give it a trial in one of those cases of infants under two years of age where the almost countless stools, distressing and agonizing tenesmus, uncontrollable restlessness, insatiable thirst, rapid emaciation, profound debility, and early supervening coma, have well-nigh invariably been followed by dissolution."

SULPHONAL, the now fashionable hypnotic, is the subject of very varied professional opinion. Some extol it, others condemn it. The truth probably lies, as usually happens, between the extreme statements. Sulphonal has a clearly defined usefulness, and belongs not so much to the class of narcotic agents, which produce sleep by stupefaction, as to the remedies which assist the natural periodical desire for sleep. The new drug is, however, by no means so harmless as has been hitherto asserted by its manufacturers. Dr. Bornemann has just reported a case of severe poisoning resulting from the administration of the drug. The patient, to whom sulphonal was given for insomnia caused by cerebral excitement, was a physician. The result was a pronounced intoxication showing very complicated symptoms. There was a distinct interference of co-ordination, first in the lower and later in the upper extremities. He could not, for instance, raise a cup of coffee. A very prominent feature of the poisoning was his perverted feelings and illusions. The patient believed he had two heads, four feet and arms, etc.; or he believed he was on a boat or in a railway car, and that some one was about to kill him. These illusions may be termed reflectory. The ataxia referred to is a central one, as it remained unchanged no matter whether the eyes were opened or closed. This distinction between central and sensory ataxia has been made by Professor Mendel. The drug did not exert any unfavorable influence over the heart and circulation, which appears opposed to the warning of Dr. Schmey not to use sulphonal in angina pectoris and arterio-schlerosis.—*Berlin Letter, Medical and Surgical Reporter, December 22d,* 1888.

CAMPHORATED NAPHTHOL.—As is well known, crystallized carbolic acid liquefies when mixed with an equal weight of camphor, and this property has been made use of in obtaining a liquid which may be used as a painless cautery. According to M. Desesquelle (*Archives de Pharmacie,* September 5th, 1888), both alpha and beta-naphthol possess similar properties ; a mixture of ten parts of beta-naphthol and twenty parts camphor produces a syrupy, colorless liquid, which is insoluble in water but miscible in all proportions with fixed oils. In order that liquefaction be rapidly produced, it is essential that the substances first be finely powdered. An interesting question arises whether naphthol in these conditions preserves its antiseptic properties, or whether they are modified in some way, as is the case with carbolic acid. Experiment only can answer this question, and if the reply be affirmative it is highly desirable that the mixture be subjected to study, since the antiseptic power of the former is more marked, and, as has been determined by Bouchard, its toxic properties are less than a similar mixture of carbolic acid and camphor.—*Therapeutic Gazette.*

COMPARATIVE EFFICACY OF ANTISEPTICS.—Dr. G. Riedlin has made experiments to determine the comparative efficacy of certain agents reputed to be antiseptics, regarding their power to destroy, or prevent the development of bacteria in culture-gelatin. Though the conclusions to be derived from this series of experiments may not be altogether transferable or applicable to all other methods of antisepsis, yet they are of value so far as they show the penetrating power of the various agents.

1. *Iodoform.* This behaves toward the several bacteria either as an almost indifferent powder, or as a feeble antiseptic. Toward cholera bacilli, however, it acts as a powerful antiseptic ; its vapors alone are sufficient to prevent their development in a 10 per cent culture-gelatin down to a depth of about 10 millimeters.

2. *Oil of Turpentine.* In a 1 per cent solution, this acts as a powerful preventive of bacterial development. Addition of 1 part of oil of turpentine to 200 parts of culture-gelatin renders the latter sterile. But a 1 per cent emulsion of the oil is insufficient to kill the bacillus anthracis. When poured upon gelatin, the oil penetrates to a depth of about 10 mm., and thus far renders it sterile.

3. Oils of *Lavender*, *Eucalyptus*, and *Rosemary* are the best antiseptics among other essential oils, particularly when used undiluted. The two first-named penetrate culture-gelatin to a depth of 10, the latter to 15 millimeters.

4. Next after these oils comes *oil of cloves*. Others, such as the oils of thyme, fennel, peppermint, anise, juniper, and camphor are of little account as antiseptics.

5. *Iodol* has proved to be inert and indifferent toward bacteria.

6. *Balsam of Peru* is a rather powerful antiseptic, being especially destructive to the cholera bacillus. It penetrates culture-gelatin to a depth of about 8 mm.

7. *Sulphichthyolate of Sodium*, in 5 per cent aqueous solution, is a very feeble antiseptic.

8. *Aniline*, best in saturated aqueous solution, is a most prompt antiseptic. A ten per cent culture-gelatin prepared with one fifth of solution of aniline is incapable of propagating bacteria.—*Centralbl. f. Ther.*

DISINFECTION OF THE HANDS.—Dr. Mugnai states that for perfect disinfection of the hands more or less time is required according whether they have previously been disinfected or not. In the latter case it is sufficient to brush them in a two and one half per cent solution of carbolic acid ; in the former case they should be washed for one and a half minutes in a one per cent solution of sublimate and immersed for the same length of time in this solution.

PLATT'S CHLORIDES is an odorless, colorless, saturated solution of those chloride salts which have proven most reliable and acceptable as deodorants, disinfectants, and antiseptics, is at once clean, powerful, and stainless (contains no mercury), and is especially designed for the hygienic uses of the physician and the practical domestic uses of the housekeeper. Its sanitary value as a purifier of the sick-room and its worth as a general disinfectant for the household have been fully demonstrated for the past seven years, and it now proudly claims the indorsement of over sixteen thousand practising physicians, among whom are the most eminent in both schools of medicine.—*Medical Bulletin.*

A WARNING TO ANÆSTHETISTS.—The announcement that the anæsthetist in a fatal case of chloroform narcosis, at Sydney, has been found guilty and sentenced to pay two hundred pounds damages, on the ground that the anæsthetic had been improperly administered, comes with rather a startling effect. While no conscientious man, be he lay or medical, will dispute the justice of such a verdict when negligence is clearly proved, difficulties arise when such matters are adjudicated upon by a jury of persons who, whatever their intelligence, are profoundly ignorant of what constitutes negligence in this respect. It would be but a step further for juries to enforce an opinion which has been gaining ground as to the inadvisability of giving chloroform at all unless specially indicated. Still, this is a matter well within the discretion of the medical man, and it would be impolitic, as well as unjust, to fetter the exercise of that discretion by a fear of legal consequences. Short of negligence amounting to a criminal act, we cannot conceive of such a verdict in this country, and we sincerely hope that the example will not be the means of imposing an additional horror to the life of medical men, who have quite enough to attend to in guarding themselves against vexatious actions for having signed lunacy certificates, and in avoiding the wiles of designing women with an eye to blackmail.—*Medical Press and Circular, October 24th,* 1888.

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PROBLEMS IN REGARD TO YELLOW-FEVER AND THE PREVENTION OF YELLOW-FEVER EPIDEMICS.*

By JEROME COCHRAN, M.D., State Health Officer of Alabama.

IN the practical application of sanitary science, the question of questions in all our Southern communities is that which concerns the management of yellow-fever and the prevention of yellow-fever epidemics. The natural habitat of this disease is in the West India Islands, which are in constant communication with our gulf and Atlantic ports; and these again are in constant communication with all the cities and towns of our Southern States. The railroads, with locomotives running from twenty to forty miles an hour, have virtually abolished distances, and brought the whole interior of the country down to the shores of the sea.

Up to the present time yellow-fever has never gained a permanent footing in any part of the United States—has never become naturalized among us; but we are now confronted with the danger that it may by possibility find an abiding domicile in the more southerly portions of Florida—that is to say, in that part of the State of Florida below the frost line. Last winter it hibernated as far north as Tampa and Plant City, but last winter was exceedingly mild in Florida, and furnishes the first instance of hibernation that has occurred in the epidemic history of the State. In Jacksonville the winters are always cold enough to eradicate yellow-fever. If we have, this coming winter, an average amount of frost and cold in Florida, I am of the opinion that there is not likely to be any

* Read before the American Public Health Association, Milwaukee, Wis., November 22, 1888.

hibernation of the disease in any of the places where it has prevailed this summer, unless it may be in the small towns on the Manatee River; and even in these small towns the chances are even that it will die out for want of material. In a large majority of epidemics that have visited Key West, where frost was never known to show itself, the fever has disappeared in the month of August; and it has never been known to hibernate there.

Yellow-fever is certainly infectious, and the specific poison that causes it—a poison as specific as atropia or hydrocyanic acid—can be transported from place to place in the ordinary vehicles of travel and traffic, in the bodies and baggage of men and women. This specific poison is undoubtedly connected in some way with the presence of some living organism, some bacterium, some microbe, some living disease-germ of some sort, and probably belongs to the class of chemical substances known as ptomaines. As yet neither the poisonous ptomaine nor the living organism which generates it has been demonstrated; and so there are many unsolved problems connected with the etiology of the disease. A few of these I will briefly indicate:

(1) Does the pathogenic organism multiply its generations within the human body, or outside of it? or does it find conditions favorable to its growth and multiplication, both in the body of the patient and in the patient's environment? Its multiplication within the body of the patient has been denied, but I think not with sufficient reason. If the organism is not itself active within the body of the sick person, I know of no clue to the explanation of some of the facts connected with the propagation of epidemics. In the mean time its growth in the environment seems hardly to admit of question. Upon no other hypothesis can we explain the infection of localities.

(2) How does the specific cause of the disease find its way into the body of the patient? Is it absorbed through the skin? Hardly, I should think. Does it find its way through the pulmonary vesicles in the act of respiration? I know of no facts which favor this presumption. On the contrary, both the pulmonary vesicles and the expired air are singularly free from the presence of germs of any sort. Only one other avenue is left open for its introduction—the alimentary mu-

cous membrane. In support of this doctrine, also, the paucity of facts is remarkable. In all the literature on the subject, so far as it is known to me, nothing is recorded to connect its introduction with the alimentary ingesta—with any sort of food or drink. Can it be that the germs first find lodgment, in the act of respiration, in the mucous membrane of the mouth and pharynx, to be subsequently swallowed along with what we eat and drink? It must get into the system in some of these ways, and it seems to me that the probabilities are most favorable to the one last mentioned. But in regard to this, let it be remembered that for the present all is pure speculation—mere guess-work, and nothing more.

(3) If the germ is generated within the body, how does it find its way out so as to become an agent for the infection of communities and localities? Is it thrown off with the exhalations of the skin? with the sweat? Or is it thrown off with the expired air in the act of breathing? Or is it eliminated through the kidneys? Or does it make its exit through the great sewer of the intestines in company with the alvine excretions? We have absolutely no facts to enable us to answer these questions, but it would seem to be the more probable supposition that it escapes from the body with the dejections from the alimentary canal; and, if this is the case, Parke was right years ago when he called yellow-fever a fecal disease.

(4) In the production of the clinical phenomena of yellow-fever, the poison permeates the entire system of the patient. It causes marked nervous disturbance. It leads to fatty degeneration of the liver and other organs and tissues. It attacks the blood corpuscles so as to cause them to part with their coloring materials. It develops acute desquamative nephritis, with albuminuria and urinary suppression, and the whole train of symptoms characteristic of what we ordinarily call uræmic poisoning. All these pathological phenomena may be ascribed, with great plausibility, to the action of the hypothetical ptomaine, which would readily find its way into the circulating blood, and so to all the tissues and organs of the body.

(5) Of the germ itself, as already stated, we know nothing in any positive and direct fashion. It has never been demonstrated. No man has ever seen it with his eyes, or touched it

with his fingers. The *cryptococcus zantho genicus* of Friere and the *peronospora lutea* of Carmona are not real existences ; and the germs of Finley and Gibier have not been shown to have anything to do in the production of yellow-fever. It may be accepted as tolerably certain that in yellow-fever no distinctive organisms are to be found in the blood or in the tissues. This seems to me to have been settled once for all by Sternberg's Havana researches in 1879. At any rate, all those at present engaged in this research have, by common consent, turned their attention to the flora of the alimentary canal. Theoretically, a microbe in the alimentary canal, generating a poisonous ptomaine, to be subsequently absorbed into the circulation, would account for all the phenomena of the disease.

Fortunately it is not necessary that all these problems of ultimate pathology should be solved in order that we may frame some rational scheme for the prevention of the spread of yellow-fever. A few of the leading facts, derived from observation of the habits of the disease, and attending its dissemination in time and space, I proceed to mention very briefly :

(1) Yellow-fever, as already stated, is infectious, and is propagated by the introduction into the human system of a specific poison, or of a specific organism which generates a specific poison, and which is transportable from place to place. In an immense majority of recorded epidemics the outbreak of the disease is in traceable connection with the introduction into the stricken community of some person from a place already infected, who has the fever at the time of his coming or within a few days thereafter. In a much smaller number of instances it is traceable to the introduction of baggage, clothing, or bedding, brought from some infected place, and which has been used about some one who had the fever. Other agents and vehicles of infection are so infrequently the causes of epidemics as not to require any special mention here.

(2) While the disease spreads from the patient, it is not, perhaps, at all, and certainly not to any considerable extent, contagious from person to person, like small-pox. In its transmission it is probably somewhat analogous to typhoid-fever and cholera. It seems to take root in the locality—in the soil, as it were—and to be contracted from the environment of the patient rather than from the patient himself ; and

the locality remains infected after the patient has been removed—remains infected for weeks, and even months.

(3) But yellow-fever does not always spread on the introduction of an exotic case. On the contrary, it is the rule, in the large majority of instances, that one or two cases occurring in a community may fail to establish an epidemic. A thousand sparks may fall on the roof of a house, but perhaps only one of them kindles into flame and causes a conflagration. Doctors and nurses are frequently exposed for a long time before they take the fever; and very often they pass through an epidemic, and even through several epidemics, without contracting the fever. The great factor in the dissemination of the fever is human intercourse. It is known that scarlet-fever and diphtheria can be carried from place to place by cats and dogs, and I know of no reason why the poison of yellow-fever cannot be carried in the same way. Yellow-fever is not disseminated ordinarily to any large extent by atmospheric currents. Ordinarily, it will not cross a street unless somebody carries it across. Ordinarily, it will not surmount a wall twenty feet high. It is usually not very dangerous to walk the streets of an infected city in the daytime. The danger is greater at night.

(4) The golden rule of prophylaxis in yellow-fever is non-intercourse—non-intercourse with infected places, non-intercourse with infected persons, and non-intercourse with infected things. If you keep away from the fire, you won't get burned, and it is not necessary to keep very far away either. The instances are very numerous in which prisons, jails, and cloistered convents, in the very midst of epidemics, have escaped infection. The instances are also numerous in which, in the midst of epidemics, private residences have in like manner, by the observance of strict isolation, escaped infection. These facts are of the utmost importance, and should be generally known and generally acted upon when yellow-fever is on its travels.

(5) It seems reasonable to believe that in infected places all persons who are at all exposed must receive into their bodies some portion, larger or smaller, of the poisonous ptomaine which generates the disease, or some number, more or less, of the specific germs which generate the ptomaine. But all who

are so exposed do not take the fever. In other words, the question of dose seems to be, in this case, as in other cases, a consideration not to be overlooked. Some of those exposed suffer no ill consequences whatever. Others suffer more or less malaise for longer or shorter times, but escape any decided attack of the fever. Others have the fever in mild form, and readily recover. Others, still, have it in every grade of increasing severity up to those malignant explosions that cause death in a few hours. It seems to me fair to conclude that these varying results are due to the interaction of two factors —differences in the quantity of the poison received, and differences in the power of resistance to the influence of the poison possessed by the several classes of persons mentioned.

(6) As to differences of susceptibility, there can be no question about that. Whites are far more susceptible than blacks. Men are more susceptible than women. Adults are more susceptible than children. Besides these broad distinctions, there are others not so manifest, but I think equally certain. Among the whites, those with dark hair and skin and with what is sometimes called the bilious temperament are less susceptible than those with light hair and fair skin and the sanguine temperament; and the same individual is more susceptible at some times than at other times.

(7) For the purposes of the sanitarian, the length of the period of incubation is a consideration of importance, as upon this depends the rational period of detention of persons in quarantine. Our information in regard to this question is not so precise as we could wish it to be. It is commonly assumed that the solution of this question depends on the ascertained facts in cases where yellow-fever occurs after a single exposure. In such cases as these, so far as I have been able to find out, the period of incubation is frequently only one or two days, and is rarely more than five days. Refugees who have yellow-fever at all usually have it within five days after leaving the infected locality; but I am not at all sure that the same rule always obtains in the infected locality. Here doubtless the poison is passing into the system from day to day, and at the same time passing out of the system from day to day. If the elimination of the poison keeps pace with the introduction of it, the man does not have yellow-fever at all; but if the pro-

cess of elimination is defective, the poison accumulates until at last the resistance is overcome, and the febrile explosion follows.

(8) I cannot dwell on the question of diagnosis, although it is practically one of the utmost importance. If the case is severe, with yellow discoloration, suppression of urine, black vomit, and death, no physician of reasonable knowledge ought to have any difficulty in saying that it is yellow-fever. But suppose the case is a mild one, without discoloration, without suppression, without black vomit, and without a fatal termination: how is the diagnosis to be made then? Even in such cases the expert finds but little difficulty. He recognizes his old acquaintance under all sorts of disguises. There is the three days of the initial fever, continued or *quasi* continued. There is the want of parallelism between the pulse and the temperature, which is usually observable to some extent even in mild cases; but the most certain diagnostic in this class of cases is the presence, to some extent, of albumen in the urine on the third or fourth day, usually on the third.

But all the problems so far suggested are preliminary to the great practical question of the prevention of the spread of yellow-fever, which may be discussed under three different heads: (1) To prevent the introduction among us of yellow-fever across the sea from foreign countries. (2) To prevent the transmission of yellow-fever from one part of our own country to another by land. (3) To prevent the spread of yellow-fever in our towns and cities after the outbreak of a few cases.

(1) The methods of maritime quarantine in this country may now be considered as definitely settled. They include the inspection of ships at the port of departure and at the port of arrival, with such detention and disinfection as may seem advisable. The larger number of our seaport quarantines are little more than inspection stations. These are supplemented by a sufficient number of thoroughly equipped refuge stations to which infected vessels are sent for treatment, said inspection stations being under the management of the Marine-Hospital Service. I take some special interest in these refuge stations because they grew out of a recommendation made by me to the National Board of Health in 1879. In the mean time a few of our large cities have well-equipped disinfecting

stations of their own, that at New Orleans being probably the most complete and the most efficient in its appointments. I think it may be fairly admitted that our maritime quarantine affords us a considerable degree of protection; and, fortunately, an immense majority of the vessels that come to us from infected ports are themselves free from infection. I should say that nineteen out of twenty of all vessels from infected ports are free from infection, and might be allowed *pratique* without any preliminary detention or disinfection. However this may be, and in spite of all possible quarantine diligence, yellow-fever will sometimes find a lodgment in some of our seaport cities. There is contraband of revenue, and there must be contraband of quarantine. The appearance of yellow-fever in one of our seaports is the signal and the warrant for the imposition of quarantine by land.

(2) The difficulties attending the administration of sea quarantine are many and great; but they are few and small indeed when compared with the difficulties attending the administration of quarantine by land. Land quarantine virtually resolves itself into the quarantine of the railroads; but the railroads are so numerous, they link together the towns and cities of the country in such an intricate network of connecting and intersecting lines of travel, and the travel over them is so rapid and continuous, flowing always, day and night, in never-ceasing currents and counter-currents, that any adequate supervision of them becomes a matter of great perplexity and magnitude. The principle that underlies the practice of railroad quarantine among us is, that neither persons nor things shall be allowed to leave the infected place. To this end the railroad trains, both passenger trains and freight trains, are prohibited from stopping in or near the infected town, so that nothing can be taken on that is tainted with suspicion; and inspectors are kept on the trains so that nothing from the stricken community can be put off where it is not wanted—neither goods nor persons. This system of railroad quarantine is fundamentally correct, but in the administration of it the most outrageous excesses have been committed. The expenditures have been often so heavy as to be very burdensome to the corporations that have had to foot the bills; and commerce and travel have been interfered with to an extent not

warranted by the imminence of the danger. The remedy for these evils is not far to seek. The several States concerned must place the administration of their quarantine laws in the hands of yellow-fever experts, and must give to such yellow-fever experts the power to overrule and supplement the work of non-expert municipal authorities. I have merely glanced at the subject of railroad quarantine, and must hasten on to the principal subject of my paper.

(3) What I want specially to consider is the management of yellow-fever in our towns and cities after the occurrence of a single case, or of a few cases, so as to prevent its dissemination generally through the community; and in my judgment this sort of work depends on principles I now proceed to formulate. I confine myself to towns and cities, because in sparsely settled country neighborhoods yellow-fever shows very little disposition to spread. It is urban and not rural.

(4) The extent and populousness of the town is an important consideration. The problem is difficult in proportion to the number of inhabitants, and in proportion as residences and business houses are crowded together. In a small, sparsely settled railroad town, where the houses are scattered about at considerable distances one from another, the problem is simple. In a densely populated city it is a problem of great complexity and difficulty.

(5) The golden rule of prophylaxis in yellow-fever is isolation—non-intercourse—non-intercourse with infected places, non-intercourse with infected persons, and non-intercourse with infected things. Don't go near the fire and you won't get burned. Non-intercourse can be enforced in a very simple, very inexpensive, and very effective way. Let the people, with one accord, by common consent, in the exercise of the commonest sort of common-sense, keep away from the infected houses and localities, and refuse to have anything to do with infected persons or infected things. To do this so as to secure absolute safety, it would be necessary for the members of every family to shut themselves up in their own premises, and to enforce a strict domiciliary quarantine against all the rest of the world. But a reasonable degree of safety can be had without resorting to quite such extreme measures.

(6) At the beginning of an outbreak the infection is re-

stricted within very narrow limits—a single house, a block of houses, a single city square; and then it is necessary only to avoid the infected place or places, and to keep at a respectful distance the persons and things that have been exposed to the infection. Intercourse with other parts of the town is still perfectly safe. And, indeed, at this time a certain amount of intercourse with the infected region is also comparatively safe. You may go into the infected region many times and not take the fever. You may even nurse the sick for a long time without taking the fever. But while all this is true, no communication with the infected region should be allowed beyond what is strictly necessary. The pitcher that goes often to the well is apt to be broken in the course of time.

(7) In small places it would hardly ever be necessary to put guards around an infected house or an infected district. A simple warning to the people should be sufficient. In more populous communities guards may sometimes be desirable.

(8) But the sick must be taken care of—must have nurses and doctors. What must be done with these? The doctor who spends but a little time with his patient is not likely to carry the infection with him into other houses he may have occasion to enter. Still, by possibility he may become a carrier of the infection, and his intercourse with other people should be restrained according to circumstances. The nurse has no need to leave the premises of the patient, and should be kept under the strictest surveillance. When the area of infection begins to extend and cases to multiply, arrangements should be made for the isolation of nurses and of all other persons engaged in taking care of the sick. Take a house within the infected region, or near by, or as many houses as may be needed, for this purpose. I cannot dilate on this; only let it never be forgotten that the most active agents for the spread of yellow-fever in any community are nurses and doctors and other attendants upon the sick, when they are allowed to eat and sleep in their own uninfected homes or boarding-houses; and in dealing with these attendants upon the sick, let it never be forgotten that among all the agencies that have been invoked to prevent the spread of yellow-fever, non-intercourse is the first in importance—is so decidedly first in importance that all the others sink almost into insignificance.

(9) The practice of disinfection is mostly based on hypothetical grounds. But I think we have good reason to believe that it does good. The agents most to be trusted are heat, cold, the mercury bi-chloride, and sulphur fumigation. It is not proven that the yellow-fever poison is connected in any way with the excretions of the yellow-fever patient; but I think the alvine dejections and the urine should be disinfected and disposed of just as we would the excretions of typhoid-fever.

(10) The probability that a few cases of yellow-fever will spread into an epidemic depends very much on the latitude of the place and the season of the year. It is very generally believed by those who have studied yellow-fever, that it requires for its prevalence and dissemination a long-continued temperature of not less than seventy degrees Fahrenheit. It takes some time for yellow-fever to gain a footing anywhere and under any circumstances. It cannot make any considerable headway in less than two weeks, and often it requires a much greater length of time. Yellow-fever in July or August is much more to be dreaded than yellow-fever in September or October; and quarantines may be still useful a hundred miles south of an infected town long after there ceases to be any excuse for it a hundred miles north of said town.

(11) When a few cases of yellow-fever occur in a city, the general opinion is that depopulation is the surest way to prevent it from expanding into epidemic dimensions. Take away the fuel, and the fire will soon cease to burn. This plan is plausible at first sight, and I do not question its efficacy. But it is attended with so many incidental disadvantages that it seems to me to be the most objectionable plan for general adoption that has ever been devised. It is not very difficult, indeed, to depopulate the infected district so long as it is restricted within narrow limits; and I believe that depopulation of an infected district may often be the highest dictate of sanitary wisdom. It would be quite possible, also, to depopulate a small town of only a few hundred inhabitants, or perhaps even a city of a few thousand inhabitants. But it would be folly to attempt to depopulate a great city like New York or New Orleans. But there is never any urgent need for the depopulation of small and sparsely settled villages. In them

yellow-fever can be managed easily by other methods. And just precisely in proportion as the population increases in numbers and density, just in that same proportion increase the danger of the epidemic and the consequent desirability of depopulation, if that is to be accepted as the proper plan of management. In other words, the more we need the remedy, the greater becomes the difficulty of using it.

(12) With us depopulation, so far as it is accomplished at all, is accomplished only in one way—namely, by the wild and reckless stampede of a demoralized and panic-stricken people. Almost all who are able to go do so, and a great many who are not able. The impecunious are left behind to the mercy of the pestilence, and the charity of the compassionate. In the mean time the depopulation is never complete. From one third to one half of the people are obliged to stay at home, because they are not able to pay the expenses involved in getting away and living somewhere else. And this is not the worst. These flying people spread panic wherever they go, the panic being far more infectious than the fever; and then follows an epidemic of quarantines. The big towns quarantine because they have so much at stake; and the little towns quarantine because they think they have as much right to be protected as their big neighbors. And such quarantines!—unlawful, extravagant, absurd, grotesque, foolish, cruel—in one word, abominable beyond all that words have power to give expression to. If the history of them could be written, it would fill up a goodly portion of that history of human folly which Professor Porson proposed to write in five hundred volumes.

(13) Another agency in the management of epidemics needs to be mentioned here—the agency of refugee camps. *A priori* one would think they would serve a good purpose, but practically they have always been failures, and they must continue to be failures. In the first place, it is next to impossible to get a place for the establishment of a refugee camp. People don't want refugee camps anywhere in the neighborhood of their residences, and won't have them. In the second place, when you succeed in establishing a camp, it accomplishes comparatively little because you cannot drive the people of the infected town into it; and I don't blame them for their reluctance. If you had the power of a Russian czar, by force

of arms you might drive the people into the camp, but in no other way.

(14) I have thus endeavored, in a very brief and imperfect fashion, to indicate what we know of the natural history of yellow-fever, and of the conditions which mark its propagation in time and space. I have, also, in the same brief and imperfect fashion, indicated some of the evil consequences of our present methods of managing yellow-fever epidemics. I need not go further back than the history of this present year to point the moral I have in mind. We have seen the people of the entire South, wild with panic, flying recklessly from their homes, and scattering consternation and dismay all over the country. I suppose there is no other single consideration that stands so much in the way of Southern development as this spectre of yellow-fever which is always associated with our sunny climate in the minds of the people who desire to settle among us. How is all this to be changed? There is but one way. We must educate our people, our doctors, and even our health officials, to a better appreciation of the true character of the enemy we have to battle with. Let it be understood that yellow-fever is not contagious from person to person as small-pox is; that in a majority of instances, when introduced into our communities, it fails to spread at all; that when it does spread, it spreads at first very slowly, so that the threatened people always have plenty of time to await the progress of events; that if it becomes desirable for the people to leave their homes, there will always be opportunities for them to do so in a systematic and orderly way. In a word, we must manage our yellow-fever epidemics in a common-sense, business way. We must get rid of our panics, our stampedes, and our shot-gun quarantines. The guardians of the public health owe it to themselves and to the people they serve to effect such a change in public opinion as will make it possible in the future to avoid the follies which have convulsed and disgraced the country in connection with our yellow-fever epidemics during the last fifteen or twenty years.

FUSIBLE METAL, which liquefies at the same temperature as boiling water, is a compound of eight parts of bismuth, five of lead, and three of tin.

SOME OBSERVATIONS ON THE ORIGIN AND SOURCES OF PATHOGENIC BACTERIA.*

By THEOBALD SMITH, M.D., of the Bureau of Animal Industry, Department of Agriculture, Washington, D. C.

THAT all pathogenic micro-organisms have been derived at some time in the past from those living in the soil, water, and decomposing organic matter will be seriously questioned by no one who has paid any attention to them. The marked similarity in form and physiological characters of pathogenic and harmless species strikingly confirms this view. Thus we have several forms of bacilli which resemble those of Asiatic cholera in most of the features which serve us as means of differentiation. Typhoid-fever bacilli resemble ordinary forms so closely that a diagnosis between them is rendered very difficult. Hog-cholera bacilli cannot be distinguished from many putrefactive forms, excepting by their peculiar and fatal effect upon experimental animals. Anthrax bacilli differ so slightly from the ubiquitous hay bacilli that Büchner was at one time led to try to transform one into the other, but without success. Not much more than ten years ago Nägeli saw no necessity for separating the various bacteria into distinct species. The morphological monotony which presented itself under the microscope led him to say that "the same species assumes in the course of generations forms unlike both morphologically and physiologically, which in the course of years and decades produce the souring of milk, the formation of butyric acid in *sauerkraut*, the gelatinification of wine, the putrescence of albuminoids, the decomposition of urea, the reddening of foods containing starch, typhoid, relapsing fever, cholera, or intermittent-fever."

Such views, if true, would make us totally helpless in our conflict with this microscopic world. If the most harmless can become our deadly enemies in the course of a few years,

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* Read before the American Public Health Association, Milwaukee, November 22, 1888.

the problem would be war against all bacteria. But the great majority are indispensable to the great rotation of matter which goes on incessantly between the organic and the inorganic household of nature.

Nägeli's extreme views, happily for us, have very little ground to stand upon. We do not believe that the transformation of harmless into pathogenic forms may take place at any time, or that variation among bacteria goes on constantly within very wide limits. We have learned that there is a marked fixity of characters in these simplest forms, which seems the more remarkable the longer we devote ourselves to their study. This fixity has very likely been reached by a gradual adaptation to special conditions extending over very long periods of time. As a necessary consequence of this adaptation there are bacteria corresponding to various grades and forms of parasitism, ranging from those which produce disease only incidentally to those which cannot subsist excepting in the animal body. We now know of bacteria, such as the cholera spirilla, which can only live outside of the body itself in the alimentary tract and poison the organism with the products of their metabolism, and we know of bacteria, such as the bacilli of tuberculosis and leprosy, which have adopted, perhaps, the most complete parasitic habit, an existence within the protoplasm of the cell-body itself.

Granted a marked fixity of physiological characters and a scale of forms corresponding to different degrees of parasitism, we cannot evade the inference that there must be going on even now imperceptible changes in the characters of some bacteria, and hence of diseases caused by them. The question may then be asked, Have we any evidence in history of the changes in the nature of prevailing diseases or of the appearance of new ones? This could only be approached by a careful study of infectious diseases and the epidemics they have caused from antiquity up to the present. Even if I were sufficiently familiar with the literature of this subject, I doubt whether much could be gained by such a study, owing to the doubtful value of the testimony of medical history. Have we not witnessed, as late as our day, the confounding of one disease with another, because nothing was known of their etiology? It is not very long ago that typhus, typhoid, and relapsing fever were looked upon as one disease. Now we know that typhoid and relapsing fever are due to very different organisms; and as to typhus, we are aware of its claim to a separate place in the list of maladies, although its etiology is still unknown. Scarcely a decade ago, all swine diseases were one. Now, this one disease turns out to be three, caused by readily distinguishable microbes. These illustrations will suffice to show that the history of medicine cannot be relied upon to help us in tracing any changes which the same disease may have undergone, or in heralding the presence of a new disease during centuries and tens of centuries. The problem is still more complicated by the fact that epidemic diseases have frequently come from unknown quarters of the globe.

There are a few indications, however, which point to variations in the severity and character of some infectious diseases. The Black Death of the fourteenth century manifested a character somewhat different from that of the Oriental plague, with which it has been in general identified. Liebermeister states that typhoid-fever has become modified in severity since the beginning of this century. It is believed that Asiatic cholera may have developed its endemic character not before the last century, having been a sporadic disease before that time, like the *cholera nostras* of European nations. Only during the present century has it invaded Europe as an epidemic disease. Attention has been called in Germany to the recent development of an epidemic character in cerebro-spinal meningitis. We may not be far from the truth, therefore, when we assume that there is a birth, change, and decay of diseases due to very gradual changes in the micro-organisms which are the causes. In weighing evidence of this kind, however, we must not lose sight of another factor, the varying power of resistance presented by individuals and races under different internal and external conditions to the same micro-organism.

When we pass to present bacteriological researches we obtain some positive facts concerning the variation of pathogenic bacteria within narrow limits. We have become familiar with the conception of variability through the persistent successful labors of Pasteur. He has taught us that anthrax bacilli can be attenuated by heat so as to form physiological varieties. This change is, no doubt, a degeneration on the part of the bacilli needing no comment, for it is the common heritage of all organisms to degenerate. But to cause an increase of pathogenic activity is an important and striking fact, not only in biology, but in epidemiology. Pasteur succeeded in increasing the virulence of *rouget* bacilli by passing them through a series of pigeons—*i.e.*, inoculating each with the blood of the one preceding in the series. The bacilli obtained from the last of the series were more fatal to swine than those obtained directly from the latter animal. We may draw upon his investigations of rabies for another valuable illustration in variability. In commencing to inoculate a series of rabbits beneath the dura with the virus of rabies from the streets, the animals lived about fifteen days. From the spinal cords of these a second pair were inoculated, from the second a third, and so on. Later on in the series, the duration of the disease fell from fifteen to twelve, eleven, nine, and eight days. After the eightieth to the one hundredth passage it was shortened to seven days. It remained at seven days after the one hundred and thirty-third passage, rarely falling to six.

Gamaleia, in a recent communication to the French Academy of Sciences, claims to have found a method of augmenting the virulence of cholera spirilla. After passing the germs through a guinea-pig, he inoculates a pigeon, which dies of a "dry cholera" with exfoliation of the intestinal epithelium. The germ appears in the blood, and after several successive inoculations it acquires such a virulence that one or two drops of blood are sufficient to kill pigeons in from eight to twelve hours ; guinea-pigs are likewise destroyed by the inoculation of very small quantities. If we bear in mind that guinea-pigs could only be infected by Koch through the stomach made strongly alkaline, and that the comma bacilli did not appear in the blood, the experimental results obtained by Gamaleia are certainly very remarkable. The same observer came to very interesting conclusions of a similar bearing concerning the microbe of fowl cholera. It is well known among bacteriologists that a certain number of animal diseases, such as fowl cholera, rabbit septicæmia, swine plague, and an infectious disease among game which has been described in Germany under the name of *Wildseuche*, are caused by what is supposed to be the same micro-organism under different conditions.

Just what these conditions are, whether depending on variations in the germ itself, or in the infected animals, or both, it is impossible to state. I have encountered this same organism as a saprophyte in the nasal mucus of healthy swine, as well as the cause of a fatal infectious pneumonia in the same species. I have found it in a few cases of interstitial pneumonia in cattle and in diseased rabbits. In these different situations it presented minor physiological variations, the most important of which had reference to its sensitiveness to temperature while multiplying, and its pathogenic activity when tested upon the same species of animal—as, for example, the rabbit. Gamaleia found this same species of organisms as ordinary inhabitants of the digestive tract of pigeons. By passing them through several rabbits in succession they became virulent enough to prove fatal to pigeons and fowls after inoculation.

Besides this physiological modification of bacteria produced experimentally in the laboratory by which their pathogenic effect is augmented, we are frequently brought face to face with modifications going on in nature. Several years ago I pointed out certain minor differences between hog-cholera bacilli from two different localities. In culture liquids one variety always formed a surface membrane, the other not. This tendency was not lost or changed even after the germ had been passed through a series of animals. The same variety was also more sensitive to the reaction of the solid media employed. So far as pathogenic activity was concerned they were the same. The production of coagulation-necrosis in the liver of mice and rabbits peculiar to hog-cholera bacilli was common to both.

But differences in form and growth upon artificial media are less common than sameness of form and growth combined with a difference in virulence. Thus I have had occasion to observe, in the study of infectious pneumonia in swine, that the germ of one epizootic when introduced beneath the skin of rabbits caused a septicæmia fatal in less than twenty-four hours. The bacteria inoculated were present in large numbers in the blood and spleen. In another epizootic the germ was incapable of destroying rabbits in less than from three to eight days. Instead of a true septicæmia there would be an extensive sanguinolent, gelatinous, or cellular infiltration of the subcutis extending from the point of inoculation, together with a partly cellular, partly fibrinous exudate in the neighboring abdominal cavity. While the bacteria were very numerous in this exudate they were nearly absent from the blood and spleen. I have also observed a difference in the virulence of glanders bacilli as manifested in inoculated guinea-pigs. In many the disease lasted three or four weeks accompanied by swelling of the limbs, suppuration of the testes, and ulcers on the surface of the body. In one animal, however, it lasted but ten days without external lesions, but with extensive formation of nodules or tubercles in spleen and lungs. The reaction of these experimental animals is usually so uniform that I should not credit this to any weakness on the part of the guinea-pig. Moreover, the source of the material confirmed the view taken of a difference in virulence.

I do not intend to convey the impression that it has not been frequently asserted that variations in the severity of epidemics were due to differences in the specific germ. I simply call attention to some facts which demonstrate what have been hitherto rather vague and unproved assertions. They serve to illustrate variations going on or already existing in nature and revealed in the laboratory, not so much by form or culture as by inoculation, which brings into play the very delicate vital forces of the animal in opposition to the invasive tendency of the temporary parasite.

We have thus far taken for granted that our disease-germs are derived from forms like those living in our surroundings, and that they have adapted themselves in some unknown way to various degrees of destructive parasitism. In some this habit has become so perfected that they have nearly or quite lost the capacity of living outside of their hosts. They fail to grow in artificial media, or else develop only when their natural environment has been imitated as closely as possible. Among these forms are the well-known bacilli of tuberculosis, leprosy, and the still hypothetical microbes of syphilis and rabies. In a number of other disease-germs the parasitic habit is but slightly developed, and the saprophytic mode of life still as marked as with many harmless germs. They are cultivated on various substrata without difficulty, and it seems as if their invasion of the living animal organism were more of an accident. If this be so, and it seems very probable, then we must conclude *that they have acquired their pathogenic properties outside of the body.* Hüppe, in a recent address on the relations between putrefaction and infectious diseases, is the first, to my knowledge, who has presented this view as a deduction from present bacteriological researches. He discusses it in a very suggestive way, and points out the important fact that this property must have been acquired under circumstances very near those obtaining in the animal body, such as are presented by the decomposition of albuminoids or putrefaction.

Let us see how far this theory accords with facts. Conditions favorable to putrefaction are offered, first of all, in the digestive tract of man and animals. Hence, we may expect to find some pathogenic bacteria in this locality. Dr. Sternberg has found a microbe in saliva, not distinguishable from the organism identified later on as the cause of one form of croupous pneumonia and cerebro-spinal meningitis in man. Gamaleia, the author already referred to for several valuable discoveries, recently discussed at length in Pasteur's journal the etiology of croupous pneumonia. With the aid of animal inoculation he was able to demonstrate the presence of the *diplococcus pneumoniæ* in every case of this disease which he examined. He concludes that this organism is the sole cause of pneumonia, and that the pneumococcus of Friedländer is a mere saprophyte in the diseased lung tissue. One of his coworkers made careful investigations as to the presence or absence of the diplococcus in the saliva of healthy persons, and he actually found it in one half of the persons examined. Experiments on sheep showed that intratracheal injections of this saliva germ were incapable of producing pneumonia, unless the lungs had been previously diseased or injured. This would interpret the results of clinical observation in making two factors necessary for the development of the disease, external meteorological influences and the infectious agent. This also harmonizes with our observations concerning the development of infectious pneumonia in swine, for the germ of this disease or one not distinguishable from it may be found in the upper air-passages of a certain percentage of healthy swine. The bacillus of malignant œdema, so markedly pathogenic when introduced beneath the skin or into the muscular tissue, may be found in the intestines of most of our domesticated animals. I have already referred to the presence of fowl cholera or rabbit septicæmia germs in the intestines of pigeons in Russia. The digestive tract must thus be regarded as one of the sources of pathogenic forms, and the future will no doubt bring to light new forms living as harmless saprophytes at one time or in one species of animals, and producing disease at another time or in another species. The decompositions and changes which they induce in the former situation must be considered as preparatory stages in the final acquisition of pathogenic properties. In fact, one microbe, the cholera spirillum, produces disease without possessing any invasive power. As Hüppe has pointed out, Asiatic cholera is simply an abnormal putrefactive process going on in competition with the bacteria ordinarily present in the small intestines.

The illustrations given under the head of variability show that these pathogenic germs living on the mucous membranes are not in the condition to produce disease until some abnormal condition of digestion, some congestion of the lungs or catarrhal condition of the air-passages, the reduction of vitality by the ptomaine poisons of putrefaction, pave the way. By these means a nidus is frequently furnished where the bacteria in question may multiply and thus gain a preliminary advantage in numbers, and very likely in virulence. Expressed in another way, these bacteria are always potentially but not kinetically disease-germs.

Besides the digestive tract and its contents, we may regard the putrefaction going on around us, the filth which the crowded condition of large cities so abundantly furnishes, as another and, perhaps, the most fruitful source of disease-germs. Koch isolated at least four kinds, capable of producing septicæmia and pyæmia in animals from decomposing blood and other matter. Mori (Zeitschrift f. Hygiene, IV.) found three bacteria fatal to animals in the water of sewers. The staphylococci, causing suppuration, may be considered ubiquitous organisms. It is true that this group may only produce disease by gaining entrance through wounds and injuries, and thus are of more interest to the surgeon than to the student of hygiene. Yet they merely present another phase of the problem before us—the sources of pathogenic bacteria.

The statements which I have made to-day may, for the sake of greater clearness, be briefly summarized as follows: Observation and experiment seem to show that in our surroundings the process of putrefaction so called is shared by a number of true disease-germs, some of which require a slight impulse to produce sporadic or epidemic diseases in man and animals; that the pathogenic property of these germs has been acquired through unknown periods of time, and is now simply latent, bursting forth occasionally to again subside. This does not apply to strictly parasitic forms, but to the causes of those still mysterious lung and intestinal diseases of man and animals, as well as septicæmic, pyæmic, and puerperal diseases, which seem to hold on to an unknown saprophytic existence while acting accidentally as true disease-germs.

It may be said that if such views are true, if disease-germs are present as saprophytes in the excreta and secretions of man and animals, and in the filth that is in great part formed by these in our environment, it is a hopeless task for the sanitarian to grapple with them. This may be true with reference to such germs as we carry in our own saliva, and which are presumptively the cause of pneumonia, but with regard to the great majority it is a purely superficial inference. The removal of filth from human habitations and its proper disposal, the prevention of soil and water pollution, have always been the self-imposed tasks of sanitarians, and the difficulties are neither increased nor diminished by regarding such filth as dangerous. In fact, it has always been looked upon as a nidus of disease, until the earlier researches of Koch and contemporaries took a somewhat different ground, by failing to recognize the possible variability of pathogenic organisms. They looked upon their presence in putrefactive processes as accidental. Now we are slowly returning to the older position, and filth will resume its former importance in the eyes of Public Health. It is true that putrefaction may and does destroy the more highly parasitic bacteria, but there is a no less destructive competition between the outspoken putrefactive bacteria themselves. Hence, even if they do destroy cholera spirilla in a few days, it does not militate against the assumption that the latter likewise carry on a kind of putrefaction, a fact of which any one may convince himself by smelling a culture of these germs.

In conclusion, I must say that I have presented what may appear to be mere theories supported by a few positive, interesting facts. Theorizing as to what bacteria in general do from what one or two are known to do has always proved a rather dangerous pastime, not because it is more apt to go wrong than in other lines of research, but because of the importance of the consequences involved. But I believe that while we must hold fast to every old fact and every new one which comes to light, we must likewise entertain theories as to what we do not yet know, theories that invariably go with already known facts and not against them. It is a fault of most of our theories that they do not frankly square up with the present, and in so far they are harmful. I have endeavored to do a little of this squaring up, and in so doing have indirectly pointed out the great importance of cleanliness as a preventive of disease.

I would also point out that almost all new ideas have been derived from observation of and experimentation upon animal diseases. The study of animal epizootics and of microbes pathogenic in animal life is to my mind of inestimable value, in casting a strong light upon corresponding diseases of man, their causes, genesis, and mode of prevention. In the latter, observation is limited, and certain lines of demonstration, such as inoculation, are entirely suppressed. Analogy must then be invoked to produce conviction in sceptics, and this is best accomplished when the student of public health makes himself thoroughly familiar with the results of well-rounded, trustworthy investigations of infectious diseases among animals. Here, as in physiology and pathology, animal diseases must form the chief, in some directions the sole stepping-stone to human diseases and to the solution of those problems which they are forcing upon us in increasing numbers. At the same time it becomes the duty of those intrusted with such investigations to make public their results in such a way as to bring them within reach of the medical profession in general and of sanitarians in particular, to point out any analogies existing between human and animal diseases, and to make such suggestions and draw such inferences as may throw light upon the obscurity that still prevails with reference to most human maladies.

THE THEORY OF RECOVERY AND IMMUNITY FROM INFECTIVE DISEASES.

By ARTHUR HANAU, M.D., First Assistant in the Zürich Pathological Institute.

WHILE I was engaged in preparing a paper containing a detailed criticism of the theory of "phagocytes" from the point of view of general pathology, together with certain views of my own on the pathology of the infective diseases, I received the recent memoir of Sahli, dealing in a comprehensive way with a similar but more general theme. I have therefore given up my original purpose, and propose now to limit myself to certain points in which my views are divergent from his, or in which I can supplement or extend them.*

I have always held that any theory which professes to account for natural recovery from the infective diseases, and the immunity from further attacks which in many of them is thereby brought about, must be in clear accord with the known facts of general pathology, and more especially with what is known of their clinical course and symptoms, before it can claim to explain the phenomena common to these diseases. The fulfilment of this preliminary condition is more important than the demonstration of a series of interesting discoveries of a histological or bacteriological kind, which are capable of being interpreted as favorable to any given theory. Holding this opinion, I some years ago expressed † my conviction that the entire doctrine of the destruction of bacteria by phagocytes was still without foundation, and wrote: "It appears to me that of late many have generalized much too widely the theory of the direct destruction of living pathogenic bacteria by 'devouring' tissue-cells, relying too much on Metschnikoff's observations, which are far from being clearly demonstrated; I consider the objections raised by Baumgarten.‡ among

* For an account of the "phagocyte" theory of Metschnikoff, see Dr. Lauder Brunton's *Pharmacology, etc.* (third edition), p. 85; and for a discussion of the prevailing views on the nature of immunity, see Klein, *Practitioner*, xxxiii. 247.

† *Zeitschrift f. klin. Med.*, vol. xv. pp. 3, 4.

‡ *Berliner klin. Wochenschrift*, 1888, p. 818.

others, to Metschnikoff's theory as thoroughly well-grounded. At most the hypothesis explains the acute local phlogogenous (septic) processes, though even in them the blocking of the lymphatics and blood-vessels is a fact more definitely proved than the 'eating-up' [of the living bacteria]. For diseases having a regular typical course the theory fails entirely. The peculiar succession of symptoms in croupous pneumonia, in small-pox, and other acute exanthemata, in intermittent and relapsing fevers, can only be accounted for on the assumption of corresponding phases of development in the micro-organisms that cause them. It is impossible to believe that the phagocytes, after they have fought the invaders for days *ancipite marte*, should within the few hours of the crisis swallow them up alive and entirely."

Without contesting the *facts* established by Metschnikoff I must still maintain this opinion. The organisms which give rise to the above-mentioned diseases, each with its typical clinical course, are from the outset exposed to the alleged attacks of the phagocytes, and nevertheless the morbid process, after a definite period of incubation begins, persists for a definite period of hours, as in intermittent, or days, as in relapsing fever, with a steady or gradually increasing intensity, and then suddenly a rapid return to the normal condition takes place in the few hours of crisis, in certain of the affections to be followed by a fresh relapse after a definite interval. Had the phagocytes been active from the beginning, as they are said to be, we should expect the disease to come to an end gradually and terminate by lysis. If it is urged that the phagocytes require time to develop their characteristic properties, that is only propping up one hypothesis by another.

Weigert * has with justice objected to a remark of Metschnikoff's in speaking of relapsing fever, that the detection of spirilla enclosed in the splenic cells at the time of the crisis does not prove that the latter were in the act of removing living spirilla from the circulation. He further argues that while there is no ground for the assumption that the vigor of the phagocytes increases, there is much (*e.g.*, the loss of their mobility) to suggest a weakening of the spirilla as the attack draws to a close. The essential factor in the process of recovery

* *Fortschritte der Medicin*, v. (1887), No. 22, and vi. (1888), No. 2.

would thus consist in the impaired vitality of the micro-organisms.

How then is this "weakening" of the micro-organisms brought about? Weigert discreetly leaves the question open. Sahli, who states that it is only in cases of slight infection by so-called "hemipathogenic" bacteria that spontaneous death of the micro-organism occurs, attributes the disappearance of the microbes in the "immunifying" diseases to vital influences originating within the tissue-cells but operating outside them: the natural recovery is the result of immunity already begun. He does so probably in order to answer by anticipation the question—Why do anti-bacterial influences only become active on a particular day of the disease; have they only then developed, and developed suddenly? So far as the question of immunity is concerned, I am rather inclined to admit that an anti-bacterial influence is exerted by the "vaccinated" and non-infectible body, inasmuch as in this case we have to do with micro-organisms entering a body in which *ab initio* they are incapable of living and multiplying; but I cannot at all accept the proposed identification of the phenomena of recovery and immunity. It is matter of experience that in one whole series of diseases (croupous pneumonia, erysipelas, septicæmia, gonorrhœa) recovery from one attack is no protection against subsequent infection, and in another series (intermittent and relapsing fevers) a single infection gives rise to a succession of subsequent attacks each of which is recovered from. Sahli is not unaware of this difficulty, and seeks to meet it by supposing that the immunity conferred may be of very short duration, and that on the other hand the increasing mildness of many recurring infections is due to a gradually increasing immunity (*e.g.*, in recurring erysipelas, pneumonia, and diphtheria).* I am unable to follow him in this view, and, while pointing out the contrast between the imperfect and gradually developed immunity he imagines, and the rapid and complete recovery that terminates each successive attack, would illustrate my position further by a few examples.

(1) Recurrent (or habitual) erysipelas almost always attacks one and the same part of the body, the cause usually being that the avenue by which the virus first gained entrance re-

* *Loc. cit.*, p. 510.

mains open. The earlier attacks usually leave behind a chronic inflammatory condition, such as elephantiasis-like changes in the legs, which from mechanical causes (obliteration of lymphatics and thickening of connective tissue) prevents the continuous propagation of the *micrococcus erysipelatis*, and this continuous propagation is one of the conditions of its continued life. The patient, however, has by no means a complete immunity from infection, for he is probably as apt to suffer in a hitherto intact portion of the body as any one else; it is only the limb or part in question that is mechanically inaccessible to the virus.

(2) Intermittent fever not only confers no immunity, but persistent and repeated attacks actually favor the supervention of the malarial cachexia. That this cachexia is probably not a mere sequela of the malarial process, but rather a very chronic form of the disease itself, appears from the fact (1) that it may occur as a primary result of continued exposure to the malarial miasm, and (2) that the blood-changes characteristic of the disease are found in patients suffering from the cachexia.* Lastly, a true pernicious malarial fever may follow upon a succession of previous slight attacks. According to Hirsch ("Geographical and Historical Pathology," vol. i., 1883), repeated infection markedly predisposes to severe remittent and hæmorrhagic forms of malarial fever. On the other hand, persons who have, without apparently suffering, dwelt long in malarious districts enjoy a relative immunity. The immunity of the negro in particular is confined to adults, for many of the children sicken and die of malaria.† The relations of malaria in this respect seem, however, to be unusually complex, for persons who possess the relative and local immunity are attacked when they migrate to other regions.

(3) In relapsing fever, though the subsequent attacks are of briefer duration, the fever is usually more intense.‡

(4) Gonorrhœa certainly confers no immunity against subsequent attacks, and yet it is often enough recovered from spontaneously, though to the end of the attack the urethra

* Councilman, *Fortschritte der Medicin*, vi. (1888).

† May not this be a case of selection by survival?

‡ On the other hand, Metschnikoff has produced a relative immunity in the monkey by means of inoculation, *Virch. Arch.*, vol. cix.

contains an infectious secretion. It may be said that the later attacks are usually less severe, but the advantage in this respect is counterbalanced by the increased risk of the affection becoming chronic. I suspect, therefore, that the diminished severity of the inflammatory symptoms is due merely to a relaxation of the mucous membrane produced by the first attack, analogous to the loosening of the conjunctiva following an attack of ophthalmia.

(5) The most remarkable relation between recovery and immunity is met with in the case of syphilis. The patient who has been constitutionally infected is immune as regards re-infection from without, but not as regards the virus which persists in his own system ; while it is probably only in the latest stages of the disease that this virus loses its infective property as regards another individual. A genuine re-infection of a syphilitic patient is actually considered to be the best proof that the first attack has been completely recovered from. In this instance, then, recovery and immunity stand in actual antithesis one to the other.

While, however, I cannot regard recovery from infective disease as due to incipient immunity, I do not reject the doctrine that the former is brought about through the destruction of the virus by some direct action of the infected body, so far, at least, as the general infections are concerned. In the case of local septic processes, I should, on the other hand, admit that many micro-organisms may be destroyed indirectly by the process of encapsuling and consequent isolation.* This process begins, as I have already suggested, by the blocking up of the lymphatics and blood-vessels. But it must not be forgotten that the encapsuling may also only begin as a secondary process, after the virus has already ceased to live.

Sahli, who, in my opinion, is fully justified in his contention that recovery from the infective diseases does not always take place in the same way, thinks that many of these affections terminate by reason of the spontaneous death of the exciting bacteria ; but he limits this mode of recovery to the slighter disorders attributable to the hemipathogenic microbes, and,

* The organisms are by this process prevented from multiplication and diffusion ; they are confined to their original nidus, and *may* gradually die away *in situ*.

as will be understood from the foregoing remarks, to those disorders which confer no immunity. The possibility of the spontaneous death of the microbes, he says, "explains in the simplest manner the phenomenon of natural recovery from many of the infective diseases, but by no means from all of them." I should myself go further, and explain recovery from a disease presenting a definite clinical course as the last act of the cycle of phenomena whose regular sequence constitutes the clinical type of the disease. As I have said before, the peculiar succession of symptoms in croupous pneumonia, in small-pox, etc., can only be accounted for on the assumption of corresponding phases of development in the micro-organisms that cause them. The specific character of the disease rests on the specific nature of the exciting micro-organism, and in like manner it must be maintained that the several phases or stages in the course of the disease are due to corresponding definite phases or stages in the condition of the micro-organism : recovery is, in all but the absolutely fatal forms, simply one of these stages. Whether the developmental phases of the virus are always evidenced by definite morphological changes (on the analogy of those occurring in trichinosis), or whether they are only biological, having reference to its chemical or local relations, is a question which we are of course not yet able to decide. Many circumstances, however, point some to one and some to the other of these alternatives.

That the view I am here maintaining is entirely new I do not for a moment assert ; I believe rather that in principle it corresponds to one of the older explanations of the normal course run by the several infective fevers, and especially by the polyleptic or remittent fevers. Recently, however, the changes which microbes undergo in the course of these affections have been somewhat neglected in favor of a number of other factors. In regard to the remittent affections I do not stand alone, for Klebs, in speaking of relapsing fever, after he has called attention to the differences between it and malarial fever, adds : "These peculiarities point to corresponding peculiarities in the micro-parasites. Either the duration of life in these organisms is remarkably long or they reach the blood in rapidly succeeding swarms (Heydenreich)."

On yellow-fever, he remarks further, "If we assume the micro-parasitic theory of the disease, it follows that the stages of invasion and relapse must depend on the multiplication and diffusion of the microbes into the circulatory channels; in that case the term invasion would be literally appropriate." Moreover, in Ziemssen's lecture on "Antipyresis and Antipyretics," there is a passage in which he comes to the same conclusion as myself concerning recovery in general. After giving reasons against the view recently upheld that pyrexia has a sanative influence, which acts injuriously on the microbes either directly or by altering the tissues, he adds, "This view does not accord with clinical experience, and especially with the fact that the acute infective diseases generally run through their typical course, whether the pyrexia be high or low. The exceptionally high temperature in relapsing fever has been by some casually associated with the disappearance of vital activity in the *Spirochæta*, but there are many other ways of accounting for the death and disappearance of the spirilla without attributing it to the intensity of the body-heat. I am rather forced to the conclusion that the life and activity of bacteria in the human body has for many species a definite period of duration, which, though different in different fevers, is independent of the pyrexia, of the treatment, and of the external conditions." Ziemssen illustrates this proposition by reference to the various infections that run a typical course, and suggests that the shortening of the duration of the affection in certain cases may depend on some alteration in the biological properties of the micro-organisms or of the patient affected, as in the varioloid of vaccinated persons. He lays special stress on the suddenness of the recovery, affirming that "it is particularly important for the understanding of this process (of recovery) to note the sudden extinction of the vital activity of the microbes which is indicated by the occurrence of the crisis. When we see that in one hundred cases of croupous pneumonia eighty-five end by crisis before the eighth day, and that whether the fever is high or low, we may well imagine that there is some regular vital property of the pneumonococcus which prevents it living and acting in the organism for a longer time." In relapsing fever he accounts for the successive attacks by assuming the invasion of successive generations of microbes.

It is obviously impossible as yet to demonstrate completely the explanations I have proposed, as the gaps in our knowledge of the behavior of many of the bacteria in the human body are still numerous, and as it happens it is precisely in those affections with a typical course, to which I have specially referred, that the true nature of the parasitic virus is in part undiscovered. These affections, however, I regard as the best type of the infective diseases; their clinical picture is the sharpest in its outline, and in each species the individual cases are the most uniform and regular. Most of the affections whose contagium is better known are due to more variable micro-parasites; I refer to anthrax, septicæmia, malignant œdema, typhoid, etc. Again, I think we must admit that in many diseases some of the possible forms of the corresponding micro-organism are still unknown; for example, in relapsing fever we know the spirillum which circulates with the blood, but do not know its preliminary stages as they must exist in the prodromic swelling of the spleen or after artificial inoculation. I would remind my readers of the behavior of the embryos of *Filaria sanguinis hominis*, which are discharged in swarms into the circulation from the maternal parasite settled in a lymphatic vessel, and after a definite time disappear again. Such developmental phases have long been known in the case of animal parasites. The example of syphilis is also worthy of note. Its manifestations in the various stages of the disease, in respect of its extent, its diffusion, its anatomical characters, its contagiousness by inoculation, its transmissibility to the fœtus, vary in a remarkable manner. Perhaps, however, there is only one infective disease in which it has so far been demonstrated that the developmental phases of the parasite stand in direct relation to the symptomatic manifestations; I refer to malaria, and to the discoveries of Golgi and Councilman, on the assumption that they are right in considering the so-called *plasmodia* as the causative parasites of malarial disease.

If the suggested interpretation of the several phases of an infective disease be accepted, I do not see why there should be any difficulty in interpreting the phenomenon of recovery in the same sense. The death of the affected host seems to me an intercurrent accident, which prevents the disease from running its full course, and is not to be referred to any hypothetical failure of the resisting power of the body against the invading parasites. When a patient suffering from trichinosis survives, the *trichinæ* in his body are not dealt with differently from those in a patient who dies. He dies when the number of these organisms is so large, or so localized, or so operative, that vital organs are thereby gravely injured. In many affections the occurrence of what is called the normal or typical course may well depend on whether or not the parasite is permitted to arrive at a certain developmental stage. Thus, in the case of the *Empusa muscæ*, it is only in the event of the death of the infected fly not occurring till autumn that the fungus can grow through the cuticle of the abdomen, and then develop and shed its spores.

But while I cannot admit that in the general or non-local infections the body exerts a direct anti-bacterial influence, I do not at all deny that it may have an indirect influence on the vitality of the invading microbes. Just as the life of the host is essential to the life of certain parasites, and just as in other cases (*e.g.*, the parasitic worms) it makes possible the attainment of certain developmental stages which the parasites could never attain to outside the host's body, it is not impossible that the influence of the body may bring about the development of a phase in the parasite in which the life-period, or the number of generations it can produce, is strictly limited. An intestinal *trichina* dies spontaneously a certain time after the eggs are laid ; but if it reaches a muscle the *trichina* may vegetate for years in its capsule before it dies. When the parasite reaches the intestine it speedily arrives at sexual maturity, and as a consequence its life is shortened ; but this does not argue that the body of the host has exerted any destructive influence upon it. In analogous fashion I conceive the death of the microbes in many of the non-fatal infective diseases to be brought about. I say in many of them, for the apparent assumption of some writers that the death of the micro-parasite is a *conditio sine qua non* of recovery is quite untenable. At least two other modes of recovery are possible : the parasite may be transformed into an innocuous form, or it may leave the body altogether. In the case of bacterial diseases the former mode has not as yet been certainly demonstrated, but its possibility must not be left out of account. Trichinosis is, however, a perfect example of it, and this example should warn us against assuming *a priori* that in every instance of recovery the parasite must have been destroyed. Suppose for a moment that our means of examination were insufficient to detect the encapsuled animal, but that we were familiar with the clinical course of trichinosis, how natural would be the erroneous hypothesis that recovery resulted from the death of the parasite. In this connection I may mention, without insisting on it further, the suggestive fact of the attenuation of the virulence of many bacteria by passing them through the bodies of certain animal hosts.

The second mode, that of the elimination of the parasite from the body, has so far only been recognized in the example, cited in this sense by Sahli, of an abscess which is spontaneously evacuated. In this example I would call special attention to the fact of the necrosis and solution of the abscess-wall by the purulent exudation, a process in which the tissue plays merely a passive part. The less the resistance of the overlying tissue the sooner occurs the reparative process of evacuation ; compare the behavior of a whitlow on the dorsal with that of one on the palmar aspect of the finger. What takes place at a stroke and *en masse* in the case of an abscess, when the liquid and solid necrotic matters are removed by evacuation, to my mind occurs gradually by epithelial exfoliation in the case of catarrhal inflammations. The organisms which penetrate and, perhaps (as Sahli instances in gonorrhœa), multiply in the cells of the mucous membrane bring about the shedding of the epithelium, and are with it washed away by the accompanying secretion. In the so-called catarrhal pneumonia, which Fleck produced by injecting micrococci into the air-passages, he appears to demonstrate this process histologically. A rapid regeneration of the lost epithelium, starting from the deeper layers, and compensating or more than compensating for that lost by desquamation, is of course a necessary condition of complete recovery. The success which attends slight cauterization of the conjunctiva in gonorrhœal ophthalmia is thus intelligible, even if we believe that the benefit is in part due to the direct destruction of the specific microbe settled in the cauterized epithelium. According to Klebs, in diphtheria the loosening of the false membrane may bring away with it the infective bacteria.

As regards the expulsion or rather the exit of the pathogenic organisms in the general infections, I agree with Sahli that their elimination by the kidneys, and still more by way of the intestine or the mammary gland, is to be regarded rather as an accident fraught with danger to these respective emunctories than as a truly sanative process. Rapid and abundant elimination, which alone he regards as likely to be effective, scarcely ever occurs in this way. But it seems to me that we have something of the kind taking place through the skin in the acute exanthemata. In two of these, small-pox and measles, the fever falls with the outbreak of the eruption, and ceases with the appearance of its last stage. In scarlatina it is true the fever persists during the eruption. That in some way, however, the virus is being removed in these infections is further supported by the fact of the desquamation or "decrustation" following the eruption, which can hardly be regarded otherwise than as a separation of necrotic layers or regions of the skin. The contagiousness of this stage not only favors the view that the virus is then in process of elimination, but it further negatives the hypothesis that recovery is due to the death or destruction of the specific micro-organisms.

The "immunifying" influence of the chemical products of bacterial action Sahli explains, and I think rightly, as due to a kind of "re-minting" (*Umprägen*) or special alteration of the tissue-cells, and not to any direct anti-bacterial property of these chemical substances.* We find, moreover, analogous effects in the animal kingdom as the result of the use of certain food materials, and that under perfectly normal conditions. Bees can rear a queen from an ordinary working bee larva by feeding it when very young with so-called "royal" food. Fabre and Newport's researches furnish a still more striking example in the transformation of the larvæ of certain parasitic beetles (*Meloë*, *Sitaris*). Bees carry one of these, in the form in which it leaves the ovum, into the hive, and there it enters the brood cell of the comb, already containing a bee's

* The immunity which follows an attack of an infective disease cannot, however, be regarded as due to any "habituation" or "acquired tolerance" in the tissue-cells; it is brought about far too rapidly for this; moreover, I cannot give my adhesion to any explanation which rests, as this does, on the hypothesis of a "struggle for existence" between the cells of the parasite and those of the host.

ovum and the honey intended for the larval bee. The *Meloë* larva first devours the egg, and then is metamorphosed into a second form capable of living on honey. Before the larva has eaten the egg it is quite incapable of assimilating honey, and similar larvæ introduced into simple honey-cells have been found still in the first form, and dying or dead, at a time of the year when the first form is normally never found.

The supply of a special food in the case of many other animal parasites seems to me the necessary condition for a particular transformation and for the normal development of a particular form, and this supply depends ultimately on some specific quality of the parasite's host. But in none of these cases does the host acquire any immunity. The animal parasite is itself a somewhat highly organized creature, which derives its nourishment merely from the chyme or tissue-juices of its host. In the case of the unicellular parasites, however, we have a more intimate and more mutual relation between the invading cell and the tissues of the host ; each is affected by the products of the other's metabolic activity. The consequences of this mutual relation we may well imagine to be twofold. On the side of the parasite it may result in the development of various morphological or biological phases, which in their turn condition the several clinical phases or stages of the corresponding disease. On the side of the host it may ultimately result in his acquiring immunity from further invasion. —*The Practitioner.*

CENTENARIANS.

MR. EMILE LEVASSEUR has recently presented to the Academy of Sciences a very interesting communication *apropos* of the "Centenarians in France, according to the Census of 1886." The number of such persons is much less than is generally supposed. Young women have the affectation to remain young, while the old men that are cited for their great age have the vanity to grow old in order to be admired.

In Bavaria, according to the census of 1871, there were 37 centenarians ; but, when the fact came to be verified, only one authentic case was found.

In Canada, 421 were cited. Out of this number, the social state of 82 was ascertained by the aid of *bona fide* documents, and there remained after the examination but 9 genuine centenarians—5 men and 4 women.

In France, the same delusion exists in regard to centenarians, as is proved by the reports emanating from the Bureau of Statistics.

After the reception of documents relative to 184 centenarians, it was found by reference to authentic records, such as registrations of baptism, half-pay lists, etc., that the number dwindled down considerably, say to about 60. Among these there was a person named Joseph Ribas, who was born at San Estevan de Litera, in Spain, on August 20th, 1770, and who lived at Tarbes.

We add to these details two little known documents on examples of extraordinary human longevity. The first of these consists of an engraving, accompanied with the following legend: "Jean Causeur, butcher by trade, aged 130 years, born in the village of Ploumoguer, in Lower Brittany. Painted in August, 1771, by Charles Caffieri, sculptor, by commission, to the king, for the navy, at Brest."

The second document is relative to Mr. Noel des Quersonnieres, whose portrait was published from a lithograph made in 1845. At this epoch, Mr. Des Quersonnieres was 117 years of age. He was still living the following year, as is proved by a biographical sketch published on his account. François Marie Joseph Noel des Quersonnieres was born on February 28th, 1728, at Valenciennes, where his father was king's counsellor. He became commissary-general of military supplies in 1789, and was in disgrace under the empire. He went to live at London, where he married. At the age of 117 he was still vigorous. His face is pleasant, says his biography, his hearing and sight have preserved an astonishing delicacy of perception, and his head is not entirely devoid of hair.—*La Nature.*

THE LARGEST WOMAN IN THE WORLD.—The death of a colored woman in Baltimore, on September 4th, 1888, who, it is said, weighed eight hundred and fifty pounds. If the figures are correct, the deceased was, in a physical sense, the largest woman in the world, if not the largest that ever lived.

Even the famous Daniel Lambert only reached the comparatively ordinary weight of seven hundred and thirty pounds. We have no record of any man exceeding the supreme obesity of the Baltimore woman, with one exception. In the year 1798 the State of North Carolina became the birthplace of Mr. Miles Darden, who, in the course of years, reached the height of seven feet six inches, and the weight of over one thousand pounds. North Carolina has shown pride in her agricultural and political resources, but she has never done historical justice to her greatest man—physically speaking.

THE NEW MARINE-HOSPITAL SERVICE LAW.—The following is the Act to regulate appointments in the Marine-Hospital Service of the United States which has just become a law:

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That medical officers of the Marine-Hospital Service of the United States shall hereafter be appointed by the President, by and with the advice and consent of the Senate; and no person shall be so appointed until after passing a satisfactory examination in the several branches of medicine, surgery, and hygiene before a board of medical officers of the said service. Said examination shall be conducted according to rules prepared by the Supervising Surgeon-General, and approved by the Secretary of the Treasury and the President.

"SECTION 2. That original appointments in the service shall only be made to the rank of assistant surgeon; and no officer shall be promoted to the rank of passed assistant surgeon until after four years' service and a second examination as aforesaid; and no passed assistant surgeon shall be promoted to be surgeon until after due examination: *Provided*, That nothing in this Act shall be so construed as to affect the rank or promotion of any officer originally appointed before the adoption of the regulations of eighteen hundred and seventy-nine; and the President is authorized to nominate for confirmation the officers in the service on the date of the passage of this Act."

From the above it will be seen that hereafter there is but one way to enter the Marine-Hospital Service, and that is through the portals of the Medical Examining Board.

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.

By Dr. HORATIO R. STORER, Newport, R. I., Member of American Public Health Association, etc.

X. *Epidemics*. Continued from Volume XXI., page 448.

III. SMALL-POX.

a. In itself.

A. ENGLAND.

DR. JOHN FREIND (1675–1728). Two epistles to Dr. Richard Mead; the one concerning confluent small-pox, etc. London, 1729, 8°.

890. Obverse. Within beaded circle, nude bust, to left. Beneath, on neck, S. V. (St. Urbain.) Inscription: Joannes. Freind. Coll. Med. Lond. Et. Reg. S. S.

Reverse. Within similar circle, a physician in the dress of a former century clasping the hand of one of the last. Between them, a globe, plants, compasses, books, etc. Legend: Medicina. Vetus. Et. Nova. Exergue: Vnam Facimvs | Vtramqve. At margin, to left, S. V. Bronze. 58 mm.

Duisburg omits the dot after Et on obverse, and, as Kluyskens had done, after the words in legend of reverse. Kluyskens does the latter in his description, and has in his figure Coil. instead of Coll., having copied carelessly where the two last letters run together. In his description he omits the dot after Joannes, as did also Rudolphi, who with Kluyskens considers the figures upon reverse as intended to represent Hippocrates and Freind himself. In the Mead Catalogue, 1755, the name is given as Friend. Frossard in his Thirty-eighth Catalogue wrongly classifies the medal as Masonic.

Gaetani, ii., p. 412, pl. 202, No. 1; Moehsen, i., p. 329, fig.; Snelling, pl. 29, No. 6; Rudolphi, 1829, p. 58, No. 239; Kluyskens, i., p. 327, fig.; Duisburg, p. 221, dlxxxvi.

This is in my own collection, through the courtesy of Dr.

J. R. Chadwick of Boston, and in that of Dr. Lee. Dr. William Dickinson of St. Louis has it also.

891. Obverse as last, but inscription, engraved: Joannes. Freind. Med. Anglus.

Reverse as last, but engraved, and exergue blank. Bronze.

Rudolphi, 1829, p. 58; Duisburg, p. 221.

Rudolphi had this, but Duisburg considers it was merely a pattern piece, and that no others were struck.

Dr. Richard Mead. "A treatise on the small-pox and measles" (etc.), London, 1747, 8°. "A discourse" on the above, etc. London, 1748, 8°, and 1755, 8°. "Abhandlung von den Kinder-pocken und Masern" (etc.). Augsburg, 1762, 16°.

Dr. Mead has been already referred to in the present Section, under general epidemics, might also have been spoken of in connection with The Plague, and will be again mentioned under Section XII., Climate.

B. Denmark.

Thomas Bartholin of Copenhagen (1619 [1616, Appleton's Cyclopedia; Thomas, Biographical Dictionary; and Index Catalogue of S. G.'s Office]—1680 [Mercklin wrongly says 1665]). He is classified under Germany by Duisburg. "De Variolis hujus anni epidemiis," Hafniae (1656), 4°.

892. Obverse. Bust. Beneath, Moltedo F. Inscription: Thomas Bartholinus.

Reverse. Natus Codaniae An. 1619. Obiit An. 1680.—Series Numismatica Universalis Virorum Illustrium. 1844. Durand Edidit. Bronze.

Duisburg, p. 113, ccciii.

Unknown to Rudolphi, Kluyskens and Renauldin.

C. Sweden.

Peter Jonas Bergius, of Stockholm (1730–90). "De variolis curandis." Upsala (1754), 4°.

893. Obverse. Busts of Bergius and his brother. Beneath, C. E. (Carl Ekblad or Enhörning.) Inscription: B(enedictus). Bergius Fisci Commis. P. J. Bergius M.D. Prof. Histor. Natural.

Reverse. Erudito Fratrum Pari Sociis Suis Munificis Acad. R. Scient. Stockholm.

Silver. 32 mm.

Kluyskens omits the dot after Histor.

Sacklén, p. 727; Rudolphi, 1829, p. 15, No. 59; Kluyskens, i., p. 104; Duisburg, p. 207, dxliv.

D. ITALY.

Antonio Cocchi. "De morbo variolari quo affectata est Maria Livia Borghesia." 1739.

Already described under Section I.

Dr. Domenico Cotugno of Naples (1735 [1736, Thomas, Biographical Dictionary; Index Catalogue Library Surgeon-General's Office]—1822). Physician to the Court of the Two Sicilies. "De sedibus variolarum syntagma." Louvain, 1786, 12°.

894. Obverse. Bust. Beneath, V. Catenacci F. Neap. Inscription: Dominicus Cotunnius.

Reverse. A figure presents the bust of Cotugno to Minerva, who holding the staff of Æsculapius contemplates a statue with strongly developed muscles that is being studied by a female representing Art. Legend: Rerum Abdita Monstrat. Exergue: Hippocrati Neapolitano, 1824. P. D. R. M. P. Bronze. 45 mm.

Kluyskens has Fec. and Cotonnius.

Rudolphi, 1829, p. 38, No. 147; Desgenettes, *Journal Compléem.*, xxiii., p. 132; Kluyskens, i., p. 229; Duisburg, p. 35, xcix.

There exist the following medals and tokens relative to the small-pox.

A. ENGLAND.

895. Obverse. View of the Hospital. Beneath, Jacobs. Inscription: The Small-pox Hospital Near | St. Pancrass

Reverse. An armorial shield. Inscription: P. Skidmore. Medal. Màker. Coppice-Row. Clerkenwell. Above, London. Upon rim: I promise to pay on demand the bearer one penny x

Neumann, No. 23,461.

Unknown to P. and R.

B. FRANCE.

There exists a small oval ecclesiastical medal of silver, which I own, of St. Martial, struck in 1830. The friend (French) from whom I received it, informs me that it was struck at Limoges, and used as a reminder to prayer for intercession toward preservation from the "peste noire," or confluent small-pox.

C. Germany.

a. Zweibrücken–Birkenfeld.

896. Obverse. Jugate busts, to right. Below shoulder, I(ohann)· W(eichinger)· Inscription : Carolo Avgvsto–Mariae Amaliae.

Reverse. Hygieia feeding a serpent entwined about an altar. Inscription : Salvti–Principvm· Exergue : Vot·Caroli Mont | MDCCLXXXIX. Bronze. 40 mm.

P. and R., p. 139, No. 384.

Upon the recovery of its rulers from small-pox.

D. Austria.

897. Bust of the Empress, to right. Beneath, M·Krafft·F· Inscription : M·Theresia D·G·Rom·Imp·Hung·&Boh·Reg·A· Aust·

Reverse. An allegorical group, Minerva, Saturn, Hygieia, etc. Legend : Providentia—Votis Et—Arte. At base, to left, K In front, Parenti Optimae | Clementi Iustae | Restituta Salus | 1767. Silver. 52 mm.

Moehsen, i., p. 9 ; P. and R., p. 136, No. 375.

Upon the recovery of the Empress Maria Theresa from small-pox.

898. Obverse. Bust of the Empress, to right. Beneath, to left, A·Wideman· Inscription : M·Theresia·D·G·Rom·Imp. Ger·Hung·&Boh·Re·A·A·

Reverse. A female kneeling at an altar, upon which, A. W. Legend : Deo Conservatori Augustae Exergue : Ob Redditam Patriae | Matrem 22 Ivlii | MDCCLXVII· Silver. 46 mm.

Moehsen, i., p. 17 ; P. and R., p. 137, No. 376.

Upon the same occasion as the last. This is in my collection.

899–901. Obverse. Bust, to right. Inscription : M·Theresia | D·G·R·—Imp·Hu·Bo·Reg·

Reverse. The female at the altar. Legends as in preceding, save 1767. Silver. 25 mm.

P. and R., p. 137, No. 377.

There are three varieties of this type, of which one is in the collection of Dr. Fisher, and another in my own.

902. As above save smaller, and M. Theres. 21 mm.

Moehsen, i., p. 17; P. and R., p. 137, No. 378.

903. A large monogram. Legend: VIVat DIVa C Laete Constanter aMen. Exergue: ex ore et corde | HumiLL: Devotis:

Reverse. Above, the Eye of God. Legend: Deo sIt gLorIa—MarIa·TheresIa | per preCes nostras | Vere sInCeras· | nobIs·RestItVta est· Silver. 46 mm.

P. and R., p. 137, No. 379.

904. Obverse. Mailed bust, to left. Inscription: Car· Alex·Loth·—Dux Belg·Praef: Under shoulder, R(oettiers). This last is omitted by P. and R.

Reverse. Belgium as an erect female, to the right, extends a crown toward sunbeams from clouds. At right, a lion. Legend: Deo Sospitatori—Augustae. Exergue: Belgica | Gratulabunda | MDCCLXXVII. Silver. 34 mm.

P. and R., p. 137, No. 380.

The above all commemorate the recovery of Maria Theresa.

905. Obverse. Bust, to right. Beneath, Wideman. Inscription: M·Josepha Austr·Ferdin·IV·Vtr·Sicil·Regi·Despons·8 Sept·1767·

Reverse. An angel with torch flying with female figure to right. Beneath, to right. P·K· Inscription: Ad Aeternas Nvptias Dvcta XV. Oct. MDCCLXVII. Exergue: Nata XIX· Martii | MDCCLI· Silver. 42 mm.

P. and R., p. 138, No. 381.

Upon the death of the Crown Princess Maria Josepha, of small-pox.

β. INOCULATION.*

A. The United States.

Benjamin Franklin. "Some Account of the Success of Inoculation for the Small-pox in England and America." London, 1759, 4°.

* Besides the chapters upon the medals of Inoculation and Vaccination in Pfeiffer and Ruland's "Pestilentia in Nummis" (Weimar, 1880 and 1882), these authors published anonymously and without date a reprint of the former, under the title "Beschreibendes Verzeichniss der zu Ehren William Jenner's und Aloysio Sacco's sowie auf die Schutzpocken-Impfung und die Blattern-Inoculation geprägten Medaillen," while Kluyskens issued a pamphlet upon the medals of Jenner, "Numismatique Jennérienne;" both of which are in my library.

Already described in Section VII., Ventilation.

Dr. J. M. Toner of Washington. "History of Inoculation in Pennsylvania." "History of Inoculation in Massachusetts." Boston, 1867.

Already described in Section I., and repeatedly referred to besides.

Since the publication of the earlier portions of this paper, an additional medal with which Dr. Toner is identified has appeared. It is the larger of the two of the International Medical Congress of 1887.

906. Obverse. Nude bust of Washington, to right. Beneath, C. E. Barber. F. Inscription: United States of America | + Founder of the Republic. +

Reverse. Æsculapius seated, with serpent feeding at his side. Before him a seated woman, with sick child in her lap. In background two aged cripples, the one with crutch, and the other with bandaged head and a cane. Beneath, C. E. Barber. F. Exergue: Washington, 1887. Inscription: International Medical Congress. N. S. Davis, Pres. J. B. Hamilton, Sec. Gen. E. S. F. Arnold, Treas. J. M. Toner, Reg. Bronze. 48.

In this medal the serpent-entwined staff of Æsculapius is very properly a rod rather than, as has so often been given, a club like that of Hercules. It is a pity that in so pretentious a medal even trifling blemishes should have been permitted. It was hardly necessary, however, for the engraver to have presented his name, like an advertisement, upon the reverse as well as the obverse, and it was a grammatical fault to place a period after it, in both instances, before the abbreviated F. That both these errors appear upon many other medals does not warrant their existence in the present instance. It is in my collection. Dr. Toner, who designed it, has published an interesting account of its history, with figures. *Journal of the American Medical Association*, December 15th, 1888, p. 851.

B. England.

Baron Dr. Thomas Dinsdale (1701 [Index Cat. S.-G. O; 1711, Am. Cycl.]—1800). Invited to Russia in 1768 by Catherine II., to inoculate herself and her son. "The present method of inoculating for the small-pox. To which are added some experiments introduced with a view to discover the effects of a similar treatment in the natural small-pox." Dublin, 1767. London, 1767, 1769, 1772, 1779. "Observations on the introduction to the plan of the Dispensary for General Inoculation," etc. London, 1778. "Remarks on a letter by J. C. Lettsom to Sir Robert Barker and Geo. Stacpoole, upon general inoculation." London, 1779.

The medal is described a little later, in this same Section; No. 923.

Dr. John Ingenhousz (1730–99). Called to Vienna in 1768 to inoculate the imperial family. Made Aulic Counsellor and Imperial Physician, with pension for life of £600.

907. Obverse. Bust, in high relief. Inscription: J. Ingenhousz. Cons. Et Archiat. Caes.

Reverse plain. Lead.

Wellenheim, ii., 2, p. 686, 13,980; Duisburg, p. 183, ccccxciii.

Unknown to Rudolphi and Kluyskens.

908. Obverse. Inscription: J. Ingenhousz. Cons. Aul. Et Archiat. Caes. Reg. Soc. Lond. Etc. Socius. 1779. Bronze. 90 mm.

Duisburg omits the dot after Socius.

Kluyskens, ii., p. 61; Duisburg, p. 183.

Unknown to Rudolphi.

For the medal of the inoculation of the Austrian Crown Prince by Dr. Ingenhousz, see No. 924, in this same Section. He will be again referred to under Section XII., Climate.

Dr. Sir Hans Sloane (1660–1753 [1752, Blake, Biographical Dictionary; Renauldin, *loc. cit.*]).

The inoculator of several of the royal family.

909. Obverse. Bust, to left. Beneath, A. Dassier F. Inscription: Jo. Sloane Equ. Baronettus.

Reverse. Doctor Medicus Socius Regiae Societ. Londinensis. 1744. Bronze. 53 mm.

Rudolphi and Kluyskens omit the dot before the date.

Frost. Mynt-og Med. Samling, 1827, p. 169, No. 227; Rudolphi, 1829, p. 148, No. 617; Renauldin, p. 452; Duisburg, p. 223, dxci., No. 1.

Rudolphi's specimen, from the collection of Hans Henrik Frost of Copenhagen, was perhaps unique. Sloane having been elected President of the Royal Society in the same year that the medal was prepared, its reverse was suppressed, and that of the following substituted.

910. Obverse as preceding.

Reverse. Praeses Societatis Londinensis. 1744. Bronze. 53 mm.

Gaetani gives Hans instead of Jo. and Kluyskens omits the dot before the date.

Gaetani, ii., p. 239, pl. 184, No. 2; Snelling, pl. 33, No. 3; Rudolphi, 1829, p. 148, No. 618; Renauldin, p. 452; Kluyskens, ii., p. 454; Duisburg, p. 223, dxci., No. 2.

C. Holland.

Dr. Peter Camper of Leyden (1722–89). "De emolumentis et optimo methodo insitionis variolarum." Groningen, 1774, 8°.

911. Obverse. Head, to right. Inscription: *ΠΟΛΛΩΝ-ΑΝΤΑΞΙΟΣ ΑΝΔΡΩΝ.*

Reverse. Æsculapius to left, seated before a column bearing Telesphorus and entwined by serpent. Inscription: *ΘΕΟΝΑΙΣΚΛΗΠΙΟΝ.* Silver. 25 mm.

Designed by Hemsterhuis and executed by Schapp.

Rudolphi and Duisburg give the inscription in small letters, as does Kluyskens in his descriptions.

Rudolphi, 1829, p. 30, No. 116; Kluyskens, i., p. 179, fig.; Duisburg, p. 182, ccccxci., No. 1; De Jonge, Notice sur le Cabinet etc., de S. M. le roi des Pays-Bas, p. 70.

The dies were early broken, and only five specimens are known to exist.

912. Obverse. Bust, to right. Inscription: Petrus Camper.

Reverse plain. Silver. Oval. 75x58 mm. Engraved by K. Lanting of Amsterdam.

Rudolphi, 1829, p. 30, No. 117; Kluyskens, i., p. 179; Duisburg, p. 182, ccccxci., No. 2.

D. France.

Dr. Guillaume Joseph de L'Epine. "Rapport sur le fait de l'inoculation de la petite verole." Paris, 1765, 4°; Supplément, 1767, 4°.

913. Obverse. Bust, to left. Beneath, Du Vivier F. Inscription: G. J. De L'Épine Parisin.—Sal. Fac. P. Dec.

Reverse. Olim Dati | Obstetricib. Prof. | Restit. 17. Maii 1745. | J. Ex. Bertin 18 Maii. | J. B. Astruc 14. Jun. Ejusd. A. | — | Bibliotheca | Publici Juris Facta | Die Jov. 3. Mart. | MDCCXLVI. Beneath this inscription a serpent, to left. Exergue: G. J. De L'Épine Dec° Silver. 30 mm.

Kluyskens omits F and P on the obverse, has L for J, and Parisinae; on reverse he has Obstetricibus, Restitut., Mai in both places, and Anni; and he omits the dots after 17 and 14, and has the final date in Roman numerals. Rudolphi and Duisburg have also several of these errors.

Hauschild, No. 478; Rudolphi, 1829, p. 50, No. 202; Kluyskens, ii., p. 145; Duisburg, p. 85, ccxliv.

This is in my collection, from that of the late Dr. Chéreau. I have described it when speaking of Bertin and Astruc in my paper upon the Medals, Jetons, and Tokens of Midwifery and the Diseases of Women (*N. E. Med. Monthly*).

914. Obverse similar to the above, but engraved, and without the engraver's name.

Reverse. Plain. Duisburg, p. 86.

This is in the Imperial Museum at Berlin, according to Duisburg.

915. Obverse as preceding.

Reverse. An amphitheatre; to left, D. V. Legend: Pulchrior Exurgit. Exergue: Inauguravit J. De Winslow. 18. Febr. MDCCXLV. Beneath, 1744. 1745. 1746. Copper. 30 mm.

Wellenheim, ii., 2, p. 662, No. 13,617 (Friedlander MS.); Kluyskens, ii., p. 145.

This was unknown to Rudolphi, and is omitted by Duisburg. It is not in the Chéreau collection, now my own, and is probably a mule, the reverse being identical with that of one of the jetons of Elias Col de Vilars, the immediate predecessor of L'Epine, which is in my possession from the Chéreau collection.

E. GERMANY.

Rev. Johann Georg Eisen Von Schwarzenburg (1717–79). Noted for his zeal in inoculating (Duisburg).

916. Obverse. Wilhelmus I Dei. Grat. Com. Regn. In Schaumburg etc. Exergue: 1774.

Reverse. Two cornucopiæ. Inscription: Herbarum Conservatori. J. G. Eisen. Eccl. Torn. In Livon. Past. Beneath, Populis Alimenta Ministrat. Bronze. 40 mm.

Duisburg omits several of the dots.

Lengnich, i., p. 338; Rudolphi, 1829, p. 48, No. 196; Kluyskens, i., p. 282; Duisburg, p. 129, cccxliii.

Dr. Johann Andreas Murray of Göttingen (1740–91 [1797, Ind. Cat. S. G. O.]). "Fata variolorum insitionis in Suecica." Gottingae (1763), 4°. "Observationum et animadversionum super variolarum insitione Satura. Sectio(nes) prima, secunda, tertia." Gottingae (1779), 4°.

917. Obverse. Bust and name.

Reverse plain.

Rudolphi, p. 114, No. 471; Duisburg, p. 135, ccclxiv.

Already mentioned in this Section, under The Plague.

Dr. Theodor Tronchin (1709–81). An advocate of inoculation, among his patients having been the Dukes of Chartres and of Parma.

918. Obverse. Bust. Inscription: Theodorus Tronchin.

Reverse. An allegorical representation of vaccination. Legend: Tutissimus Ibis. Exergue: Securitas Populi Parmensis. 1764. Silver.

Rudolphi and Kluyskens give the date as 1734.

Haller, i., p. 165, No. 283; Müller, Merkw. Ueberbleibsel etc., Zurich, 1773, 4° fig.; Rudolphi, 1829, p. 160, No. 666; Kluyskens, ii., p. 315; Duisburg, p. 130, cccxlvii.; P. and R., p. 136, No. 374.

F. Switzerland.

Daniel Bernouilli (1700 [1706, Index Cat. S.-G. O.]–82). "Essai d'une nouvelle analyse de la mortalité causée par la petite vérole, et des avantages de l'inoculation pour la prévenir." (Acad. des Sciences de Paris.)

919. Obverse. Bust. Beneath, A(bramson). S. Inscription: Daniel Bernouilli.

Reverse. An observatory, with ship in the distance. Legend: Maris Et Coeli Mensor. Exergue: Natus, 1700. Silver, tin. 40 mm.

Kluyskens has Memor.

Von Haller. Schweirerisches Münz- und Med. Kabinet, i., p. 88, No. 141; Hauschild, No. 60; Rudolphi, 1829, p. 16, No. 63; Kluyskens, i., p. 114; Duisburg, p. 132, cccli.

The name of a second D. B., a nephew of the preceding, appears upon a medal to Johann Bernouilli, his brother. The two are not to be confounded.

G. SWEDEN.

Catharina Charlotta de Geer (by birth, Ribbing). The first of the Swedish nobility to permit inoculation in their families.

920. Obverse. Upon a band entwined with an oak wreath, Cath. Charlott Ribbing. Within, Ob | Infantes | Civium Svec. | Felici Ausu | Servatos. Beneath, 1756.

Reverse. A serpent-entwined altar, with patera. Legend: Sublato Jure Nocendo. Exergue: Variolorum. 30 mm.

P. and R., p. 136, No. 373. The reverse is figured.

Dr. Nicolas Rosen a Rosenstein, of Stockholm (1706–73). Court Physician, and did much for inoculation in Sweden.

921. Obverse. Bust. Beneath, G. L(jungberger). Legend: Saecli Decus Indelebile Nostri.

Reverse. Nic. Rosen De Rosenstein Eq. A. Archiater Reg. Suec. Et Acad. Sc. Membrum. Artis Sal. Discipulis Desideratus Obiit A. Ch. 1773, Aet. 67. Silver. 35 mm.

Rudolphi and Kluyskens have no dot after Membrum.

Sacklén, p. 520; Rudolphi, 1829, p. 137, No. 569; Kluyskens, ii., p. 386; Duisburg, p. 200, dxxxiii., No. 1.

922. Obverse. Bust. Beneath, C. F(ehrman). Inscription: Nicolaus Rosén. A. Rosenstein Archiater Eq. O. De St. P.

Reverse. Æsculapius. Legend: Phoebo Ante Alios Dilectus. Exergue: Artis Medicae Clarus Antistes. Ob. 1773. Silver, bronze. 25 mm.

Rudolphi and Kluyskens have C. E. for initials of engraver.

Sacklén, p. 520; Rudolphi, 1829, p. 137, No. 570; Kluyskens, ii., p. 387; Duisburg, p. 200, dxxxiii., No. 2.

Struck by the Swedish Academy in 1814.

Dr. David Schultz a Schultzenheim of Upsala (1732–1823). Inoculated the Swedish princes, and wrote upon the general subject.

923. Obverse. Bust. Beneath, M Frumerie. Inscription: Dav. A. Schulzenheim Praes. R. Coll. San. Com. Ord. Vas.

Reverse. Minerva, at altar of Æsculapius. Legend: Acumine Et Viligantia. Exergue: Claro Per 54 Ann. Soc. Acad. R. Sc. Sv. 1814. Silver. 34 mm.

Duisburg has Acumen.

Sacklén, p. 177; Rudolphi, 1829, p. 146, No. 607; Kluyskens, ii., p. 436; Duisburg, p. 211, dlxii.

The name of Schulzenheim also appears upon a medal of Berzelius, already given under Section IV., No. 172.

There are the following additional medals of Inoculation.

A. AUSTRIA.

924. Obverse. Busts, jugate. Beneath, A. Wideman. Inscription: Josephus·II· M·Theresia·Augg·

Reverse. Ferdinandus | Maximilianus | Eorumque Neptis | Theresia | Archiduces Austriae | De Insertis Variolis· | Restituti 29·Sept· | MDCCLXVIII. Bronze. 41 mm.

Schau- und Denk-münzen, welche unter der Regierung Maria Theresia geprägt worden sind. Wien, 1782, fol., p. 282, fig.; P. and R., p. 138, No. 382.

Upon the inoculation of the Crown Princess of Austria by Dr. Ingenhousz, already referred to. The dies of this medal are preserved at the Imperial Mint at Vienna.

B. ITALY.

The medal commemorative of the inoculation of the Duke of Parma has been already described in the present Section, No. 916, in speaking of Dr. Tronchin.

C. RUSSIA.

925. Obverse. Bust of the Empress, to right. Beneath, the engraver's name, in Russian. Inscription, in Russian: (Catharine II, Empress and Czarina of all the Russias).

Reverse. The Empress, holding her son by the hand, speaks to a female, at the left. Behind her, a boy leaning upon the Russian Arms, and a second who extends his arms to the Empress. Behind, at the base of a temple, a slaughtered dragon. Inscription, in Russian: (She herself gave the example). Exergue, in Russian: (Upon Oct. 12, 1768). Bronze. 65 mm.

P. and R., p. 138, No. 383.

Upon the inoculation of the Russian Court by Dimsdale, already mentioned in this Section. The dies of the medal are preserved at the Imperial Mint at St. Petersburg. In the Lee and Fisher collections.

(*To be continued.*)

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

MANY subscriptions for 1889 are still due; and some there are for previous years, which, unless promptly paid, will be placed in the hands of persons authorized to collect them. Subscribers will please conform to conditions of detachable order on advertising page.

INFECTIOUS DISEASES AND QUARANTINE.

It is surprising that one with the opportunities of Horatio R. Bigelow, M.D., foreign correspondent of the *Journal of the American Medical Association*, should write as he has recently written referring to quarantines that,

"Their history at any time of the world's history, and whenever enforced, have never shown them to be productive of preventing the spread of an epidemic or of arresting its localized progress. America with a strict quarantine is scourged, while England with no quarantine escapes. The advance of any epidemic can only be arrested by improving the conditions upon which it depends for an existence, and history fails to record a single instance in which it has been stopped in any other way."

Notoriously, to all well-informed persons on the subject, England maintains against infectious diseases of every kind, the strictest "quarantine," except in name, of any nation in the world. While she wisely ignores the word quarantine, she uses preventive measures against the importation of infectious disease at her ports of entry with the utmost strictness; and in the exercise of her internal measures is equally strict in enforcing the isolation of all persons affected with infectious or contagious diseases.

Through her well-informed and thoroughly-organized sanitary service she practices the knowledge which all nations and communities should acquire and practice with the same particularity, *internal* as well as external measures for the prevention of disease. Yet there are Englishmen "abroad," and on the platform of her home gatherings, who appear to be no better informed than the correspondent of the *Journal*, or who by their purblindness would hoodwink the necessity of any measures suggestive of possible restriction against England's commerce, at whatever risk of introducing disease into other communities.

Moreover, with special regard to yellow-fever, Dr. Bigelow writes that,

"At a time when Montevideo was suffering disastrously from yellow-fever invasion a doctor in charge of the hospital there succeeded in quieting the people, who had a superstitious dread of contagion, that it *was not* personally contagious by taking his two young children with him each time that he made his visits to the fever wards." This, considering the context, is evidently intended to correct an implied fallacy entertained by the physicians in the United States. Whereas it would be difficult to find one familiar with yellow-fever, who believes it to be personally contagious. Yet they do not, on that account, believe it safe to have free intercourse with infected places.

Nearly thirty years ago the following resolution was formulated by the late Alexander H. Stevens, M.D., and A. N. Bell, M.D.:

"*Resolved*, That in the absence of any evidence establishing the conclusion that yellow-fever has ever been conveyed by one person to another, it is the opinion of this Convention that personal quarantine in cases of yellow-fever may be safely abolished, provided that *fomites* of every kind be rigidly restricted." This was adopted by a vote of 70 yeas to 4 nays, April 29th, 1859.—*Third National Quarantine and Sanitary Convention, p.* 201.

Among the voters in the affirmative on this resolution were our foremost sanitarians of the time: Drs. John H. Griscom, Stephen Smith, Elisha Harris, R. La Roche, William M. Kemp, E. M. Snow, J. W. Sterling, William C. Anderson, and others, comprehending many of the most distinguished members of the medical profession at that time. If any one among them ever subsequently recanted his opinion, we have never heard of it.

It is gratifying to observe that, as one of the results of recurring opportunities to study the nature of yellow-fever, under the light of increasing attention to preventive measures generally, the non-contagiousness of yellow-fever is more and more extensively recognized, though with surprising delay in some unexpected quarters. For example, at the recent meeting of the Mississippi Valley Medical Association, resolutions were adopted of the same purport as the one just above quoted without recognition, adopted nearly thirty years before, so slow is the progress of sanitary knowledge, even among physicians supposed to be well informed.

DISINFECTION WITH STEAM, in the slow progress of the knowledge of its efficiency, is closely related to the foregoing. It was first effectually applied to a vessel infected with yellow-fever more than forty years ago; frequently repeated, and its efficacy thoroughly proven by numerous experiments subsequently. But persons who had no practical knowledge in the premises "knew better;" and because certain organic germs were found to inhabit hot springs of 300° F. and upward, assumed that nothing less would kill *disease* germs, and that dry heat only could be relied upon. But in the progress of bacteriological knowledge, the discovery was finally made that,

"A temperature much below the boiling point destroys micrococci and bacilli in active growth. Thus, I have fixed the thermal death-point of the micrococcus of pus (from an acute abscess) at 140° F. (60° C.), the time of exposure being ten minutes. This temperature is also fatal to the swine plague. The micrococcus of fowl cholera is destroyed by exposure for fifteen minutes to a temperature of 132° F. (Salmon). Nine or ten minutes' exposure to a temperature of 54° C. (129.2° F.) is sufficient to destroy the vitality of anthrax bacilli in blood (Chauveau).

"A temperature of 132.8° F. is fatal to the bacillus of anthrax, the bacillus of typhoid-fever, the bacillus of glanders, the spirillium of Asiatic cholera, the erysipelas coccus, to the virus of vaccinia, of rinderpest, of sheep-pox, and probably of several other infectious diseases.

"A temperature of 143.6° F. is fatal to all of the pathogenic or non-pathogenic organisms tested, in the absence of spores, with the single exception of *Sarcina lutea*, which in one experiment grew after exposure to this temperature" (Sternberg).

Under the head of "Superheated *vs.* Simple Steam:"

"Dr. E. Von Esmarch, Assistant in the Hygienic Institute in Berlin, has recently made some investigations to determine the comparative disinfecting power of superheated steam not under pressure as compared with the same kind of steam not superheated. He found that when applied to anthrax spores, steam, as it is raised above 100° C. (the boiling point of water) gradually loses its disinfecting power until the temperature of the steam reaches 150° C. or upward, at which temperature it becomes destructive to the fabrics.

"Or, estimating the disinfecting power of steam at various temperatures, freely flowing steam of 100° C. killed anthrax spores in ten minutes, at 110° C. in twenty minutes, at 123° C. in forty minutes. The only explanation why steam gradually, within certain limits, loses its disinfecting power as its temperature is raised, is that the superheated steam is dry steam, and that a certain amount of moisture is necessary to soften up, as it were, the envelop of the bacteria that the steam or the heat may prove destructive to the organism within."—(*Sanitary Inspector for November.*)

Notwithstanding, in the official correspondence on the Proposed Method of the Disinfection of the United States Steamship "Boston," in our preceding number, we find a board of medical officers of the navy recommending the use of superheated steam of the temperature of 220° F. for two hours!—at such a temperature and for such a length of time as to prohibit its use, lest in the opinion of an expert builder (of iron ships) it materially injure, if not, indeed, destroy the vessel. We are constrained to express our surprise at the recommendation, considering the evidence of the superior efficiency of steam at a lower temperature, with which the officers are supposed to be familiar. But it is a striking illustration of the slow progress of practical sanitation against preconceived notions.

VACANCIES IN THE MEDICAL CORPS OF THE NAVY.

Among the first subjects of importance to which the attention of the Secretary of the Navy is called, in the recent report of Surgeon-General Jno. Mills Browne, U.S.N., Chief of the

Bureau of Medicine and Surgery, is the continued deficiency in the medical corps.

Medical Director Gorgas, President of the Board of Examiners, in May last, reported : "I have been greatly disappointed at the results of our work this year ; seven of the twelve applicants were rejected physically, and but one of the others has passed professionally." There still remain, at the date of the report, eleven vacancies ; but at the time of this writing *fourteen.*

"The Examining Board is now in session at the United States Naval Hospital, Philadelphia, for the examination of candidates for admission into the medical corps of the navy as assistant surgeons. The board will remain in Philadelphia until the 31st of March, 1889.

"After the 1st of April, 1889, the board will hold its sessions at the Naval Hospital, Brooklyn, N. Y.

"Further information may be obtained by addressing the President of the Examining Board."

A NATIONAL BOARD OF HEALTH is again proposed, by bill introduced by Senator Harris, February 4th, which provides for a board to be organized in the Treasury Department, to be composed of seven members, three to be appointed from civil life by the President, and to draw salaries of $5000 each ; three to be medical officers, one from the army, one from the navy, and one from the marine service, and the seventh to be an officer learned in law, to be appointed from the department of justice. The four officials, members of the board, are to receive no other emolument than their official salaries.

HYGIENE is recently making considerable progress in Spain, particularly in the cities of Barcelona and Madrid.

Señor Decio Carlan, in his report published in *El Siglo Médico*, says that the Sociedad Española de Higiene has the most brilliant sessions of any medical society in Madrid. The meeting held on the 27th of December, ult., was the most successful yet held. Two of Spain's greatest orators, CASTELAR and MORET, the Governor, representatives of different societies, and a large attendance of ladies were present, and with the members of the society filled every available space in the hall.

Señor Pulido, one of the editors of *El Siglo Médico*, delivered a discourse which elicited hearty applause from the vast audience. Señor Moret distributed the prizes, and the ex-Secretary of State then made one of the most eloquent discourses that he has ever pronounced in public on the sanitary condition of Madrid and the necessity of a rigid inspection of every house, that sickness and disease may be prevented.

GRAVEYARD PESTILENCES.—Apropos to our remarks in the January number on the probable pollution of the water supply by graveyard seepage, as the cause of the prevalence of typhoid-fever in Brooklyn, and to which we shall again recur, *The Sanitary Journal, December 17th*, 1888, reports that, at a recent meeting of the Scottish Burial Reform and Cremation Society, Sir Spencer Wells said: "In the cemetery at Ilford, connected with the city of London, nine thousand persons are buried every year. Think what a dreadful state of things that represents! Whether in coffins or wicker baskets, you have that enormous amount of material decomposing within a short distance of a large centre of population. I cannot doubt that if it goes on unchecked there will be some terrible pestilence, which will be worse than the plague of London or the 'Black Death' of the Middle Ages. We shall not only get diseases resulting from impure water and impure air, from the decomposition of dead bodies, but we shall get the propagation of specific diseases. As Pasteur has shown, the germs of these diseases are preserved in the burying-ground, and they are brought from the grave to the surface of the earth where they poison the grass that the cattle feed on and the water that they drink, and they spread the diseases from which the animals die. There was a remarkable instance in Yorkshire, where a number of scarlet-fever patients were buried in the churchyard. A part of that churchyard was closed, but was afterward included in the garden of the rector, who had it dug up, and the scarlet-fever from which those patients had died thirty years before broke out in the family of that clergyman, and spread to the surrounding houses. There are many instances in which other diseases have spread in the same way."

CATARACT OF GLASS-MAKERS.—A Paris correspondent writes the *Journal of the American Medical Association* as follows:

In a note in the *Petit Journal de la Saute* on the cataract of glass-makers, the author remarks that a German physician found that of 442 glass-makers aged less than 40, there were 42 —that is to say, 9.5 per cent—affected with the commencement of cataract; and of 64 glass-makers aged more than 40 years, he found 17—that is, 26.5 per cent—affected with the same malady. This proportion is far above the average. In order to account for the cause of this singular predisposition, the author made some researches, and came to the conclusion that the trouble of the crystalline lens is due, on the one hand, to the direct action of the intense heat on the eye, particularly the left eye, which is the most frequently affected; on the other hand, the enormous loss of water caused by the excessive perspiration under the influence of the heat. It is by this excessive loss of water that may be explained the production of cataract in diabetic subjects.

DR. KILVINGTON.—The *Northwestern Builder* says: "Minneapolis's indefatigable health officer, Dr. Kilvington, has succeeded in forcing upon the public, against much opposition, what Mr. Beecher might have called a means of grace—viz., a garbage crematory; and his furnace is said to be considerably in advance of others used for like purposes. It is quite inexpensive in operation, gives off no odors, and consumes all kinds of refuse. A number of cities have sent their health officials to see this crematory in operation, and it is said Milwaukee already is building two upon the Minneapolis plan."

AN INTERNATIONAL EXHIBITION OF ALIMENTARY SUBSTANCES will be opened at Cologne on May 18th, and will remain on view until October 15th. Austria-Hungary, Great Britain, Russia, Italy, Holland and Belgium are already named among the nationalities to be represented, and others are expected to give in their adhesion shortly. The grounds set apart for the exhibition are eminently spacious and picturesque, and every effort is being made to insure its utility and attractiveness.

A NEW INSTITUTE FOR THE PRACTICAL STUDY OF SANITARY SCIENCE has been organized at Rome, being the tenth school of this kind to be undertaken in Europe. Government aid, through the Italian National Board of Health, will be given toward forwarding original research in sanitary subjects. Upon the completion of definite prescribed courses a diploma will be granted.

PRIZE ESSAY.—Dr. L. D. Mason, Vice-President of the American Association for the Study and Cure of Inebriety, offers the sum of one hundred dollars for the best original essay on "*The Pathological Lesions of Chronic Alcoholism Capable of Microscopic Demonstration.*"

The essay is to be accompanied by carefully prepared microscopic slides, which are to demonstrate clearly and satisfactorily the pathological conditions which the essay considers. Conclusions resulting from experiments on animals will be admissible. Accurate drawings or micro-photographs of the slides are desired. The microscopic specimens should be accompanied by an authentic alcoholic history, and other complications, as syphilis, should be excluded.

The essay, microscopic slides, drawings or micro-photographs are to be marked with a private motto or legend and sent to Dr. W. H. Bates, the chairman of the committee, 175 Remsen Street, Brooklyn, N. Y., on or before Oct. 1st, 1890.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—Under a joint resolution of the General Assembly, the Governor of the State has issued to the Governors of the States of Texas, Florida, Louisiana, Mississippi, South Carolina, North Carolina, Georgia, Tennessee, Kentucky, and Illinois, invitations to appoint delegates to a Quarantine Conference to be held in the city of Montgomery, beginning on Tuesday, the 5th of March next, and to continue for such number of days as the business in hand may render necessary.

The reason for the limitation of this notice to the Gulf States is, we are informed, with a view to such concerted action among them in the event of yellow-fever hereafter, as may be deemed least embarrassing to travel and commerce, while most effectual for the prevention of the spread of the disease.

Notwithstanding, we should certainly not be purblind to the continued liability to yellow-fever of many seaports north of the States named in this invitation, and the equal importance of properly equipped stations to arrest and destroy it *in limine*. And it might go without saying that some of our northern seaports, Philadelphia, for example, and some on the Pacific Coast are so extremely deficient in this respect that, in our judgment, it would have been better to have extended the scope of the conference, and given it a national instead of a mere sectional bearing.

Mobile, 40,000: Reports 89 deaths during December, of which 17 were under five years of age. Annual death-rate, 26.7 per 1000. From zymotic diseases, 12, and from consumption, 12.

CALIFORNIA.—The Tenth Biennial Report of the State Board of Health for the fiscal years from June 30th, 1886, to June 30th, 1888, comprises a general abstract of the proceedings of the board, a detailed account of the diseases which have prevailed and their mortality, the means which have been used for their prevention, and the expenses.

The most prominent subject of the report, and that which has required more attention than any other, is small-pox, which prevailed epidemically in San Francisco during the winter of 1887–88; and during the early part of the year 1888 extended to numerous places widely distant from each other in different parts of the State. As reported upon by Dr. S. S. Herrick, there were in San Francisco from May 3d, 1887, beginning with the second case, a Chinese passenger from the steamship City of Sydney, to June 30th, 1888, 568 cases. The first case, after an entire exemption from the disease for more than a year, was reported February 23d, 1887, but the origin of this case appears not to have been traced. Of the 568 cases reported, 494 were white, 72 Mongolian, and 2 African; 69 died.

"Justice to the San Francisco Board of Health," Dr. Herrick remarks, "demands the explanation that repeated efforts were made, beginning in the early course of the visitation, to have enforced the rule requiring all public school pupils to be protected by vaccination. But opposition was made on the ground that the Board of Health had no right to use a school-house for a health office. It would be unfair to say, that the school authorities, generally, were opposed to the enforcement of the vaccination rule; but it would be a suppression of the truth not to state that the superintendent, Mr. James W. Anderson, and Mr. Thomas P. Woodward, a member of the Board of Education, were conspicuous in obstructing the inspection of the school children, by which means alone the Board of Health could be satisfied of the protection of these children." Twenty-nine school children were admitted to the small-pox hospital, who had never been vaccinated, and of these 3 died.

Accepting these school officers, who obstructed the only certain means of protecting the health and lives of school children from small-pox, as an index of the intelligence of the community on the subject, it is no longer a matter of surprise that the disease became epidemic in San Francisco, and extended to other parts of the State. The whole number of deaths reported from it was 94; but the Secretary remarks, "There were other deaths from small-pox in the State not reported."

The cost of the epidemic to San Francisco, consequent upon the neglect of vaccination which led to it, and the public expense involved to meet the emergency, is estimated by Dr. Herrick to have been nearly $50,000. In addition to this, the steamship companies declare their extra expenses in quarantine and otherwise, during the period of May 1st, 1887, to June 30th, 1888, to amount to about $200,000. "The total loss to the city and to the steamship companies considerably exceeds $300,000." Such epidemics and such expenses are the legitimate fruit of purblind negligence of timely sanitary measures.

Of other preventable diseases in the State generally, taking the years separately, from June 30th, 1886, to June 30th, 1887, deaths reported from diphtheria, 376, and "at least 300 more that were not reported;" croup, 164; scarlet-fever, 60; measles, 34; whooping-cough, 64; diarrhœal diseases, 334; typhoid-fever, 289. Deaths from consumption, 1617; pneumonia, 611; bronchitis, 186. Total deaths reported from all causes, exclusive of 357 still births, 9959. By adding 6000, in default of deficient returns, the Secretary estimates the death-rate at 13.50. On the same basis, the percentage from consumption was 10.7.

From June 30th, 1887, to June 30th, 1888, the number of deaths reported was, from diphtheria, 358; croup, 203; whooping-cough, 42; scarlet-fever, 59; measles, 139; diarrhœal diseases, 416; typhoid-fever, 414; cerebro-spinal fever. 144. Deaths from consumption, 1832; pneumonia, 1039; bronchitis, 262. Total number of deaths reported from all causes, exclusive of 329 still births, 11,993. Pursuing the same course as for the preceding year, adding 6000 as an allowance for deaths not reported, the death-rate is estimated at 14.6. Percentage from consumption, 10.12.

But it is evident from the whole tenor of the report, without detriment to the interest manifested by all the members of the board, and the indefatigable labor of a skilled executive officer, that the deficiency in the returns is so great as to well-nigh neutralize the effort to submit even an approximate exhibit of the ravages of preventable diseases and mortality statistics. The blame rests upon the Legislature for neglecting to pass effective laws for protection against small-pox, an efficient registration law, and for not making needful and timely appropriations for the work of the board, in default of which thousands of lives have been lost and over $300,000 wasted.

For the month of December, 1888, the Secretary's abstract of the reports received from 75 cities and towns, with an aggregate population of 700,600, the number of deaths was 917, "exclusive of those towns reporting *no deaths*, having a population of 10,500, so that actually in a population of 719,100, the mortality gives the exceedingly low percentage of 1.27 per 1000 for the month of December, when the death-rate is expectedly increased everywhere within the temperate zone." Annual rate, 14.55. Deaths from consumption during the month, 137; percentage of total, 14.9, which, it will be observed in this exceptional month upon reliable returns from 75 localities, is much larger than for the estimated returns in the biennial report, though a decrease on the preceding month. From pneumonia 90, against 108 in November. From zymotic diseases: Diphtheria and croup, 56; typhoid-fever, 36; typho-malarial fever, 4; remittent and intermittent fevers, 5; cerebro-spinal fever, 7; diarrhœal diseases, 6; whooping-cough, 4; scarlatina, 3; small-pox (in San Francisco), 2.

San Francisco.—Health Department reports for the fiscal year ending June 30th, 1888: Population, 330,000; deaths, 530 Chinese, 5506 other nationalities. Death-rate, 18.27. Estimating the Chinese population at 30,000, their death-rate was 17.63; of other nationalities, exclusive of Chinese, 300,-000, death-rate was 18.36. Deaths from zymotic diseases during the year: Small-pox, 67; diphtheria and croup, 241; typhoid-fever, 152; scarlatina, 28; cholera infantum, 94; cerebro-spinal meningitis, 64; other zymotic diseases, 242: 888. From consumption, 905—15 per cent of total.

The small-pox epidemic is reported in detail. Forty-five Chinese cases were landed from the steamers. In the city, the Chinese never report cases, and usually the finding of the dead body of some one who had died of the disease was the first intimation of its existence. The cost of the epidemic has already been referred to. More than 80,000 vaccinations were effected, and for the vaccine matter alone, $7526.80 was paid.

In default of a quarantine station—"During the prevalence of small-pox, the steamship companies were obliged to detain the passengers on floating hulks at a great expense to themselves and inconvenience to the passengers. In one instance, several hundreds of Chinese were cooped up for more than a month on a hulk exposed to the ravages of both typhus-fever and small-pox. On another occasion a quarantine ship was wrecked in the bay during a severe gale, the passengers barely escaping with their lives."

A properly equipped quarantine is an urgent necessity. "Certain factories employed in the business of making mattresses, coverlets, and other articles, were found using uncleaned rags for the purpose. The Board of Health at once insisted upon the cleaning and disinfection of these rags before use. A microscopical investigation of these rags was made, the result being that the germs discovered (on being cultivated) were found to be capable of producing infectious diseases."

Each factory was directed to erect and use a steam disinfecting apparatus, on a plan devised by the Health Department.

During the month of December, 1888, the number of deaths was 473. From zymotic diseases, 48; 2 of which were from small-pox. From consumption, 83—17.5 per cent.

Los Angeles, 80,000: 65; from zymotic diseases, 15; consumption, 10.

Oakland, 55,000: 65; from zymotic diseases, 7; consumption, 5.

San Diego, 32,000: 12; from zymotic diseases, 2; consumption, 12.

Sacramento, 30,000: 47; from zymotic diseases, 12; consumption, 4.

CONNECTICUT.—The Secretary of the State Board of Health reports for December, 1888, 950 deaths from 167 towns, comprising a population of 737,276, representing an annual death-rate of 15.4. Deaths under five years of age, 174—18.3 per cent. Deaths from zymotic diseases, 136—14.3 per cent. From consumption, 125—13 per cent.

In New Haven, during the year 1888, the number of deaths from typhoid-fever and diphtheria has been nearly twice that in 1887. There have been 150 more deaths in New Haven during the year 1888 than in the previous year.

FLORIDA.—"*Gainesville*, January 3d, 1889.—That you may have all necessary information relative to the health of Gainesville, Fla., since Dr. Martin concluded his labors here, I will report that during the month of December and up to this time, there has been only one case of yellow-fever. This case occurred just outside the corporate limits in the person of a Mr. York, a carpenter, who had worked, however, daily in the city. He was taken on the 18th (December), and died on the 22d. His case was typical, unmistakable. The two succeeding nights after he was taken were quite cold, ice forming each night, and no other cases have occurred. I feel confident that there will be no other cases now. The same precautions were taken relative to this case that were taken during the existence of the epidemic—bedding burned, house fumigated, family isolated," etc. N. D. Phillips, M.D., to Surgeon-General Hamilton. "In the opinion of this bureau, travel may safely be resumed throughout the State. An inspection service will be maintained, and in case of any appearance of fever, the public will be notified."—*Weekly Abstract of Sanitary Reports, United States Marine-Hospital Service, January 11th*, 1889.

The Governor has called an extra session of the State Legislature for the purpose of establishing a State Board of Health.

Pensacola.—Board of Health report: "Mortality for week ending Saturday, January 19th, 1889. Estimated population, 15,000. Deaths, 5. Death-rate per 1000 *per annum*, 1.73." There is an evident mistake in the decimal point, for, according to our calculation, 5 deaths in seven days in 15,000 is equal to 260.7 for the year, and to an annual death-rate of 17.38 per 1000.

Report for the week ending January 26th, no death. Pensacola appears to be a healthful city, and the Board of Health can well afford to make correct reports.

IOWA.—Monthly *Bulletin* for December reports:

Keokuk.—November.—No deaths from contagious diseases. Total deaths, 14. Death-rate 1000, 0.88.

Dubuque.—October—Membranous croup, 1; whooping-cough. Total deaths, 23. Death-rate, 7.88.

Davenport.—November—Diphtheria, 16; membranous croup, 4; croup, 2. Total deaths, 41. Death-rate, 14.59.

Burlington.—Deaths from diphtheria from November 1st to December 17th, 7. Several deaths from membranous croup.

Des Moines., November—Typhoid-fever, 2. Total deaths, 23.

Fort Madison.—November—Croup, 1. Total deaths, 6. Death-rate, 0.75.

The interest of this report would be greatly increased by giving the latest estimated populations of the several localities, and by uniformly giving the *annual* death-rates.

ILLINOIS.—"It is a matter of record—a fact which I under stand has now passed into the authentic history of epidemics in this country," says Governor Oglesby in his message to the General Assembly, January 9th, 1889, "that the labors of the State Board of Health in this direction resulted in a saving of nearly $3,500,000 to the people of the State in 1881 and 1882, when small-pox was epidemic. Through the preventive and protective measures then established and since enforced, there has been no repetition of that disease in an epidemic form.

"The wise and intelligent policy of the Board on the subject of quarantine has been of great value to the material interests, not only of Illinois, but of the whole Mississippi Valley. While vigilantly guarding against the introduction and spread of the dangerous, contagious, and infectious diseases, it secures the least interference with commerce and travel, and so averts unfounded panics and prevents loss and interruption of business and industry. During the past few months a striking illustration of the value of this policy was afforded by the action of the worthy Secretary of the Board, who refused to sanction any expenditure of money from the public treasury in the maintenance of quarantine restrictions, which his wide and varied experience and scientific knowledge enabled him to pronounce unnecessary for the State. His firmness in this instance alone prevented the loss of thousands of dollars, besides great inconvenience to travellers and vexatious interference with business; and the example thus set materially helped to check the ruinous and needless quarantine enforced in other States.

"In 1883 the Board began a sanitary survey of the State, with the object of preparing it against a threatened invasion of Asiatic cholera. This work, which is still being prosecuted, embraces a house-to-house inspection, which results in abatement of private as well as public nuisances, in the sanitary defects and unhealthy conditions. It is claimed that in consequence of this work the cities, towns, and villages of Illinois have steadily improved in their sanitary conditions, until the State is now one of the healthiest and most favorable to long and vigorous life of any in the Union.

"An important agency in the preservation of health is an abundant supply of pure water. . . . The Secretary of the Board has made the pollution of streams and the character of water supplies the subject of personal study for many years, and an exhaustive investigation, involving hundreds of chemical analyses, microscopic and biologic examinations, and the engineering questions involved, is now being made by the Board under his immediate supervision. . . . There is reason to anticipate from these, in many localities, an abundant supply of pure water, not liable to contamination from sewage or other pollution, and constant at all seasons. If these expectations are realized, not only communities but individuals—farmers, stock raisers, manufacturers, and others—will be largely benefited by this work of the Board.

"A separate and distinct line of duty and responsibility is devolved upon the Board by the Medical Practice Act. During less than the twelve years of its existence, this act has done much to protect the sick and the afflicted from charlatans and quacks; it has driven out of the State most of the ignorant, unqualified, and unprincipled men who were preying upon the miseries of their fellows; and it is not too much to say that it has elevated and ennobled the practice of medicine, both in the State and throughout the country. The methods of medical education have been improved as a consequence, and the standard of attainments required of the physician who is to deal with the weighty questions of health and disease, and of life and death, is being steadily raised.

"The Illinois State Board of Health is now regarded as the pioneer in this work, and it is quoted as authority both in this country and abroad. Since the passage of the amended act —in force July 1st, 1887—the Board has refused licenses to itinerant vendors of nostrums, with show accompaniments; the amount of these licenses would aggregate over $20,000, but the sum which the itinerants would fleece from the credulous would figure up hundreds of thousands a year.

"That the Board has been prudent and economical in the expenditure of appropriations subject to its order, is manifest from the fact that the contingent sum of $40,000 for 1885-86 was conveyed back into the Treasury untouched. Of a similar amount appropriated for 1887-88, only a small amount has been expended. I recommend the usual appropriations to sustain the Board and continue its usefulness to the State; and have no doubt that it will be wise to continue the usual contingent appropriation."

Chicago, 800,000: Reports 1166 deaths during December, of which 488 were under five years of age. Annual death-rate, 17.49 per 1000. From zymotic diseases, 250, and from consumption, 104.

MAINE.—The Secretary of the State Board has issued a circular urging the necessity of isolating infectious diseases, and the importance of reporting and prompt action in first cases. That, "Every house in which a case of diphtheria or scarlet-fever exists should be placarded, the teachers of the schools in the neighborhood should be notified, and children from infected houses should strictly be excluded from school, Sabbath school, churches, and all places where they would be liable to infect other persons."

MARYLAND.—*Baltimore*, 431,879: Reports 780 deaths during the five weeks ending December 29th, of which 272 were under five years of age. Annual death-rate, 18.77 per 1000. From zymotic diseases, 84, and from consumption, 113.

MASSACHUSETTS.—The Forty-sixth Report to the Legislature relating to the Registration and Return of Births, Marriages, and Deaths in the Commonwealth, together with the reports relating to the returns of libels for divorce, and to the returns of deaths investigated by the Medical Examiners for the year 1887, is a volume of 440 pages, chiefly statistical.

There were during the year: Marriages, 19,533; births, 53,174; deaths, 40,763. Estimating the population at 2,010,-388, on the ratio of increase from the State census of 1885, the rates per 1000 of population for the year 1887, and the average for periods of five years preceding, and for the year 1888, were as follows:

1887:	marriages,	9.72;	births,	26.45;	deaths,	20.28
1885:	"	9.03;	"	25.01;	"	19.08
1880:	"	8.00;	"	24.08;	"	19.02
1875:	"	9.09;	"	27.06;	"	20.08
1870:	"	10.05;	"	26.01;	"	18.02
*1865:	"	4.03;	"	25.04;	"	20.07
1860:	"	9.08;	"	29.05;	"	17.09
1855:	"	11.07;	"	28.08;	"	18.07
1888:	"	9.12;	"	25.69;	"	18.85

Of the causes of death, 19.07 per cent were caused by zymotic diseases; in 1886, 18.05; in 1885, 19.00; in 1878, 25.02,

* Including the years of the Civil War.

and for ten years previous, 21.05. There was, also, for the same period a decrease in the percentage of deaths from constitutional disease from 25.02 to 22.06. Deaths from local diseases increased from 34.07 to 42.27 per cent. Consumption caused 5871 deaths—14.40 per cent of all deaths during the year, and at the rate of 1.02 per 1000 of the living, in the decade 1878–87, a decrease from 1.39 in the decade 1868–77.

The Medical Examiners report 1556 deaths investigated, of which 52 were from homicide, 173 suicide, 748 accident or negligence.

Divorces, 796: 1 to 24 marriages; an increase from an average of 1 in 32.07 in the ten years, 1868–77, to 1 in 27.07 in the ten years, 1878–87.

Boston, 415,000: Reports 781 deaths during December, of which 233 were under five years of age. Annual death-rate, 22.05 per 1000.

There were 118 deaths from zymotic diseases, and 135 from consumption. For the year 1888 there were 10,197 deaths—3599 under five years of age. Annual death-rate, 24.57 per 1000.

There were 1841 deaths from zymotic diseases, and 1464 from consumption.

MICHIGAN.—The Secretary reports that, for the month of December, 1888, compared with the preceding month, pneumonia and consumption of lungs increased, and that typho-malarial fever decreased in prevalence.

Compared with the preceding month, the temperature in the month of December, 1888, was lower, the absolute humidity was less, the relative humidity and the day ozone and the night ozone were more.

Compared with the average for the month of December in the nine years, 1879–87, intermittent-fever, consumption of lungs, inflammation of kidney, tonsillitis, and remittent-fever were less prevalent in December, 1888.

For the month of December, 1888, compared with the average of corresponding months in the nine years, 1879–87, the temperature was higher, the absolute humidity was more, the relative humidity and the day and the night ozone were less.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of December, 1888, at fifty-two places, scarlet-fever at fifty-seven places, typhoid-fever at thirty places, measles at ten places, and small-pox at six places.

Reports from all sources show diphtheria reported at twenty-six places more, scarlet-fever at sixteen places more, typhoid-fever at seven places more, measles at four places more, and small-pox at one place less in December, 1888, than in the preceding month.

Detroit, 230,000: Reports 284 deaths for December, of which 71 were under five years of age. Annual death-rate, 14.53 per 1000. From zymotic causes, 61, and from consumption, 23.

MINNESOTA.—The Secretary reports the distribution and mortality of specified diseases in Minnesota, for the months of November and December, 1888:

Diphtheria, cases, 223; deaths, 56; scarlatina, cases, 52; deaths, 6.

Diseases of animals: Cases of glanders remaining isolated or not accounted for, 31; reported during the months, 8; killed, 10; released, 14; isolated, 4. Remaining January 1st, 1889, isolated or not accounted for, 15. Most of these are cases exposed, and isolated for further observation.

"The death-rate in Minnesota has steadily decreased during the last five years. In 1883 the death-rate per 1000 of the population was 11.46; in 1886, the rate was 11.06; and in 1887, 9.9. Very few understand what so apparently trivial a reduction as 1.06 in 1000, or 0.106 per cent, means here. It represents the saving of human lives between 1886 and 1887, and it means that 1438 men, women, and children escaped death who, had the mortality rate of 1886 continued in 1887, would have died."

MISSOURI.—At a conference of local health officials, held by invitation of the State Board of Health at St. Louis, December 4th, 1888, Dr. George Homan, Secretary, after explaining the urgent necessity for such action, submitted a proposed bill by the State Board of Health for an act to create county and other local boards of health, defining their duties and powers, and providing for the compensation of their members and officers. The objects of the proposed bill were briefly stated to be "to make quarantine regulations more simple and effective, to facilitate and encourage the registration of births and deaths and other vital statistics, by providing compensation for the county officials charged with such duty, and requiring the State Board to make biennial reports to the Legislature instead of annually, as now, to the Governor, the executive to have the right to call for special reports by the Board on public health matters at any time." The proposition was approved and recommended to the Legislature for enactment.

As an incentive to such legislative action as the Conference recommended, Dr. Homan submitted :

A Graduated List Showing the Total Amounts of Appropriated Revenue Available in the Year 1888 *for General and Special Public Health Uses and Prevention of Epidemics by the Various State Boards of Health in the United States.*

The plus mark (+) affixed to the totals appropriated of certain of the States indicates additional sources of revenue or advantage, as epidemic funds without definite limit, fees from different sources, free printing, etc. Arranged by the Secretary of the State Board of Health of Missouri.

Massachusetts, $111,300 ; Texas, $61,000 ; Illinois, $49,000+ ; Mississippi, $46,550 ; Minnesota, $29,000 ; New York, $25,000 ; New Jersey, $21,500+ ; Wisconsin, $20,500 ; Michigan, $16,145+ ; Alabama, $13,000 ; Maryland, $13,000 ; California, $12,500 ; Connecticut, $10,000+ ; New Hampshire, $8500+ ; North Carolina, $5500+ ; Indiana, $5000+ ; Iowa, $5000+ ; Louisiana, $5000+ ; Pennsylvania, $5000+ ; Maine, $5000 ; Kansas, $4500 ; Ohio, $4000 ; South Carolina, $4000 ; Tennessee, $3000+ ; Rhode Island, $2700+ ; Kentucky, $2500+ ; Vermont, $2500 ; West Virginia, $2000 ; Delaware, $350.

The communication was ordered made a part of the proceedings ; and the following resolution adopted :

Resolved, That we hereby endorse, and by this action would extend our thanks to our very efficient State Board of Health, who have, without remuneration from the State, and at great expense to themselves individually, attended to all the duties contemplated in the execution of our State law governing the Board of Health.

St. Louis, 420,000: Reports for December 648 deaths, of which 240 were under five years of age. Annual death-rate, 17.67 per 1000. From zymotic diseases there were 162 deaths, and from consumption, 72.

NEW HAMPSHIRE.—Seventh Annual Report of the State Board of Health, for the fiscal year ending April 30th, 1888, pp. 326. The increased demand for the services of the Board during the year is very properly interpreted in the opening remarks of the report, to mean a better appreciation of its work by the people, an intelligent recognition of the value of practical sanitation in the promotion of their best interests.

Sanitation at summer resorts, drainage and sewerage, public water supplies, the condition of almshouses, school-houses, notification and restriction of infectious and contagious diseases have been, as in previous years, subjects of primary importance in measures for the protection of the health of the people.

The total number of deaths reported for the year 1887, exclusive of still and premature births, was 6250. The death-rate per 1000, based upon the last census, was 18.01. Over one fifth of all the decedents was under five years of age; 776 —12.41 per cent—were caused by consumption.

In a special paper on the "Extent and Distribution of Consumption in New Hampshire," by Irving A. Watson, Secretary of the Board, it is shown that the danger of contracting this disease is about equal at all periods of life, and not, according to the popular idea, shared to some extent by the medical profession. The apparent greater susceptibility during a particular period of life, between twenty and thirty years of age, is chiefly due to the fact that there are more persons living at that period.

"The average death-rate from consumption for the years 1885, 1886, and 1887, is 12.86 per cent of the total mortality of the State. In Massachusetts, for the ten years ending 1886, deaths from consumption averaged 16.10 per cent of the total mortality; and in Rhode Island, for a period of twenty-five years ending 1884, 16.30 per cent."

Of zymotic diseases, the number of deaths from diphtheria was 175, against 156 in the previous year, 78 in 1883, 110 in 1884, and 109 in 1883; 84 deaths were returned from croup. Typhoid-fever, 134, including 8 reported "fever," 7 bilious-fever, and 1 typho-malarial fever; and yet the lowest annual mortality from this cause since a registration report has been published, the next being in 1885, when 136 deaths were reported; in 1886 there were 193. A fuller and more minute report of the vital statistics of the State is deferred to the registration report, to be made hereafter.

NEW JERSEY.—*Hudson County*, 270,232: Reports 606 deaths for December, of which 270 were under five years of age. Annual death-rate, 26.9 per 1000. From zymotic diseases there were 131 deaths, and from consumption, 63.

Newark, 178,033: Reports for December 292 deaths, of which 97 were under five years of age. Annual death-rate, 19.68 per 1000. There were 39 deaths from zymotic diseases, and 34 from consumption.

Paterson, 80,000: Reports 121 deaths during December, of which 39 were under five years of age. Annual death-rate, 18.1 per 1000. There were 16 deaths from zymotic diseases, and 17 from consumption.

NEW YORK.—Official *Bulletin* of the Secretary reports 8369 deaths during the month of December (7886 in December, 1887), of which 7050 were reported from a population of 3,862,-000, including all the cities and larger villages, giving a death-rate of 21.90 per 1000 annually. The infant death-rate is lower than in December, 1887. Zymotic diseases caused 17.90 per cent of the total mortality (19.00 in December, 1888, and 17.48 in November, 1888). There is an increase in the prevalence of scarlet-fever and diphtheria. Small-pox is reported from Lyons, Rome, Newark, Middlebury, Wyoming County, Rochester, Malone, and Weyland, Steuben County; it also exists, as previously reported, at Troy, Syracuse, and Frankfort. Consumption caused 11.67 per cent of all deaths, and 17.31 per cent of deaths above five years of age. From acute respiratory diseases, 16.63 per cent of all deaths occurred.

Severally, the populations and death-rates are as follows:

Maritime District.—New York City, 1,526,081, 25.17; Brooklyn, 757,755, 22.93; Gravesend, 5000, 24.00; New Utrecht, 4742, 27.80; Long Island City, 21,000, 25.14; Newtown, 10,000, 13.20; Oyster Bay, 12,000, 18.00; Hempstead, 18,000, 12.00; North Hempstead, 8000, 12.00; Huntington, 8100, 10.36; Jamaica, 10,089, 19.00; Southold, 7267, 14.80; Sag Harbor, 3000, 8.00; New Brighton, 15,000, 15.20; Edgewater, 12,000, 17.00; Northfield, 7014, 29.14; Westfield, 7000, 25.85; Yonkers, 30,000, 20.40; Westchester, 6900, 20.57; Sing Sing, 6500, 14.77; New Rochelle, 5500, 17.45; Port Chester, 4000, 3.00.

Hudson Valley District.—Albany, 102,909, 21.11; Cohoes, 20,000, 19.20; Troy, 65,000, 24.74; West Troy, 13,000, 24.00; Hoosick Falls, 6000, 10.00; Lansingburg, 10,000, 20.70; Green Island, 5000, 26.40; Greenbush, 8000, 19.50; Coxsackie, 4000, 12.00; Catskill, 4500, 21.33; Hudson, 10,000, 12.00; Kingston, 21,000, 13.14; Ellenville, 3000, 24.00; Marbletown, 4000, 30.00; Esopus, 4736, 8.45; Saugerties, 4000, 9.00; Poughkeepsie, 20,200, 23.36; Fishkill, 10,732, ——; Wappinger Falls, 5000, 14.40; Newburg, 20,000, 18.00; Port Jervis, 9500, 15.38; Middletown, 10,000, 27.60; Goshen, 4387, 19.14; Ramapo, 5000, 24.60; Haverstraw, 7000, 15.43.

Adirondack and Northern District.—Greenwich, 3861, 6.20; Argyle, 3700, 6.50; Salem, 3500, 24.00; Fort Ann, 4267, 8.40; Fort Edward, 4880, 7.35; Glens Falls, 10,000, 14.40; Crown Point, 4287, ——; Malone, 9000, 15.67; Potsdam, 4000, 9.00; Ogdensburg, 11,000, 27.27; Gouverneur, 5500, 17.45; Plattsburg, 7000, ——; Watertown, 12,200, 19.67; Lowville, 3188, ——; Clayton, 4314, 13.00; Ellisburgh, 4811, 22.45.

Mohawk Valley District.—Schenectady, 20,000, 12.60; Schoharie, 3350, ——; Cobleskill, 3371, 14.28; Middleburgh, 8376, ——; Amsterdam, 14,000, 10.80; Johnstown, 6000, 16.00; Gloversville, 10,000, 16.80; Little Falls, 7200, 20.00; Herkimer, 3000, 16.00; Ilion, 4200, 8.57; Utica, 43,000, 17.86; Rome, 12,045, 10.00; Boonville, 4000, 12.00; Camden, 3400, 24.70; Waterford, 5400, 28.89; Ballston Spa, 3200, 11.23; Saratoga Springs, 10,000, 24.00.

Southern Tier District.—Binghamton, 30,000, 14.40; Owego, 6000, 12.00; Candor, 4323, 5.50; Waverly, 3000, 20.00; Hornellsville, 10,000, ——; Elmira, 25,000, 18.00; Horseheads, 3500, 27.42; Bath, 3500, 17.14; Corning, 8000, 12.00; Olean, 8000, 15.00; Salamanca, 6000, 4.00; Jamestown, 14,000, 11.20; Westfield, 3000, 16.00.

East Central District.—Walton, 3540, 10.20; Delhi, 3000, 8.00; Cooperstown, 3000, 12.00; Oneonta, 7000, 15.43; Worcester, 3000, 4.00; Cazenovia, 4363, 8.22; Brookfield, 3685, 13.00; Hamilton, 3912, 15.38; Baldwinsville, 3000, 4.00; Skaneateles, 4866, ——; Syracuse, 80,000, 16.80; Cortland, 9000, 14.66; Homer, 3000, 32.00.

West Central District.—Auburn, 26,000, 14.30; Ithaca, 10,000, 15.60; Groton, 3450, 17.14; Waterloo, 4500, 21.33; Hector, 5000, 12.00; Manchester, 4000, 6.00; Phelps, 7000, ——; Canandaigua, 6300, 15.40; Geneva, 6000, 27.00; Penn Yan, 4500, 18.67; Dansville, 3700, ——; Batavia, 7000, ——.

Lake Ontario and Western District.—Oswego, 24,000, 14.00; Richland, 4000, 18.00; Fulton, 4000, 12.00; Clyde, 3000, 18.00; Lyons, 6000, 10.00; Newark, 3500, 10.30; Palmyra, 4800, 6.00; Rochester, 110,000, 20.72.; Brockport, 4500, ——; Medina, 4000, 24.00; Albion, 5000, 28.80; Buffalo, 230,000, 16.22; Tonawanda, 4900, 16.80; Amherst, 4578, ——; Lockport, 15,000, ——.

NORTH CAROLINA.—Official summary of the mortality returns for twelve towns, giving a total population of ——, for the month of November, 1888: There was 1 death from typhoid-fever; 2 from malarial-fever; 8 from diphtheria; 6 from pneumonia; 14 from consumption; 5 from heart disease; 8 from brain disease; 10 from diarrhœal disease; 2 from accident; 42 from all other diseases, and 2 from suicide.

The mortality rates of the chief towns were: Of Durham, white, 12.00, colored, 24.18; Charlotte, white, 12.1, colored, 24.0: 15.1. Fayetteville, white, 7.02, colored, 24.0: 12.1; Goldsboro', white, 7.02, colored, 12.8: 12.1. New Berne, white, 12.0, colored, 24.0: 18.0. Raleigh, white, 7.2, colored, 12.8: 12.1. Washington, white, 12.6, colored, 8.6. Wilmington, white, 7.2, colored, 13.0: 11.0. Henderson, white, ——, colored, 24.3: 12.1. Oxford, white, 12.6, colored, 6.0: 9.6.

OHIO.—Official *Monthly Record* of the Secretary reports 1111 deaths during the month of December, representing an annual death-rate per 1000 population of 47 cities and towns of 13.78. Deaths under five years of age, 332. From zymotic diseases, 196—chiefly croup and diphtheria, 50 ; typhoid-fever, 35 ; scarlatina, 5 ; whooping-cough, 10. Deaths from consumption, 139. Severally, the populations and death-rates were as follows :

Akron, 30,000, 6.40 ; Alliance, 7000, 18.85 ; Ashtabula, 6500, 24.00 ; Ashley, 800, 45.00 ; Bellaire, 12,000, 13.00 ; Bellevue, 3500, 13.71 ; Bloomingburg, 800, 45.00 ; Canton, 25,000, 13.19 ; Chagrin Falls, 1400, 17.13 ; Chillicothe, 14,000, 6.00 ; Cincinnati, 325,000, 16.06 ; Cleveland, 225,000, 11.57 ; Clyde, 3000, 8.00 ; Columbus, 101,000, 10.93 ; Conneaut, 1500, 24.00 ; Cuyahoga Falls, 2800, 17.14 ; Dayton, 52,000, 13.20 ; Defiance, 7000, 17.14 ; Delaware, 9000, 17.33 ; East Liverpool, 10,000, 26.40 ; East Palestine, 1600, 30.00 ; Forest, 1300, 18.46 ; Galion, 6000, 22.00 ; Galipolis, 5000, 31.20 ; Hamilton, 20,000, 9.00 ; Hartwell, 2000, 18.00 ; Huron, 1100, 21.61 ; Kent, 3750, 12.80 ; Logan, 3700, 13.00 ; Mansfield, 15,000, 4.00 ; Marion, 8000, 10.50 ; Middletown, 7000, 18.85 ; Minster, 1500, 10.00 ; Mt. Sterling, 950, 50.52 ; Mt. Vernon, 6000, 12.00 ; Monroeville, 1500, 16.00 ; Nelsonville, 5000, 9.60 ; New Straitsville, 3000, 12.00 ; North Amherst, 1600, 22.50 ; Oberlin, 4000, 6.00 ; Oxford, 2000, 30.00 ; Piqua, 10,000, 18.00 ; Plymouth, 1500, 24.00 ; Portsmouth, 14,000, 11.13 ; Ravenna, 4000, 9.00 ; St. Mary's, 2500, 24.00 ; Shawnee, 4000, 9.00 ; Shelby, 2500, 9.60 ; Springboro', 500, 72.00 ; Toledo, 80,000, 11.70 ; Urbana, 8000, 12.00 ; Versailles, 1900, 15.17 ; Wadsworth, 2500, 24.00 ; Washington Court-House, 5200, 18.46 ; Wapakoneta, 3300, 10.91 ; Warren, 8000, 3.00 ; Winchester, 1000, 84.00 ; Westminster, 1000, 24.00 ; Wooster, 8500, 9.88 ; Xenia, 10,000, 10.80 ; Youngstown, 24,300, 14.81.

Cincinnati.—Twenty-first Annual Report of the Health Department, for the year ending December 31st, 1887 : The late presentation is due to the death of the late registrar of vital statistics, after a long-continued illness, and consequent accumulation of work which devolved upon his successor. The number of deaths recorded for the year was 6490, an increase of 320 over the previous year. Based on an estimated population of 325,000, the death-rate was 19.97; 883, or 54.74 per cent, of the decedents were of children under five years of age, 1613, 24.23 per cent, were caused by zymotic diseases, and 817, 12.59 per cent, by consumption; 494 were caused by pneumonia, and 243 by bronchitis.

Of the zymotic diseases, there were from typhoid-fever, 403 deaths, just one less than twice the mortality from the same cause of any preceding year on record; from diarrhœal diseases, 535, 99 more than during the previous year. It is interesting to observe in connection with this excessive prevalence of typhoid-fever and other intestinal diseases, that an analysis of the drinking water at about the time of their greatest prevalence showed, in samples of one hundred thousand parts by weight, taken from the localities designated, the following results:

Stage of River, 36 Inches.—Locality.	Ammonia.		Residues Dried at 212° F.			
	Free Ammonia.	Albuminoid Ammonia.	Inorganic Solids.	Organic and Volatile.	Total Solids.	Chlorine.
Pumping-works	0.0128	0.0097	9.2	7.5	16.7	1.85
Eden Park Reservoir	0.018	0.0084	10.7	6.1	16.8	1.76
Ohio River, three miles above the mouth of the Little Miami River	0 0054	0.0074	10.3	5.4	15.7	1.70
Sewage	0.7200	1.1150	121.4	82.2	203.6	8.30

"The sewage given in the table was taken because of its close proximity to the intake. It is a surface drain of some size, and serves as a receptacle for all manner of filth from several tenement-houses located along its course. A portion of its contents cannot fail to enter the intake whenever the river has a depth of less than fourteen feet—a state of affairs generally occurring during four or five months of each year.

"The pipes leading out into the river have been blocked up during the last fifteen or twenty years, it having been found impossible to keep them open on account of 'drift.' The shorewater coming from the densely-settled district above, charged with sewage, is taken directly in through the arch at the river wall at the pumping-house and forced up into the reservoir. Many drains and four sewers, with an unknown number of water-closets emptying into them, are located above the water-works.

"C. R. HOLMES, M.D.

"KARL LANGENBECK, *Analytical Chemist.*"

After a general review of the deficiencies, in concluding his report, the health officer urges the following important subjects as eminently necessary for the promotion of the health of the city :

"Improvement in the water-supply ; extension of the sewerage system ; compulsory connection with sewers when built, and abandonment of the present system of vaults ; incineration and more frequent removal of garbage, and more rigid enforcement of the ordinances against the mixing of garbage and ashes ; removal of all insanitary conditions which are a standing invitation to disease, and the rigid enforcement of all laws and regulations in regard to sale of adulterated or unsound articles of food."

PENNSYLVANIA.—*Philadelphia* Bureau of Health reports for the year ending December 31st, 1887 : Births, 24,113, an increase of 892 over the preceding year ; marriages, 6355, an increase of 140 ; deaths (exclusive of 1507 still and premature births), 21,719, an increase of 1714—9086 were of children under five years of age. Death-rate, on estimated population of 993,801, 21.85, and the exact average rate for twenty-seven years previous. The highest and the lowest rates, respectively, were (in 1872), 26.19 and (in 1879) 17.17 ; 2800, 12.89 per cent from all causes, were caused by consumption, a decrease of 34 from the previous year, but 480 more than the annual average for the preceding twenty-six years. But there were besides 63 deaths from hemorrhage of the lungs, and 37 from consumption of the bowels, larynx, and throat.

Three thousand five hundred and seventy-two were caused by zymotic diseases, of which the chief were : diarrhœal diseases, 1187 ; typhoid-fever, 621 ; croup, 442 ; diphtheria, 416 ; measles, 358 ; scarlet-fever, 159 ; whooping-cough, 130 ; septicæmia, 69 ; erysipelas, 59 ; cerebro-spinal fever, 45.

Total deaths from typhoid-fever for twenty-seven years, 1861 to 1887, inclusive, 13,657, an annual average of 505.8. The largest number in any one year was 773, in 1865 ; the smallest in 1879, 344. The number for 1887 was three greater only than in 1886, and one less only than the average for the five years preceding. Estimated by the usual rate of mortality, the average number of cases of typhoid-fever in Philadelphia, annually, for several years, is about 8000.

Reports for five weeks ending December 29th : Population, 1,016,758 ; the number of deaths was 1665, of which 553 were under five years of age. Annual death-rate per 1000, 17.2. From zymotic diseases, 196, and from consumption, 251.

Pittsburgh, 230,000 : Reports for three weeks ending December 29th, 194 deaths, of which 75 were under five years of age. Annual death-rate, 15.0 per 1000. From zymotic diseases, 26, and from consumption, 14.

RHODE ISLAND.—*Newport*, 22,000 : Reports for December 22 deaths—4 under five years of age. Annual death-rate, 12.0 per 1000. From zymotic diseases there was but one death, and from consumption none.

During the year 1888 there were 315 deaths—99 under five years of age. Annual death-rate per 1000, 14.31.

Deaths from zymotic diseases, 68, and from consumption, 25.

TEXAS.—Report of Texas Quarantine for 1887–88, by R. Rutherford, M.D., State Health Officer, shows a justifiable pride in the result of his constant vigilance and prompt action against all the avenues of yellow-fever, considering the local and climatic conditions of numerous harbors of that State in commercial relations with Vera Cruz, Tampico, and other places where yellow-fever is wont to prevail, and the special danger of the recent epidemic in Florida. To the *few* people in Texas who are disposed to condemn the whole system of quarantine as a useless expenditure, he addresses the question whether, " from 1837 to 1867, there was ever two years consecutive in the cities contiguous to our coast between these dates that yellow-fever was not epidemic in some one of them ; and further, that since 1878 no epidemic of any serious nature has occurred, they are not indebted to the quarantine system of the State for the immunity. Even during those years when fever did obtain a foothold it was due and directly traceable to negligence of the rational rules governing this source of protection.

" With the yellow-fever epidemic still in a number of towns in Florida, and undoubted past evidence that it will hibernate there, demands of the Legislature a more liberal appropriation to meet exigencies almost beyond doubt foreshadowed."

WISCONSIN.—*Milwaukee*, 195,000: Reports 262 deaths in December, of which 116 were under five years of age. Annual death rate, 16.1 per 1000. From zymotic diseases there were 57 deaths, and from consumption, 19.

CANADA.—*Montreal*, 189,051: Deaths reported for the month of December, 461; under five years of age, 240; from zymotic diseases, 147, of which 121 were from diphtheria and croup. Deaths from consumption, 37—8.03 per cent of total. Death-rate, 28.5.

CUBA.—*Havana*, 200,000: Deaths reported for the month of December 566, under five years of age, 133. From consumption, 129—22.8 per cent of total mortality. From *yellow-fever*, 26; other fevers, 22. Death-rate, 33.3.

NAVAL STATISTICS.—The Chief of the Bureau of Medicine and Surgery reports for 1887: Main strength of the navy, including officers and men on duty for the year 1887, officers, 1368; enlisted men, 8250: 9618.

Total number of cases of disease under treatment during the year 1887, in naval hospitals, 1450; at navy-yards and shore stations, 2111; on board vessels afloat and receiving ships, 7912: 11,473.

Total number of deaths from all causes during the year 1887, in naval hospitals, 54; at navy-yards and stations, 11; on board vessels afloat and receiving ships, 34: 99.

Death-rate per 1000 for the year 1887, 10.29. Of the causes of death, the number by phthisis pneumonica, was unusually large: 13 in hospitals, 3 in vessels, and 1 at navy station—17.17 of the deaths from all causes.

Excerpt from the special medical reports is deferred till next number.

INFECTIOUS DISEASES ABROAD DURING THE FOURTH QUARTER, 1888.

By returns at hand from abroad, the number of deaths reported from infectious diseases during the *three months* ending December 31st, 1888, was from:

Small-pox in London, 2; Sheffield, 1; Bradford, 1; Hull, 3; Prague, 168; Paris, 44; Havre, 12; Nancy, 1; Amiens, 85; Trieste, 76; Marseilles, 31; Bordeaux, 1; Rouen, 2; Vienna, 4; Nice, 1; Turin, 5; Lyons, 2; St. Petersburg, 8; Warsaw, 97; Cracow, 1; Bucharest, 55; Odessa, 3; Pesth, 1; Jamappes, 8; Quaregnon, 8; Dixmude, 7; Bruges, 1; Wasmes, 1; Hornu, 1; Anvers, 2; Gand, 3; Liege, 1; Louvain, 1; Ostende, 20; Roulers, 2.

Measles in London, 1488; Liverpool, 290; Glasgow, 40; Birmingham, 53; Manchester, 88; Dublin, 26; Leeds, 152; Sheffield, 38; Edinburgh, 0; Bradford, 10; Belfast, 0; Bristol, 32; Hull, 0; Newcastle, 0; Amsterdam, 76; Rotterdam, 0; Paris, 288; Lyons, 2; Marseilles, 26; Hague, 14; Bordeaux, 6; Saint Étienne, 8; Havre, 4; Rouen, 2; Rheims, 0; Nancy, 3; Amiens, 2; Nice, 1; Berlin, 109; Hamburg, 15; Munich, 48; Dresden, 7; Leipzig, 3; Breslau, 8; Koenigsberg, 1; Cologne, 46; Hanover, 1; Magdeburg, 36; Bremen, 9; Frankfort, 3; Düsseldorf, 31; Stuttgart, 28; Nuremberg, 1; Strasburg, 1; Dantzig, 5; Altona, 2; Chemnitz, 5; Mayence, 5; Metz, 1; Bale, 1; Geneva, 1; Vienna, 33; Pesth, 3; Prague, 48; Helsingfors, 3; Copenhagen, 2; Christiania, 1; St. Petersburg, 26; Odessa, 15; Warsaw, 15; Turin, 9; Bucharest, 16; Brussels, 87; Anvers, 67; Gand, 6; Liege, 1; Jamappes, 26; Bruges, 1; Ostend, 1; Roulers, 37; Tournay, 3; Lierre, 2; Wetteren, 3; Ledeberg, 1; Ecloo, 9; Blankenberg, 3; Hornu, 2; Ninove, 18; Kockelberg, 1; Borgerhout, 6; Mons, 1.

Scarlet-fever in London, 321; Liverpool, 76; Glasgow, 63; Birmingham, 11; Manchester, 50; Dublin, 18; Leeds, 30; Sheffield, 55; Edinburgh, 3; Bradford, 6; Belfast, 9; Bristol, 9; Hull, 8; Newcastle, 7; Amsterdam, 4; Paris, 26; Lyons, 5; Marseilles, 2; Nantes, 3; Bordeaux, 4; Saint Étienne, 1; Havre, 3; Nancy, 2; Amiens, 2; Berlin, 52; Hamburg, 29; Breslau, 22; Munich, 37; Dresden, 7; Leipzig, 3; Magdeburg, 16; Frankfort, 6; Koenigsberg, 43; Hanover, 1; Dusseldorf, 1; Nuremberg, 2; Bremen, 5; Chemnitz, 5; Dantzig, 74; Stuttgart, 6; Strasburg, 3; Elberfeld, 1; Altona, 2; Mayence, 9; Bale, 3; Metz, 14; Geneva, 1; Vienna, 50; Zurich, 1; Pesth, 24; Prague, 30; Trieste, 1; Debreczin, 2; Cracow, 20; Copenhagen, 37;

Stockholm, 41 ; Christiania, 8 ; St. Petersburg, 155 ; Odessa, 43 ; Warsaw, 213 ; Bucharest, 114 ; Jassy, 47 ; Brussels, 2 ; Anvers, 3 ; Bruges, 1 ; Tournay, 3 ; Turin, 4 ; Malines, 2 ; Ostend, 2 ; Hornu, 4.

Fevers.—Typhus and Typhoid in London, 193 ; Liverpool, 46 ; Glasgow, 26 ; Birmingham, 14 ; Manchester, 46 ; Dublin, 74 ; Leeds, 13 ; Sheffield, 19 ; Edinburgh, 9 ; Bradford, 12 ; Belfast, 44 ; Bristol, 10 ; Hull, 7 ; Newcastle, 9 ; Amsterdam, 20 ; Rotterdam, 2 ; Paris, 185 ; Lyons, 27 ; Marseilles, 89 ; Bordeaux, 40 ; Nantes, 20 ; Saint Étienne, 10 ; Havre, 82 ; Rouen, 24 ; Rheims, 7 ; Nancy, 5 ; Amiens, 10 ; Nice, 57 ; Berlin, 47 ; Hamburg, 54 ; Breslau, 9 ; Munich, 6 ; Dresden, 6 ; Leipzig, 6 ; Cologne, 9 ; Magdeburg, 7 ; Frankfort, 4 ; Koenigsberg, 29 ; Hanover, 3 ; Düsseldorf, 6 ; Nuremberg, 4 ; Bremen, 44 ; Chemnitz, 8 ; Dantzig, 7 ; Stuttgart, 4 ; Strasburg, 4 ; Elberfeld, 3 ; Altona, 10 ; Barmen, 1 ; Aix-la-Chapelle, 1 ; Berne, 5 ; Lausanne, 1 ; Mayence, 3 ; Bale, 2 ; Vienna, 35 ; Pesth, 80 ; Prague, 17 ; Trieste, 2 ; Debreczin, 12 ; Presburg, 6 ; Copenhagen, 12 ; Stockholm, 8 ; Christiania, 2 ; Helsingfors, 3 ; Warsaw, 30 ; St. Petersburg, 135 ; Cracow, 16 ; Odessa, 32 ; Turin, 22 ; Venice, 8 ; Bucharest, 62 ; Jassy, 7 ; Brussels, 22 ; Anvers, 14 ; Gand, 7 ; Liege, 11 ; Bruges, 3 ; Malines, 4 ; Verviers, 3 ; Louvain, 9 ; Tournay, 1 ; Seraing, 1 ; Bergerhout, 1 ; Ostend, 3 ; Mons, 3 ; Jumet, 2 ; Alost, 5 ; Charleroi, 1 ; Lokeren, 1 ; Gilly, 4 ; Turnhout, 1 ; Ypres, 2 ; Marchiennes au Pont, 1 ; Wasmes, 1 ; Boom, 1 ; Grammont, 4 ; Vilvorde, 2 ; Morlanwels, 1 ; Audenarde, 2.

Diphtheria and Croup in London, 595 ; Liverpool, 16 ; Glasgow, 108 ; Birmingham, 12 ; Manchester, 66 ; Dublin, 26 ; Leeds, 1 ; Sheffield, 5 ; Edinburgh, 31 ; Bradford, 2 ; Belfast, 12 ; Bristol, 5 ; Hull, 1 ; Newcastle, 13 ; Amsterdam, 66 ; Rotterdam, 8 ; Hague, 5 ; Paris, 397 ; Lyons, 31 ; Marseilles, 113 ; Bordeaux, 47 ; Nantes, 5 ; Saint Étienne, 15 ; Havre, 17 ; Rouen, 9 ; Rheims, 15; Nancy, 11 ; Amiens, 14 ; Nice, 29 ; Berlin, 374 ; Hamburg, 161 ; Breslau, 193 ; Munich, 98 ; Dresden, 105 ; Leipzig, 49 ; Cologne, 30 ; Magdeburg, 30 ; Frankfort, 41 ; Koenigsberg, 42 ; Hanover, 138 ; Düsseldorf, 21 ; Nuremberg, 40 ; Bremen, 10 ; Chemnitz, 27 ; Dantzig, 40 ; Stuttgart, 18 ; Strasburg, 22 ; Elberfeld, 26 ; Altona, 20 ; Barmen, 14 ; Aix-la-Chapelle, 6 ; Mayence, 7 ; Metz, 25 ;

Bale, 6; Lausanne, 5; Berne, 3; Vienna, 185; Pesth, 134; Prague, 146; Trieste, 29; Debreczin, 16; Presburg, 16; Copenhagen, 25; Stockholm, 40; Christiania, 92; Helsingfors, 5; St. Petersburg, 140; Cracow, 24; Odessa, 36; Warsaw, 151; Turin, 45; Bucharest, 23; Jassy, 18; Brussels, 27; Anvers, 19; Gand, 10; Liege, 13; Bruges, 11; Malines, 7; Verviers, 1; Tournay, 11; Bergerhout, 6; Ostend, 22; Mons, 1; Alost, 14; Roulers, 2; Jumet, 2; Quaregnon, 1; Lierre, 3; Turnhout, 21; Marchiennes au Pont, 1; Hasselt, 6; Boom, 16; Wasmes, 1; Uccle, 3; Ledeberg, 3; Jamappes, 1; Wetteren, 10; Grammont, 9; Vilvorde, 2; Iseghem, 3; Termonde, 3; Gossieles, 1; Hornu, 1; Ninove, 4; Wavre, 3; Audenarde, 2; Forest, 2; Dinant, 2.

Whooping-cough in London, 223; Liverpool, 71; Glasgow, 70; Birmingham, 81; Manchester, 47; Dublin, 59; Leeds, 69; Sheffield, 29; Edinburgh, 9; Bradford, 19; Belfast, 8; Bristol, 5; Hull, 6; Newcastle, 22; Amsterdam, 40; Rotterdam, 16; Hague, 7; Paris, 51; Lyons, 3; Marseilles, 21; Nantes, 1; Bordeaux, 11; Saint Étienne, 2; Havre, 3; Rouen, 4; Berne, 1; Zurich, 3; Chaux-de-Fonds, 2; Nice, 9; Hamburg, 48; Breslau, 10; Munich, 17; Cologne, 16; Vienna, 18; Bale, 5; Pesth, 5; Prague, 7; Trieste, 2; Debreczin, 4; Cracow, 1; Copenhagen, 23; Stockholm, 8; Christiania, 7; Helsingfors, 6; St. Petersburg, 60; Warsaw, 26; Odessa, 2; Bucharest, 12; Brussels, 20; Turin, 5; Anvers, 8; Gand, 15; Liege, 19; Bruges, 7; Lierre, 5; Tournay, 6; Ypres, 1; Seraing, 7; Jumet, 1; Alost, 11; Uccle, 1; Jamappes, 1; Vilvorde, 1; Maldeghem, 11; Braine-le-Comte, 3; Hornu, 2; Malines, 3; Verviers, 2; Borgerhout, 3; Ostend, 1; Herstal, 1; Ledeberg, 3; Ecloo, 2; Wetteren, 1; Iseghem, 1; Arlon, 1; Tougres, 3; Wavre, 8; Audenarde, 1; Forest, 2; Dixmude, 1; Basel, 2.

For the *third* quarter, ending September 30th, 1888, the number of deaths reported from *small-pox*, was in Lisle, 4; Lemberg, 8; Moscow, 3; Milan, 137; Turin, 1; Genoa, 20; Bologne, 16; Saragossa, 23; Morrice, 33; Carthagena, 76; Lisbon, 52; Buenos Ayres, 101.

Death-rates *in foreign cities* during the fourth quarter, 1888, as follows: London, 4,282,921, 18.8; Liverpool, 599,738, 22.2; Glasgow, 526,088, 20.6; Birmingham, 447,912, 17.7;

Manchester, 378,164, 26.2; Dublin, 353,082, 24.6; Leeds, 351,210, 21.9; Sheffield, 321,711, 20.1; Edinburgh, 262,733, 15.4; Bradford, 229,721, 17.8; Belfast, 227,022, 21.7; Bristol, 226,510, 16.7; Hull, 202,359, 16.3; Newcastle, 159,003, 22.7; Amsterdam, 389,916, 20.8; Rotterdam, 193,658, 19.7; Hague, 149,477, 18.7; Paris, 2,260,945, 21.5; Lyons, 401,930, 19.5; Marseilles, 376,143, 25.3; Bordeaux, 240,582, 23.7; Nantes, 127,482, 21.3; St. Étienne, 117,875, 21.9; Havre, 112,074, 29.9; Rouen, 105,672, 29.5; Rheims, 97,903, 24.5; Nancy, 81,593, 22.4; Amiens, 80,288, 25.3; Nice, 78,482, 26.2; Berlin, 1,414,980, 19.6; Hamburg, 543,670, 23.6; Breslau, 313,451, 25.8; Munich, 275,000, 29.1; Dresden, 259,142, 18.6; Leipzig, 181,324, 17.2; Cologne, 175,200, 22.8; Magdeburg, 171,086, 22.8; Frankfort-on-the-Main, 163,655, 16.4; Koenigsberg, 156,441, 26.2; Hanover, 148,458, 19.7; Düsseldorf, 125,384, 24.4; Nuremberg, 122,832, 23.5; Bremen, 121,-464, 17.4; Chemnitz, 118,926, 28.3; Dantzig, 118,037, 27.8; Stuttgart, 117,861, 17.4; Strasburg, 115,870, 23.1; Elberfeld, 113,195, 18.8; Altona, 111,780, 21.9; Barmen, 106,749, 15.6; Aix-la-Chapelle, 100,982, 19.4; Mayence, 69,119, 21.3; Metz, 54,558, 22.1; Basle, 73,963, 15.8; Geneva, 52,516, 13.3; Berne, 50,220, 19.8; Lausanne, 32,954, 19.3; Zurich, 28,062, 13.8; Chaux-de-Fonds, 24,372, 16.6; Vienna, 800,-836, 23.2; Pesth, 442,787, 27.2; Prague, 295,857, 25.9; Trieste, 156,042, 25.6; Cracow, 67,000, 27.1; Debreczin, 56,-168, 26.6; Presburg, 49,003, 30.1; Copenhagen, 300,000, 18.7; Stockholm, 221,549, 17.2; Christiania, 136,791, 18.7; Helsingfors, 51,515, 18.6; St. Petersburg, 988,016, 22.1; Warsaw, 439,174, 28.2; Odessa, 268,000, 24.1; Turin, 294,-826, 20.4; Bucharest, 206,000, 29.9; Yassy, 82,856, 41.1; Brussels, 462,069, 20.7; Anvers, 220,123, 21.9; Gand, 147,-912, 22.2; Liege, 137,566, 17.9; Bruges, 51,341, 21.5; Malines, 48,971, 22.2; Verviers, 47,744, 15.8; Louvain, 39,-460, 19.5; Tournay, 36,536, 19.9; Seraing, 31,322, 16.1; Borgerhout, 28,781, 25.0; Mons, 25,755, 14.8; Jumet, 23,-455, 14.7; Ostend, 24,500, 35.9; Alost, 23,399, 20.9; Charleroy, 21,490, 14.3; Roulers, 20,163, 24.8.

Populations and death-rates returned during the third quarter, 1888: Utrecht, 81,334, 18.4; Groningen, 52,996, 18.7; Maestricht, 31,483, 23.8; Lille, 188,272, 22.7; Roubaix, 100,456, 25.7 ; St. Quentin, 46,746, 22.1 ; Bayonne, 27,289, 21.8 ; La Rochelle, 16,616, 20.6 ; Lemberg, 120,127, 30.2 ; Grätz, 105,-274, 24.2 ; Brünn, 86,125, 34.5 ; Cracow, 70,084, 28.5 ; Moscow, 753,469, 42.6 ; Rome, 382,973, 23.7 ; Milan, 373,352, 28.7 ; Turin, 294,826, 17.3 ; Genoa, 183,591, 21.0 ; Bologna, 133,789, 22.3 ; Livourne, 101,722, 19.0 ; Saragossa, 87,922, 35.1 ; Murcia, 80,000, 56.0 ; Carthagena, 54,313, 57.9 ; Badajoz, 23,000, 45.7 ; Lisbon, 242,297, 33.6 ; Algiers, 71,339, 28.5 ; Bombay, 773,196, 30.3 ; Calcutta, 433,219, 21.1 ; Madras, 398,777, 34.0 ; Buenos Ayres, 428,448, 26.5.

LITERARY NOTICES.

The Milroy Lectures: On Epidemic Influences; Epidemiological Aspects of Yellow-fever; Epidemiological Aspects of Cholera. By Robert Lawson, LL.D., Inspector-General of Hospitals; late President Epidemiological Society; Fellow Statistical Society. London: J. & A. Churchill.

The purport of these lectures is to show the relations of, if not, indeed, the dependence of the prevalence of the diseases treated of upon pandemic waves incidental to inappreciable, or, at least, indescribable influences of the atmosphere at particular periods. The progress of the pandemic waves is illustrated with maps and charts of the regions over which they have passed, coupled with historical data of the period, duration, and mortality. Numerous citations are made of the relation of local conditions and their limitations to the outbreaks of epidemics of yellow-fever and cholera, and their dependence when disassociated from their usual habitudes.

A New Mode of Treating and Disposing of Night Soil. By S. de M. Aserappa, M.D., Edin., Sanitary Officer, Municipality of Colombo, Ceylon, is a pamphlet of ten pages, describing the advantages of coir-dust as an absorbent and deodorant of excreta, and the subsequent incineration of the mass, over the dry-earth system.

The incinerator consists of a brick chamber with an iron flap-door at the top, divided by an iron grate into two horizontal compartments, and the lower one also provided with an iron grate as a fuel bed; and each compartment with a side opening for draught. The chamber is provided with a chimney at one end carried to the height of an ordinary kitchen chimney, with draught flues adjusted to the grates. The fæcal compost is thrown down through the door on the top into a chute so arranged as to have it fall on the lower grate, where it is fired and spread. Meanwhile a fire is also kept up on the upper grate. The object of this arrangement is to consume the gases (all inflammable) evolved by the combustion of the compost on the lower grate.

The process is a crude imitation of the Engle Cremator. Obviously any other absorbent and deodorant "dust" that is readily inflammable would serve the same purpose as the coir-dust—fibres of the cocoanut. The process is commendable.

NERVOUS EXHAUSTION—NEURASTHENIA: Its Hygiene, Causes, Symptoms, and Treatment. By GEORGE M. BEARD, A.M., M.D., Formerly Lecturer on Nervous Diseases in the University of the city of New York; Fellow of the New York Academy of Medicine, etc. Second edition revised and enlarged by A. D. ROCKWELL, A.M., M.D., Professor of Electro-Therapeutics in the New York Post Graduate Medical School and Hospital; Fellow of the New York Academy of Medicine, etc. Pp. 254. Price, $2.75. New York: E. B. Treat.

The term *neurasthenia*, which was first used by the author of this book more than a dozen years ago, has at last gained acceptance by the medical profession as the proper designation of the various forms of nervous disturbance hitherto commonly expressed under such terms as "general debility," "nervous prostration," "nervous debility," "nervous asthenia," "nervous strain," "nervous weakness," etc. But the designation should not be regarded as a mere cloak of convenience for an uncertain group of rational symptoms. On the contrary, it is intended, in the mind of the medical practitioner at least, to dispel such vague expressions as those quoted, which are, for the most part, the mere expressions of irregularities of living and indolence. Against all such the work before us wisely discriminates; they need not rest, more food, and soothing treatment, but more mental and physical activity and less engorgement.

Veritable neurasthenia, on the other hand, is commonly traceable through a sequence of causes of a wholly different character, and it requires wholly different treatment both hygienic and medical.

This the work before us clearly points out ; and considering the present general tendency of pursuits and diversions, few books can be read by the medical practitioner with more benefit.

FAVORITE PRESCRIPTIONS OF DISTINGUISHED PRACTITIONERS, WITH NOTES ON TREATMENT. Compiled from the Published Writings or Unpublished Records of Drs. Fordyce Barker, Roberts Bartholow, Samuel D. Gross, Austin Flint, Alonzo Clark, Alfred L. Loomis, F. J. Bumstead, T. G. Thomas, H. C. Wood, William Goodell, A. Jacobi, J. M. Fothergill, N. S. Davis, J. Marion-Sims, William H. Byford, L. A. Duhring, E. O. Janeway, J. M. Da Costa, J. Solis Cohen, Meredith Clymer, J. Lewis Smith, W. H. Thomson, C. E. Brown-Sequard, M. A. Pallen, George H. Fox, W. A. Hammond, E. C. Spitzka, etc. By B. W. PALMER, A.M., M.D. New, Enlarged, and Revised Edition, with Blank Pages interleaved in Its Several Departments for Registering Formulæ worth Preserving. Price, $2.75. New York : E. B. Treat.

This is an interesting volume to students and young practitioners to look over at odd times, but, like all mere prescription books, to be avoided as a guide to practice. All such books are dangerous to medical practitioners in proportion as they are more or less likely to divert attention from painstaking diagnosis, which, with such knowledge of indications and therapeutics as all prescribers should be required to possess, is the only true guide to correct practice.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS : Consisting of Original Treatises and of Complete Reproductions, in English, of Books and Monographs Selected from the Latest Literature of Foreign Countries, with all Illustrations, etc. Published monthly. Price, $10 a year. Single copies, $1.

January and February numbers contain : (1) Pedigree of Disease, by Jonathan Hutchinson, F.R.S. ; Common Diseases of the Skin, by Robert M. Simon, M.D.; Varieties and Treatment of Bronchitis, by Dr. Ferrand. (2) Gonorrhœal Infection in Women, by William Japp Sinclair; Giddiness, by Thomas Grainger Stewart, M.D.; Albuminuria in Bright's Disease, by Dr. Pierre Jaenton.

A CYCLOPÆDIA OF THE DISEASES OF CHILDREN, medical and surgical, by American, British, and Canadian authors, edited by JOHN M. KEATING, M.D., in four imperial octavo volumes, to be sold by subscription only, is announced by the Messrs. J. B. Lippincott Company. The first volume will be issued early in April, and the subsequent volumes at short intervals.

A thorough knowledge of the diseases of children is a matter of the greatest importance to most physicians, and as this is the only work of the kind that has been published in English, it will be invaluable as a text-book and work of reference for the busy practitioner.

HAND-BOOK OF MATERIA MEDICA, PHARMACY, AND THERAPEUTICS. Compiled for the use of students preparing for examination. By CUTHBERT BOWEN, M.D., B.A., Editor of "Notes on Practice." 12mo, pp. 366. Price, $1.40. Philadelphia: F. A. Davis. A concise *résumé* of all that is most valuable in this branch of medicine, and admirably well adapted to its purpose.

ALDEN'S MANIFOLD CYCLOPÆDIA, second and third volumes, now before us, fully maintains the good opinion we formed of it in review of the first volume (August number, 1888). These volumes cover the alphabet between the titles America-British, and Baptisia, pages, respectively, 632, 631. There seems little doubt that it will become, as it deserves to, the most popular cyclopædia for a long time to come. The embodiment of an Unabridged Dictionary of Language and a complete Cyclopædia of Universal Knowledge in one work, in excellent type, with thousands of illustrations, and all for a price less than people have been used to paying for a dictionary alone, is not only a novelty in plan, but to the ordinary book-buyer, the fact is equally astounding. The publisher, John B. Alden, 393 Pearl Street, New York, or Clark and Adams streets, Chicago, will send specimen pages free to any applicant, or a specimen volume (which may be returned if not wanted) in cloth for 50 cents, or half morocco, 65 cents; postage 10 cents extra. The set of thirty volumes is offered at considerably reduced price to early subscribers.

THE ARTESIAN WELLS OF DAKOTA are probably the most remarkable for pressure, and the immense quantity of water supplied, of any ever opened. More than a hundred of such wells, from 500 to 1600 feet deep, are to-day in successful operation, distributed throughout twenty-nine counties, from Yankton, in the extreme south, to Pembina, in the extreme north, giving forth a constant, never-varying stream, which is in no wise affected by the increased number of wells, and showing a gauge pressure in some instances as high as 160, 170, 175, and 187 pounds to the square inch. This tremendous power is utilized, in the more important towns, for water-supply, fire protection, and the driving of machinery, at a wonderful saving on the original cost of plant and maintenance, when compared with steam. In the city of Yankton a forty-horse-power turbine-wheel, operating a tow-mill by day and an electric-light plant by night, is driven by the force of water flowing from an artesian well, the cost of obtaining which was no greater than would have been the cost of a steam-engine developing the same power, not counting the continual outlay necessary (had steam been employed) for fuel, repairs, and the salaries of engineer and fireman. What has been accomplished through the aid of natural gas and cheap fuel in building up manufactories elsewhere, may some day be rivalled on the prairies of Dakota by tapping the inexhaustible power stored in nature's reservoirs beneath the surface.—*P. F. McClure, in Harper's Magazine for February.*

WHY WOMEN GET SHORT OF BREATH.—In order to ascertain the influence of tight clothing upon the action of the heart during exercise a dozen young women consented this summer to run 540 yards in their loose gymnasium garments, and then to run the same distance with corsets on. The running time was two minutes and thirty seconds for each person at each trial, and in order that there should be no cardiac excitement or depression following the first test, the second trial was made the following day. Before beginning the running the average heart impulse was 84 beats to the minute ; after running the above-named distance the heart impulse was 152 beats to the minute ; the average natural waist girth being 25 inches. The next day corsets were worn during the exercise, and the average girth of waist was reduced to 24 inches. The same distance was run in the same time by all, and immediately afterward the average heart impulse was found to be 168 beats per minute. When I state that I should feel myself justified in advising an athlete not to enter a running or rowing race whose heart impulse was 160 beats per minute after a little exercise, even though there were not the slightest evidence of disease, one can form some idea of the wear and tear on this important organ, and the physiological loss entailed upon the system in women who force it to labor for over half their lives under such a disadvantage as the tight corset imposes.—*From " The Physical Development of Women," by Dr. D. A. Sargent, in the February Scribner's.*

EDITORIAL CHANGE AND A LIFE TENURE—SURGEON-GENERAL HAMILTON AT HIS POST AGAIN.—In the *Journal of the American Medical Association* of February 9th, Dr. John B. Hamilton makes the following announcement :

" When the writer accepted the position as editor of the *Association Journal*, although the Marine-Hospital Service Bill was then pending, as it had been for the past ten years, he had no certainty of its passage, but, on January 4th, it passed both houses of Congress and became a law, which by prohibiting any original appointments into the service except to the rank of assistant-surgeon, has the effect of creating a life tenure in the office of supervising surgeon-general. He therefore tendered his resignation as editor to the Board of Trustees, and it was kindly accepted by them to take effect on a day named by himself. His editorial connection with the *Journal* will therefore cease with the present number, and, until further notice, the ' Committee on General Management ' will take charge of the affairs of the *Journal*. With the most sincere thanks to those who have sent him kindly letters, his best wishes for the continued success of the *Journal*, and the renewed prosperity of the Association, the editor resumes his life-work in the Marine-Hospital Service."

MEDICAL EXCERPT.

MEDICAL ANTISEPSIS.—From a lecture given at the Hospital St. André by Dr. Artigalas, so competent on all microbiological questions, the following conclusions are noted :

1. The body normally manufactures ptomaines. They can accumulate and produce some accident when the oxygen which should destroy them is deficient, or the channels of elimination are obstructed. From this the two great physiological principles of antisepsis are evolved : (*a*) to maintain normal oxygenation ; (*b*) to keep the secretions normal or to restore their equilibrium.

2. According to the constitution of the microbian illness, it is either local or general. The morbific element thrives in certain regions, and causes there the formation of toxic products.

Therefore : (*a*) the necessity to find a diffusible antiseptic, as is sulphate of quinine in intermittent-fever ; (*b*) to change the surroundings where the microbes flourish, as in the intestinal antisepsis of typhoid-fever ; (*c*) to make, as far as possible, secondary channels for elimination of the microbes and ptomaines, as in nephritis of scarlatina and of cholera.—*Revue de Thérapeutique.*

ANTI-BACTERIAL ACTION OF ANTIPYRIN.—By Dr. Nikolai F. Keldysh (St. Petersburg, Russia). Dr. Keldysh has carried out numerous bacteriological experiments for verifying Neudoerfer's startling statement concerning the antiseptic power of antipyrin. He inoculated dry pure cultures of the staphylococcus aureus and albus and micrococcus prodigiosus in a solid nutritious jelly containing 2.5, 5, and 10 per cent antipyrin. In every one of the experiments an excellent growth of the microbes was invariably obtained which did not in any way whatever differ from that in a set of controlling test-tubes containing a non-antipyrinized nutrient jelly. There was not even any retardation in the bacterial growth ; hence Dr. Keldysh goes still further than Dr. Lenevitch, and says that antipyrin does not possess any antiseptic properties at all.—*Russkaia Meditzina*, No. 26, 1888.

OXYCYANIDE OF MERCURY AS AN ANTISEPTIC.—The comparative merits of oxycyanide of mercury and corrosive sublimate are to be summed up as follows: Its solution has a slightly alkaline reaction, and precipitates albumen only slightly. It is less irritant than solutions of corrosive sublimate, and solutions of the chemical 1–1500 do not attack, except slightly, the materials used in surgical instruments. When tested by the power of preventing decomposition of soup, its antiseptic power proved to be six times greater than that of bichloride of mercury; while tested as to its power to destroy the micrococcus pyogenes aureus, the advantage lay somewhat in favor of the sublimate, 1–1400 of the former to 1–1300 of the latter. When employed on suppurating surfaces, or to render mucous surfaces antiseptic, it furnished much better results than the bichloride, because of its much greater tolerance by the tissues and of the small amount absorbed thereby (Comptes Rend. de la Soc. de Biol., July, 1888).—*The Satellite.*

QUININE AND ANTIPYRINE IN COMBINATION.—Dr. Dulon adds 15 centigrammes of antipyrine to 25 centigrammes of quinine and obtains an antipyretic effect equal to that from 75 centigrammes of quinine, without producing cinchonism or disturbing the stomach.—*Revue Générale de Clinique et de Thérapeutique.*

OF TERRALINE, a preparation of petroleum, in the treatment of bronchial and pulmonary affections, Dr. C. S. Strothers, of Georgia, writes to the *Medical and Surgical Reporter* as follows: "I have been prescribing this new remedial agent for about a year, and the results have been so perfectly satisfactory that I do not feel I would be doing my duty to the profession were I to keep silent in regard to it. I have given it in all forms of bronchial, pulmonary, and pharyngeal troubles, and I am happy to bear record that in every instance its effects have been to greatly relieve and palliate, if not to work an entire cure. I have found it far superior to cod-liver oil in phthisis, as its effects have been not only to relieve the cough and allay the extreme pulmonary irritation, but it improves the appetite and overcomes the indifference and distaste for food, increases the weight of the body, and begets a sense of comfort which I have seen exhibited by none other of the noted remedies usually given in these cases." It may be obtained from Hazard, Hazard & Co., New York.

LANOLIN AND BORIC ACID IN THE SKIN DISEASES OF CHILDREN.—The combination of lanolin and boric acid as an ointment is said to have a most gratifying effect in certain skin diseases in children, especially eczema of the head and face, intertrigo, and seborrhea. In the case of eczema, for example, with raw patches on the cheeks and yellowish crusts on the head, the surface is first cleansed in the usual way, and then dusted over with finely-powdered boric acid. On the following day this washing and dusting over is repeated ; already the inflammation will seem lessened. The process is then repeated twice daily, the washing being always done gently, until the skin is in a condition to bear an ointment containing thirty per cent of lanolin and eight per cent of boric acid. In the squamous form of eczema with considerable induration, olive oil is well rubbed in and then removed with castile soap, and an ointment containing one half, or one per cent of salicylic acid, with thirty per cent of lanolin, is energetically applied according to the degree of induration. This washing and application are repeated twice daily. The strikingly beneficial action of this course of treatment, which is less painful than the use of strong alkalies, or oil of cade, is ascribed to the penetrating properties of lanolin, which thus facilitates the entrance of salicylic acid into the deeper layer of the epidermis. Dr. Russel Sturgis, who advocates the above treatment, also finds the lanolin a reliable means of alleviating the irritation due to chronic uticaria.—*Brit. Med. Jour.*

CREOLINE AND THE COMMA-BACILLUS.—Creoline is one of the most recent of the many new antiseptic substances that have of late years been brought to the notice of the profession. As is the case with most new remedies, the advocates of this drug claim for it the advantage of great efficacy and harmlessness to the animal organism ; but whether these claims will be substantiated by a more extended trial remains to be seen. Some experimenters have already asserted that the substance is capable of giving rise to toxic symptoms in even moderate doses, and doubtless it will be found that care is necessary in its administration as well as in that of other powerful antiseptics.

Drs. Sirena and Alessi have made a series of experiments with creoline to determine its action upon the comma-bacillus of Koch, and have been led by the results obtained to place great hopes upon it as an efficient remedy in cholera (*La Riforma Medica*, Nos. 257 and 258, 1888). It is not necessary to give the details of these experiments, which may be found in the original article, and we will reproduce here merely the following conclusions which the authors have reached, as a result of their labors :

They state that the addition of from eight to ten drops of a three per cent aqueous solution of creoline is sufficient to completely sterilize, within five minutes, a pure culture in broth of the comma-bacillus. From one to four drops of the same solution, added to ninety drops of a broth culture, will prevent the development of the comma-bacillus. From one to three drops of a one per cent solution retard the development of the micro-organisms, and four drops or more prevent it completely.

The solutions of creoline are apt to lose their efficacy in time, hence it is necessary to use fresh solutions whenever a certain and speedy action is desired.

The authors regard creoline as an antiseptic of great value, and recommend that it be employed in the treatment of cholera. They believe also—and this belief they hope to fortify by experiments in the early future—that the remedy will be found of great efficacy in the treatment of tuberculosis.—*Medical Record.*

NITRO-GLYCERIN IN CARDIAC AND RENAL DISEASES.—Dr. L.-V. Holst has employed nitro-glycerin in a number of accidents consecutive to cardiac and renal diseases, such as dyspnœa, angina, palpitation, etc., and the following are the conclusions which he draws from cases which he reports in detail (*Gazette Hebdomadaire des Sciences Médicales*, Oct. 6*th*, 1888) :

Nitro-glycerin is a remedy which is capable of affecting the innervation of the heart in the most marked manner; its effects being especially marked in cases of weakening of the cardiac muscles with implication of the valves. The best results, however, are obtained in cases of angina, where it is claimed that the symptoms are not only relieved, but that the disease may be even cured. In cases of kidney trouble, the author states that he has nearly always succeeded in obtaining good results from the use of nitro-glycerin, and even in some cases its employment has led to the disappearance of renal complications as a secondary effect to its regulating action on the heart. In cases of weakness of the heart it may lead to the disappearance of serous effusions, its direct action being cardiac in origin. The great obstacle to its employment is its great poisonousness, and the difficulty of administration. The author has employed a preparation of nitro-glycerin, of which he gives one drop three times a day. If this dose is too small, it may be gradually increased drop by drop, the maximum dose being six drops daily.

HOMŒOPATHIC THERAPEUTICS does not consist in the dilution or size of the dose; but "the healing power of medicine rests upon its faculty of producing symptoms *similar* to the disease and superior to it in strength; so that each individual case of disease is most certainly, fundamentally, and rapidly extinguished and cancelled by a drug which is more potent than the disease, and capable of producing in the body symptoms most similar to and completely resembling the totality of those of the disease;" be it by the action of a dram of the crude drug or by the one thousandth centesimal trituration.—*W. Irving Thayer, D.D.S., M.D., in Independent Practitioner, December,* 1888.

VASELINE SUBCUTANEOUS INJECTIONS, as shown by some recent experiments, may occasionally prove decidedly injurious. Dr. G. Daremberg, of Dr. Grancher's laboratory, observed that while guinea-pigs and rabbits may stand for a long time daily injections of cod-liver, olive, cotton, and other vegetable oils, they rapidly succumb under the administration of crude petroleum, and the internal lesions will extend as far as the spleen, liver, and lungs. Dr. J. Roussel, the other day commenting on Dr. Daremberg's experiments, remarked before the Biological Society that he perfectly agreed with his colleague's opinion, his own observations on the human subject confirming the objections not only against petroleum, but all the refined derivatives known as vaseline oils. He said, "As they cannot be either saponified or emulsified within the tissues, they are *ipso facto* rebellious to assimilation. When things turn out for the best, the mineral oil will become encysted in the conjunctive tissue, where it may be found several weeks after the injection unaltered and still holding the medicament absorbed. In the majority of cases the mineral oil will cause a sharp and painful inflammation of the skin, and, finally, purulent abscesses, which, on opening, will discharge it out. With vegetable oils, fresh and sterilized, on the contrary, no trouble is experienced, their absorption being as speedy as their assimilation."—*Paris Correspondent, Therapeutic Gazette, December 15th,* 1888.

A SIMPLE TEST FOR BLOOD, and easy of application, is made by the addition of tincture of guaiac and ozonized ether to a weak solution of blood, when a bright blue color is produced. If a drop of blood be mixed with one half ounce of distilled water, upon the addition of one or two drops of tincture of guaiac a cloudy precipitate of the resin appears, and the solution has a faint tint. If to this solution one drop of an ethereal solution of hydrogen peroxide is added, a blue tint appears, which, upon a few minutes' exposure, gradually deepens. This test is very valuable for minute quantities of blood, and Dr. Day, of Geelong, succeeded in obtaining sixty impressions from a stain upon cloth where the microscope failed to show any blood.—*Coll. & Clin. Rec.*

THE ALLEGED INCREASE OF CANCER.—Apart from the purely surgical interest attaching to the Morton Lecture on Cancer and Cancerous Diseases, delivered on the 26th ult., by Sir Spencer Wells, before the Royal College of Surgeons, London, the lecture contained in its opening remarks some important statistical information tending to prove that such diseases are on the increase in this country. Thus, in England, during the twenty-six years 1861–87, the mortality from cancer has risen from 360 per 1,000,000 of the population to 606—an increase which, Sir Spencer Wells truly remarked, is far more than can be attributed to improved registration. In Ireland, although the total mortality does not show so striking an increase, yet when this is corrected by reference to the diminishing population of that country, the proportional increase per 1,000,000 is almost as striking as that for England—viz., from 1864 to 1880 an average annual rate of 676, and from 1881 to 1887 a rate of 873. In Scotland the proportion of deaths from cancer is larger than in Ireland. A like increase in mortality from cancer during the last decade is noted in the United States. It is obvious that improved diagnosis of malignant disease and greater accuracy in making returns do not suffice to explain the rise in these figures.—*Lancet, December 15th*, 1888.

A CASE OF PRIMITIVE SARCOMA OF THE PANCREAS was presented by Dr. Litten to the Medical Society of Rio de Janeiro. The morbid growth was taken from a child four years old, who within a few weeks had become extremely emaciated ; but its abdomen became enlarged to such a degree that, notwithstanding the emaciation, the weight increased *ten* pounds.

The child had some diarrhœa and complained of slight colic. The case was evidently an immense tumor in which there was no fluctuation ; it was solid and evidently malignant. As experience has shown that large abdominal tumors in children arise most frequently from the kidneys, Litten diagnosed a *primitive sarcoma* of that organ ; but the autopsy showed that this immense tumor was a primitive sarcoma of the pancreas, which almost completely filled the abdominal cavity and pressed the intestines aside.

The case is unique ; no one has heretofore pointed out a primitive sarcoma of the pancreas, and what makes it specially interesting, is that the little patient had but little disturbance of digestion compared with the immense size of tumor.—*Uniãs Medica, Rio de Janeiro.*

AN INGENIOUS METHOD OF FORMING A SPHINCTER AFTER GASTROSTOMY.—To avoid the usual unfortunate and almost inevitable leakage from the artificial opening in cases of gastrostomy, Girard recommends the following procedure: Through a fifteen-centimetre vertical incision, the left rectus muscle is divided in its upper portion in the median line. The peritoneal cavity is then opened near the middle of the cut, and a wedge-shaped portion of the fundus of the stomach drawn out through the wound. A row of sutures is then introduced, so as to include the posterior portion of the sheath of the rectus, the edge of the peritoneum, and the stomach-wall at the base of this protruding portion. These are to fix the stomach in the wound. An incision ten centimetres long, and parallel to the original wound, is now made on either side of the latter, so that two bundles of muscle-tissue of the size of a finger are formed. These bands are now crossed laterally, and the stomach drawn out through the sphincter-like opening thus made in the interval between them. The muscle-bands and gastric pouch are now fastened in place by sutures, after which the stomach is immediately opened. The author thereby hopes to obtain a sphincteric action upon the stomach-opening which shall be under muscular control, or, should the muscle-structure disappear, that the cicatrix itself, being pulled upon by the rectus, will accomplish the desideratum.

Girard performed this operation recently in a case, but as the patient died before reacting from the operation, we cannot yet be sure of its utility (Wiener Med. Presse, No. 25, 1888).—*The Satellite.*

DETERMINATION OF FAT IN MILK AND CREAM.—Place 5 cc. cream, or 10 cc. milk, carefully measured, into a test glass of 50 cc. capacity, graduated into 1–10 cc. add 10 cc. concentrated hydrochloric acid, boil while rotating the liquid, and agitate the cold dark-brown liquid with 30 cc. ether. After this separates clearly, read off the volume of the ethereal layer, remove 10 cc. with a pipette, allow to flow into a tarred porcelain crucible, evaporate on a water bath, dry in an air bath at 100° C., and weigh, calculating the weight for the volume read off. This determination can be made in about 15 minutes, and the results do not differ by 0.1 per cent from those obtained by other quantitative methods.—*Ztsch. An. Ch.* (*Am. Jr. Ph.*).

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THE VALUE OF MERCURIC CHLORIDE AS A PRACTICAL DISINFECTANT.

By V. C. VAUGHAN, M.D., of Ann Arbor, Mich.

THE report of the Committee of the American Public Health Association on Disinfectants, together with the experimental investigation of others, has given great prominence to the employment of mercuric chloride as a germicide. Recently* Dr. William B. Hills, of Cambridge, Mass., has criticised the above-mentioned report so far as it recommends mercuric chloride. As this is a matter of great practical importance, I propose in this paper to notice the points raised in this criticism. Dr. Hills does not seem to have made any biological or chemical tests himself, but founds his opinion upon what he deems to be well-established facts. The critic uses severe language with reference to the committee, and asserts that "it is not creditable" that the committee should have made the recommendations referred to upon the experimental evidence presented.

In the first place, Dr. Hills states that corrosive sublimate is rendered insoluble when brought in contact with organic matter. He says: "It is, however, a well-known chemical fact that the corrosive sublimate *is* destroyed, or at least undergoes chemical changes, when brought into contact with organic matter. It is immediately converted by albumen to the insoluble albuminate of mercury. For this reason, albumen is recognized as the most efficient antidote in cases of poisoning by corrosive sublimate."

Now, let us inquire into the well-known chemical fact referred to by Dr. Hills. I endeavored to show in the report,

* *Boston Medical and Surgical Journal*, August 25th, 1888.

which Dr. Hills criticises, that the albuminate of mercury *is* soluble in solutions containing organic matter, and that it does diffuse through such solutions; but as Dr. Hills places his opinion against my experience, we will see what others say upon this point. Merck,* of Darmstadt, says that the albuminate of mercury, which he manufactures according to the formula of Schneider,† is readily soluble in blood-serum, meat-broth, sodium chloride, etc. Every physician knows that the albuminate of mercury is used hypodermically on account of its ready solubility and non-irritating properties. For the preparation of this compound either egg-albumen, blood-serum, or peptone is used. Merck uses egg-albumen, while Filehne‡ recommends the following formula: "15 grams of dry peptones, 10 grams of bichloride of mercury, 15 grams of ammonia chloride, and enough water and glycerine so that each cubic centimetre *of the solution* shall contain from two to four milligrammes of mercuric chloride." Other formulæ are given by other authors. In one place Dr. Hills admits that the albuminate of mercury is "slightly soluble," but he says "the amount redissolved is very small." Filehne's solution contains more than two and a half drams of the bichloride. This amount would hardly be called "very small." When Dr. Hills says that albumen is recognized as the most efficient antidote in cases of poisoning by corrosive sublimate *on account of the insolubility* of *the albuminate of mercury*, he teaches a doctrine which, I must admit, is wholly new to me. Mercuric bichloride owes its corrosive properties to the avidity with which it combines with proteids. In cases of poisoning by this salt we give the albumen in order to supply a proteid with which the poison can combine without injury to the walls of the stomach, *and then we hasten* to give an emetic. What would be the result if we should leave the albuminate of mercury in the stomach? If this compound is so insoluble, why do we give the emetic? The idea that the albuminate of mercury would not be readily absorbed by the stomach is, to use some of Dr. Hills' vigorous English, "so absurd that it would not deserve serious notice were it not for the fact" that it has

* Merck's *Bulletin*, August, 1888.

† *Pharm. Centralblatt*, 1888.

‡ Cloetta's "Lehrbuch der Arzneimittellehre," 1887, S. 134.

been suggested by one so eminent in the profession. If mercury forms an inert compound with albumen and other proteids, how is it that we get constitutional effects by the administration of the compounds of this base in the treatment of disease? Are the contents of the stomach and intestines always free from proteids when the medicine is administered? The truth is that the albuminate of mercury is insoluble in water, but is freely soluble in excess of albumen, in blood-serum, in meat-broth, in solution containing sodium chloride, etc. Indeed, all the mercury given medicinally is said by leading therapeutists and physiological chemists to be converted into the albuminate before it is absorbed. Filehne says concerning the absorption of mercury: "The salts of mercury soluble in water form first with albumen compounds which, partly in excess of albumen, partly from the action of other substances, as sodium chloride, hydrochloric acid, etc., are soluble, so that the passage of these compounds into the blood as soluble albuminates is undoubted. The compounds insoluble in water are by the action of sodium chloride and hydrochloric acid converted into the sublimate, and this in turn into the albuminate." Nothnagel and Rossbach* say that while the albuminate of mercury is insoluble in water, it is freely soluble in excess of albumen and in sodium chloride.

Dr. Hills again says: "Sternberg, in the *Medical Record* for August 1st, 1885, affirms positively that the albuminate (of mercury) is a potent germicide, but gives no facts in support of this statement. Klein's experiments, however, suggest that its germicide power is very slight at the most. Admitting, however, that it has such power, the amount redissolved is very small, *and this is likely to be converted at once to the inert sulphide by the sulphuretted hydrogen* present."

I have italicized the assertion to which I desire to give immediate attention. Here Dr. Hills is again wrong. Sulphuretted hydrogen does not decompose the albuminate of mercury. Every toxicologist knows this, and destroys the organic matter before he attempts to precipitate mercury from solutions containing proteids. In the report of the committee, where I show that the albuminate of mercury is soluble, I

* "Handbuch der Arzneimittellehre," sechste Auflage, S. 194.

state that the organic matter was destroyed by potassium chlorate and hydrochloric acid, *after which* the mercury was precipitated with sulphuretted hydrogen. Nothnagel and Rossbach * say "from the albuminate of mercury one cannot precipitate the metal with sulphuretted hydrogen until the organic matter has been destroyed." If sulphuretted hydrogen precipitate mercury from proteid solutions, the mercury so precipitated is not combined with albumen, and the occurrence of such a precipitation shows that the mercury exists in excess above that taken up in the formation of the albuminate. The albuminate of mercury is not easily decomposed.

Again, Dr. Hills thinks that the alkalies formed in decomposing matter would precipitate the mercury. Nothnagel and Rossbach † say: "If common salt be added to an alkaline solution of albumen, mercuric chloride will then fail to produce any precipitate." No one will question the existence of common salt in privy vaults.

It is true that Klein's experiments suggest that the germicide power of mercuric albuminate is very slight at most. Indeed, Klein asserts (or rather did assert) that a one per cent solution of mercuric chloride is no more a germicide than is vinegar. Certainly no one will now champion this statement, although vinegar is not worthless as a germicide. Koch found that the spores of the anthrax bacillus will not germinate in a *proteid* solution if there be present one part of corrosive sublimate in three hundred thousand. And yet Dr. Hills, without having made an experiment, condemns the committee for recommending a solution of corrosive sublimate, one to five hundred, for the disinfection of the liquid discharges of cholera, typhoid-fever, etc.

Dr. Hills finds very strong language of condemnation for the report of the committee in recommending that the amount of bichloride found necessary to sterilize broken-down beef-tea be multiplied by two, and used for the disinfection of the liquid discharges from the bowels of patients with cholera, typhoid-fever, advanced tuberculosis, septic diarrhœa, etc. As he bases his condemnation upon the incompatibility (?) of mercuric chloride with albumen, he must suppose that these

* *Loco citato.*

† *Loco citato.*

stools contain a large amount of soluble proteids. In this he is again wrong; such discharges do not contain large amounts of albumen or other soluble proteids. Simon * obtained the following results from the analysis of the fæcal matters in cholera:

Water	980.00
Solid matters	20.00
Fat	0.08
Extractive matter	4.80
Albumen and mucus	0.52
Chloride of sodium, lactate and acetate of sodium, and alkaline phosphates	13.40
Phosphate of lime and magnesia	0.60

The blood contains, according to Hammerston, from 2.677 per cent (horse) to 4.436 per cent (rabbit) of serum albumen; and yet, according to Von Ermengen, mercuric chloride in solution of 1 : 800 and 1 : 1000 sterilizes blood. With these figures before us can we say that "it is not creditable to a committee of the leading sanitary association of this country" to recommend a solution of mercuric chloride 1 : 500 for the disinfection of cholera stools.

Practically we know that mercuric chloride does efficiently disinfect substances containing a hundred times as much proteid as cholera stools contain. This is done many times every day in bacteriological laboratories. Gelatine plates and tubes, agar tubes, and blood-serum tubes, laden with all the known germs, are disinfected with a solution of mercuric chloride 1 : 1000. In Koch's laboratory this is the only disinfectant used, and there has been no evidence of its failure. Plates covered with colonies of the anthrax bacillus, the comma bacillus, etc., are immersed in the solution with the certainty that the sterilization will be complete. Old tube cultures are treated in the same way, and with the same result, whether they contain gelatine, agar, or blood-serum. Now, in the gelatine, one litre of beef-tea contains 100 grams of gelatine, 10 grams of peptone, and 5 grams of sodium chloride. We have seen that the albuminate of mercury is made with peptone as well as with albumen, and there is nearly twenty times

* Becquerel and Rodier's "Pathological Chemistry," p. 459.

as much peptone in this mixture as there is albumen in cholera stools, and nearly two hundred times as much gelatine besides. Certainly no one will question the large amount of albumen in blood-serum. Is it not strange, if the albuminate of mercury is so "inert," that the disinfection of these cultures should be so successful? Even the evacuations of infants with green diarrhœa, containing a large amount of undigested food, do not contain as much proteids as do gelatine cultures, as is shown by the following analysis of Golding Bird:

Water	900.00
Biliverdin, alcoholic extracts, fat, cholesterine.	24.50
Ptyalin, watery extract, colored with biliverdin	11 25
Mucus, coagulated albumen, and hematin	56.00
Chloride of sodium, with traces of tribasic phosphate of soda	5.50
Tribasic phosphate of soda	1.75
Peroxide of iron	1.00

In the first report of the committee (1885) a solution of chloride of lime was given the first place for the disinfection of excreta in the sick-room, and a solution of mercuric chloride of the strength of 1 : 500 the second place. In the latest report (1888) carbolic acid has been given the second place, and mercuric chloride has not been recommended for this purpose. This change was made because the carbolic acid was believed to be sufficient, and not because the mercuric chloride was believed to be inefficient. In the light of the most recent experiments in this country and abroad, we believe that mercuric chloride, in the proportion named, would be effective in the disinfection of the liquid discharges of patients suffering from typhoid-fever or cholera, and that the recommendation made in our first report was justified by the experimental data then given, and not yet contradicted by any new evidence.

The committee called attention to the action of mercuric chloride on lead pipes in its first report, and this influenced it in substituting carbolic acid for mercuric chloride for disinfecting the excreta in the sick-room.

To return to our critic, the broad statement is made that: "An examination of the report of this committee fails, however, to bring to light the slightest particle of evidence upon which such a recommendation could have been based," viz., the disinfection of excreta with mercuric chloride. Dr. Sternberg, chairman of the committee, made extended researches upon the germicide power of this agent several years before (1883) the committee was appointed, and to those experiments reference is made in the first report. It is for this reason that extended experimental researches were not made with this agent in 1885. However, a number of experiments were made and recorded in our report. These show that even the solid or semi-fluid fæces of a healthy person may be sterilized by the use of the solution recommended by the committee, provided that they are broken up so as to be fairly exposed to the action of the disinfecting agent. Moreover, the fact is recorded that a certain amount of the mercurial salt remained in solution at the end of twenty-four hours, as shown by a deposit of mercury on a copper wire (exp. of September 8). Yet our critic, without recording a single experimental observation of his own, states that there is not the slightest particle of evidence upon which our recommendation could have been based.

One who has given no special attention to chemistry may be pardoned for not being acquainted with the chemical nature of the albuminate of mercury, but certainly any one who had read our report could not have made the sweeping assertion which we find in Dr. Hills' criticism.—*Boston Medical and Surgical Journal, January* 3, 1889.

THE CLIMATE AND SANITARY QUALITIES OF WESTERN NORTH CAROLINA.

ABSTRACT OF A PAPER READ BEFORE THE INTERNATIONAL MEDICAL CONGRESS, WASHINGTON, D. C., SEPTEMBER, 1887.

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THE great Appalachian chain of mountains, in their southerly extent, present many features of scientific interest, chief of which is found in the composition of the granite. The decomposition of the rocks is most extraordinary, railroad cuts often extending fifty feet through the ledges, requiring only the use of the pick and shovel. The explanation is found in the fact that the feldspar is by far the largest factor of the granite; often it with the mica and quartz lie in separate layers, and to this peculiarity is due the exceptional purity and extent of the mica veins here found of greater size than elsewhere in the world. To the decomposed feldspar, setting free potash salts, is also due the marvellous tree growth which covers this entire territory, nine tenths of which is yet the primeval forest. These forests consist chiefly of deciduous trees in great variety, oak and chestnut predominating. Under their broad arches, spreading out in leafy shade, eighty to one hundred feet above the traveller, one may ride on horseback almost anywhere, except along the streams, which are thickly hedged by an almost impenetrable jungle of kalmia and rhododendron, whose waxy leaves, in June and July, are almost hidden by the great bunches of pink and white bloom.

Pearly streams of the purest water make laughing music through every valley, and from the hill-sides gush forth in endless number cool springs, often impregnated with iron, sulphur, and other minerals. In a few places lithia springs are reported and claimed to possess much medicinal value.

The smaller streams abound in trout; the larger game is still found in the forest depths, holding attractions for the sportsman, while the seeming endless variety of plant growth furnishes interest to the botanist, and the lover of nature never tires of the kaleidoscopic pattern of landscape picture, on every hand, domed by the clear blue vault of heaven, which is itself often the panorama of cloud and storm rarely seen outside these mountains.

The great variety of forest and plant growth is found in the fact that these elevated ranges extend into a southern latitude. In climbing the sides of some great mountain, the different tree growth of two thousand miles in latitude may be met, until near the summit one wanders under the impenetrable shade of the balsams and firs peculiar to the great stretches north of Canada and to Northern Europe.

From the above description ready reference will be made of a scant population, which is found, indeed, in a class of hardy mountaineers, simple and uncultivated in taste and habit, whose chief wealth lies in broad acreage of small monetary value, interspersed with little patches of corn and grain along the larger streams, and also in herds of cattle, sometimes of considerable size, which roam through the forest at will, and are often found grazing upon the highest tops of the mountains.

On account of the inaccessibility of this section until recently, it has been less known to the outside world than perhaps any other of equal size in the United States east of the Rocky Mountains. Before the late war, a few of the more wealthy planters upon the coast of the Carolinas and Georgia took refuge upon the easterly and southern slopes from the summer heat.

When first known to the whites, this region was the central home of the Cherokee Indians, and in this tribe was found a civilization superior to any other of the races east of the Mississippi. When visited by William Bartram in 1772 (see his most interesting book published in London in 1778), he found them dwelling in houses made of logs, much as now seen occupied by the natives, and separated in families, living a peaceful life, cultivating their corn and beans in well-kept fields. He repeatedly expressed his wonderment at the physical strength and beauty of the natives.

Owing to the disasters following the recent conflict and the engineering difficulties to be overcome, it is only very recently that this territory has been rendered by any means fairly accessible to travel. The invalid seeking health in this region has also been met with the extraordinary disadvantage of not finding, even in moderate degree, the home comforts so essential to his welfare. However, the advantages offered to invalids, in considerable variety of disease, were so apparent that many have braved the discomforts attending such evils, and results have been attained of a character sufficiently marked to warrant the further study of the climatic conditions of this wide extent of country.

Asheville, the central metropolis of this region, has grown, within a short period, from a small village to a city of about nine thousand inhabitants. At first it was simply a summer resort for the residents of the low country south, and, until very recently, almost without winter visitors. Now a considerable percentage of the inhabitants consists of invalids from the North, many of whom have found such marked improvement that they have made it a place of permanent abode. Some of the residences are homes of wealth and comfort, and a number of excellent hotels offer good accommodation. The largest are the Swannanoa and the Battery Park. The latter, recently erected by Colonel Coxe, of Philadelphia, is a model of excellence rarely surpassed anywhere. This was nearly as full last winter as during the more fashionable summer season. Dr. Battle, a resident of the hotel, who has had the opportunity of observing several hundred cases, assures me that he has rarely seen a patient whom he thought had made a mistake in selecting Asheville as a health resort. I saw several physicians who not only were enthusiastic in the belief that this section was one of great healthfulness, especially to be commended in pulmonary diseases, but said they themselves were compelled by disease to leave other localities, while here they were able to endure the fatigues of the active practice of their profession. One who four years ago had had frequent hæmoptysis and a supposed cavity, was now nearly free from cough, had been actively at work, and certainly gave every appearance of recovery. From Dr. Watson we received a confirmatory report in his exceptionally large and varied experience. I have sent about fifty patients to Asheville and vicinity within a few years, and, for the most part, with very satisfactory results.

The town has not been entirely free from diarrhœal diseases and typhoid, but great improvement has been made within two years in the introduction of pure water from a distance, and a system of good sewerage has been also inaugurated. The location is excellent—upon a plateau, with a beautiful outlook over an amphitheatre twenty miles in diameter, surrounded by mountains, yet clothed, for the most part, by forest.

Asheville is twenty-three hundred feet above the sea, and from its southern location possesses advantages in climate which, for mildness, is not unlike Southern France. From observations now made for a number of years, the mean average temperature of Asheville is: Spring, 52.3°; summer, 71.3°; autumn, 55.3°; winter, 37.2°; year, 55.3° F. During a period of eight years the thermometer but twice rose above 88°, and only three times fell below zero.

I here append a carefully kept record, tabulated by Mr. D. S. Watson, of Asheville, for the first four months of 1886. The cold wave of January will be remembered as having passed over the entire South, and was of a severity beyond that in the experience of "the oldest inhabitant."

I copy the following tables from a reprint of Dr. H. T. Gatchell:

TABLE A.

Table of deaths from consumption in 10,000 of white population, excepting in Western North Carolina, where the estimate is for whites and blacks :

Four counties in Western North Carolina......	6.5
Three counties in South Carolina, with Aiken as central point..........................	10.2
Minnesota................................	10.7
Four adjoining counties in Georgia, with Thomasville as central point...................	11.3
Peninsula of Florida......................	13.0
Mainland of Florida........................	18.0
Plains of Colorado (excluding Denver).........	21.6
Maine....................................	28.0
Los Angeles County, California...............	29.0
Massachusetts..............................	29.0
New Orleans...............................	30.0
District of Columbia........................	30.0
Charleston, South Carolina..................	31.4

TABLE B.

Table of deaths from pneumonia in 10,000 of white population, excepting in Western North Carolina, where the estimate is for whites and blacks :

Western North Carolina......................	4.5
Los Angeles County, California...............	5.3
Four counties in Georgia, with Thomasville as central point.........................	5.5
Florida..................................	5.7
Minnesota................................	6.0

Michigan	8.0
Charleston, South Carolina	9.0
Maine	9.0
New Orleans	9.3
District of Columbia	10.0
Massachusetts	14.0
Plains of Colorado (excluding Denver)	17.0

The late Dr. H. T. Gatchell, of Asheville, was a careful student of the section of country adjacent to Asheville for many years, and his observations, first published nearly twenty years since, are of much value. His son, Dr. E. A. Gatchell, writes me his experiences are confirmatory of those of his father. The elder wrote : "In a series of nine years the mercury did not rise about 90° F. any day in summer, the nights are always cool, permitting refreshing sleep. In winter it is seldom that a zero temperature is reached, while the air is comfortable, dry, clear, and invigorating.

* * * * * * * *

"The following table gives the ratio of consumption in several sections of the country. The figures indicate the number of deaths from this disease in every thousand :

New England (nearly)	250
Minnesota and California	150
Kentucky and Tennessee	100
Western North Carolina	30

To any who seek entrance to the mountain region from the east, Asheville will be the central point of interest, and, if actuated by the restlessness of most of our countrymen, the first stopping-place. There can be no doubt but many localities upon the easterly and southerly slopes of the Blue Ridge present great attractions for invalids. A number of my medical correspondents write that some of these localities are especially desirable because of the dryness of the atmosphere and freedom from fog, which, at certain seasons of the year, prevail to a considerable extent through the mountains.

Unfortunately, no records of temperature, sunshine, rainfall, etc., from other localities have come under notice. The same general features of the landscape and climate here prevail. Along some of the southerly slopes the "no-frost line" is clearly perceptible, and sanitaria, well selected at such localities, would offer certain marked advantages. It is greatly to be regretted that careful observations have not been made at some of these places as to the equability of heat, amount of sunshine, rainfall, etc., as well as to the absence of severe cold, a fact so abundantly substantiated that it cannot be doubted, although a little distance away frost and ice are of common occurrence.

On the Western North Carolina Railroad, at Morganton, is located the State Asylum for the Insane, selected because of the healthfulness and beauty of surroundings.

The Piedmont Springs, fifteen miles north of Morganton, have been a favorite resort for a generation, and a long, rambling hotel, venerable in service, offers attractions of quiet and rest. The springs are sulphur, not unlike the White Sulphur of Virginia, and a short distance away is a fine chalybeate spring, entirely free of sulphur. The surroundings are wildly mountainous, picturesque, of a rugged Swiss type.

A few miles south of Marion, at Glen Alpine, is a large hotel, long a favorite resort of the residents of the southeast. Here are said to be good springs of iron and sulphur. Lithia springs are reported at several places on the southeasterly slopes of the Blue Ridge, but little, however, is known of the medicinal value of the waters.

The railroad crossing the Blue Ridge is an engineering feat worthy of modern science, and compares favorably with the difficulties overcome in the famous Sœmmering Pass of Europe. To the north, in the range known as the Black, towers Mount Mitchell, the highest peak of the entire region, 6711 feet above the sea-level. In a broken, undulating line runs the chain of the Blue Ridge to the Grandfather, fertile farms dotting its slopes here and there ; a region intersected by valley and mountain, picturesque, wild gorges, rippling streams, tumbling cascades, forests, deep jungles of rhododendron, with a mean annual temperature of 45° F., quite similar to that of Vermont. From this point, the Grandfather, diverges the Smoky Range, called by the Indians Unaka or White, which forms the boundary line of Tennessee. Its grandest representative is found at its very beginning, in the Roan, 6390 feet in height, and the beautiful peak called the "Yellow," a little less high than either, is the massive gate forever locked between these magnificent representative pillars of the splendid ranges of the Blue Ridge and Unaka mountains. Near the top of the Roan a large and comfortable hotel has been erected by General John P. Wilder as a sanitarium, open during four months of the year. It is the highest inhabitable spot east of the Rocky Mountains. The difficulties encountered in the ascent make the journey a severe one for the invalid, although the railroad from Johnson City to Cranberry passes at the base of the mountain. The station called Roan is the point of leaving the rail. There is in contemplation the speedy completion of an elevated railway to the top. The Signal Service station on the mountain has furnished interesting and important data for climatic study. The equability of the temperature has far exceeded expectation, and the electric phenomena are very interesting. It has long been claimed that the Roan offered an asylum to the victim of hay-fever unequalled, but the irony of Fate has in it another illustration. Now that the recluse here can be surrounded by the comforts of modern life, the old enemy continues in attendance, for hay-fever has been reported in the entire locality the last two years, including also the region about the Grandfather.

A new avenue has been opened through the mountains from the south to Asheville, *via* Hendersonville from Spartansburg. Ten miles south of Asheville, amid pleasant surroundings, is the Arden Park Hotel, situated half way to Hendersonville; also a town with good hotels, and the entire section one of beauty and interest. A little south from here is Cæsar's Head, an abrupt "fault" in the mountain on the South Carolina border. Much is claimed for this locality on account of its dryness, but I know of no reports of actual observations. The landscape views are extremely varied and interesting. The elevation is about 4000 feet. The hotel is well kept and a popular resort in summer. The air is pure and bracing, and many attractions are found in the immediate vicinity to interest the invalid.

West is Cashier's Valley, a high table-land about 3400 feet above the sea. It is of repute as a resort for consumption. Still farther west is the Highlands, a hamlet widely advertised as a health resort. It is reached with great difficulty, indeed, to the confirmed invalid, inaccessible, long distance from the rail on either side, over roads of the worst sort. Here the average rainfall has been found to be seventy inches annually, and, judging from the configuration of the abrupt mountain ranges bordering the lowlands lying south, it is presumable the rainfall of the entire region is excessive.

Down the French Broad River one easily reaches, by rail, the Hot Springs, which are becoming justly celebrated. The hotel accommodations are modern and excellent, while the baths are numerous and ample. The effect of the water appears not unlike the famous Hot Springs of Arkansas.

Westward from Asheville about thirty miles is the enterprising little town of Waynesville. In the Richland Valley, one mile away, is situated the Hayward White Sulphur Springs. The proprietor, Major W. W. Stringfield, is justly popular, and his new hotel has been well filled with guests. The elevation is over 2700 feet. The valley is very lovely, and the view of the broad meadows and lofty mountain ranges, as seen from the hotel, is beautiful beyond description. The waters of the creek rush along with great rapidity over the whitest pebbles, and their gentle murmuring is sweet music to the troubled heart and weary brain. Much curative effect is claimed for the sulphur water, which wells up pure and cool into a marble basin at the edge of the valley. Westward from Waynesville the railroad climbs the Balsam range to a height, at the divide, of nearly thirty-five hundred feet. The dry, pure, bracing air has attracted hither invalids, who reported to me great benefit from a few weeks' residence, although the hotel is limited and designed only as a station for dining passengers. Beyond lie the beautiful broad valleys of the Tuckaseegee and Little Tennessee rivers, rapid streams of considerable size, only recently reached by rail ; still farther westward tower the splendid ranges of the Cowee, Nantehaleh and Valley River mountains, irregularly dividing the wide space of the base of the triangle made by the Blue Ridge and Smoky ranges. These are almost without exception clothed to the very top with the primeval forest, which yet covers nine tenths of the entire territory. The country beyond the iron ways is of yet greater interest to the invalid able to "rough it" somewhat. The roads are, of course, poor, the hotels intended as hostelries only, but the quaint, old-time manners and customs of a rude but always hospitable, honest people, are a never-failing source of interest, and often of profit, to the student of men as well as nature.

The valley of the Nantehaleh is of interest as a broad plateau between the ranges, watered by the loveliest of rivers. Its banks are thickly hedged with kalmia and rhododendrons which in June present a mass of bloom never seen outside these mountains. The delicate branches of the graceful birches gently sway in the breeze, the music of the laughing waters fills the air; all else is the unbroken silence of the primitive forest. Mr. L. R. Finch, who resides on a cattle ranch in the Nantehaleh Valley, has sent me a daily record of the weather during the past summer. The rainfall has been large and the variations in temperature considerable. On June 13th there was a frost and a temperature record of 30° F. I found the two weeks which I spent here during August of the present year very agreeable, although a fire morning and evening was a comfort. Frost was reported about the 20th of the month.

The Valley River Valley surpasses all the others in beauty and picturesqueness; broad and fertile, a landscape rarely equalled, set in a mountain frame of living green, of which the eye never tires. The small hotel is ever full, and when proper accommodations can be reached by rail it will become a popular resort.

Surrounded by a medium from which there is even momentarily no escape, and which we must ever breathe, atmospheric impurities must be of the first consideration in the climatic elements. These are both chemical and atomic; while the relative amount of oxygen varies but little in a given weight of air taken from sea or mountain, its changes, even in very slight amount, are important. When deficient it is usually replaced by carbonic acid. The last is undoubtedly deleterious; nausea and headache are common in close rooms containing only one percentum of carbonic acid. These changes are also important as indices of an atmospheric contamination in a particular way by the presence of foreign material, chiefly of a fermentative type. Since these are usually of the lowest origin of spore plant life, the general name of germ contamination has been given to it.

The value of recent investigations upon this subject, as a cause of disease, is one of the triumphs of modern science, and invests the study of climate with new interest.

Since these minute growths develop under conditions of the atmosphere usually marked by the lessening of the oxygen and increase of carbonic acid, such changes assume an importance greater than earlier supposed.

The organic material exhaled with the breath is molecular, and is disseminated by atmospheric currents. The odor from the decomposition of these organic elements is generally perceptible when the carbonic acid reaches seven parts in ten thousand, and is strong when it amounts to ten parts. One of the chief causes of lung diseases in cities arises from the atmospheric contamination by myriads of microscopic cell growths.

One danger, by no means hypothetical, from the consumptive, lies in the material expectorated. This very commonly dries where it is carelessly lodged, is pulverized and distributed as dust. In the inspiration of the atmosphere thus infected, the bacilli are lodged upon the mucous membrane of the air-passages, and, if these are inflamed or broken, may find a suitable soil for generation. In this sense certainly consumption is a contagious, or rather an infectious disease. Organic material in the air is ever to be looked upon as injurious. We can have no *chemical* test for discriminating between hurtful and harmless organic matter, since the poisonous infection is *vital.*

The mechanical admixture of water with the atmosphere in the form of vapor is a constantly varying factor, dependent upon a number of conditions, and although rarely entirely absent is an element of itself comparatively unimportant; however, in combination with heat, albuminoids and the omnipresent microscopic cell plants, it renders possible changes of the highest importance.

Atmospheric moisture has a marked influence upon the skin and its glandular functions, as well as upon the respiratory tract. Its presence also lessens, in a considerable degree, the permeability of the atmosphere by the sun's rays, diminishing thereby the oxidizing power of sunlight.

Ozone, although we know far too little of it as yet as an agent, from its admitted powers, is an important atmospheric factor in its bearing upon climate and health. It is an allotropic form of oxygen which has attained new properties of an intensely active character, supposed to have been produced chiefly by electricity.

Ozone owes its great value as a disinfecting agent to its exceedingly powerful oxidizing qualities. The compounds of ammonia, phosphorus and sulphur are acted upon with great rapidity, and the odors resulting from decomposition are removed instantly. It is probably destructive to all the minute vegetable organisms. Under the direction of a committee from the American Medical Association a series of continuous studies in various sections of the country have been conducted for a number of years to determine if any relation exists between the development of acute epidemic diseases and changes of atmospheric character.

Ozone tests are being continually and carefully made. It exists in larger quantities in the atmosphere of mountains and forest country than elsewhere, and is increased most of all after severe thunder storms. To this, more than to any other agent, is to be attributed the so-called "clearing effect upon the air" after a thunder shower, giving a delightful, exhilarating feeling in respiration never experienced after a long rain.

Temperature is an important climatic consideration. The remarkable results obtained from a winter residence at elevated localities in the Alps has demonstrated the possibility of great gain, although the cold is intense. Under such conditions the atmosphere is nearly free from moisture and impurities, and the cold in the sunshine is seeming rather than real, since the diathermancy of the air is so great at considerable elevations that the sun's rays make it comfortable to remain out of doors when the ordinary thermometer registers a temperature of 20° or 30° F. The experience in our own country, of invalids at elevated regions of the North in winter, has been limited, and generally not favorable.

Patients have braved the winter in the Adirondacks, some with good results; but out-of-door exercise is limited, and the elevation of 1000 feet too little to make the rarefaction of the atmosphere important. This is also true in the White Hills of New Hampshire. A *warmer climate*, with *elevation*, is important, and one of the great climatic advantages of the elevated regions of Western North Carolina consists in the latitude, which is south of 33° 53′ and 36° 33′. The winter temperature here is not unlike Southern France, while the elevation is from 2000 to 3000 feet. The invalid can comfortably be out of doors in winter here most of the pleasant days. One of the very best commendations of any climate is found in the largest number of hours and days suitable for exercise out of doors. This, of course, applies to rain and storm as well as cold.

The barometric changes occurring in the great aerial ocean in which we live are of the greatest interest. From their study, in large degree, has arisen the new science of "Probabilities" as to weather, which already governs so great a part of the civilized world in its movements. Air currents are created, with changes of temperature, moisture, etc., many hundreds of miles in length.

In elevated localities broken by high mountains there is a more or less fixed cloud region, where the chilling of the moisture-laden atmosphere causes condensation ; especially is this true during the summer months. During the day the surface of the lower valleys is much heated, and the lower atmospheric stratum becomes rarefied and rises along the slopes, producing the breezes of the early part of the day. After sunset the higher peaks and sides radiate the heat more rapidly than the base, and the cold, condensed air descends, causing often an evening wind. These air currents vary greatly with the configuration of the locality, and should be studied in relation to the selection of sanitaria.

The formation of clouds about the mountain-tops is different. The warm, damp winds blow across the ranges, the air is suddenly cooled, and most of the moisture is precipitated in the form of mist, rain, or snow. The air currents that cross the summits sink in various directions, condense and become warmer in descending. This modification of the temperature of the air currents gives great variety to the cloud formation and rainfall. Often the wind blowing steadily in one direction will give abundant rain on the first range of mountains, while beyond it is clear and dry. These influences greatly modify the climate of the valleys, which is widely variable, according as they are sheltered from the winds and open to the sunlight. The extreme temperature between day and night is also more marked in the valley. Upon the side toward the sun, under the direct influence of its rays, the heat is increased by radiation during the day and diminished during the night. On the contrary, the differences in temperature between the heated and cold seasons is less marked in the valleys. Locations for residences in valleys should be selected that will furnish the greatest number of hours of sunshine.

When the atmospheric humidity is considerable, the morning and evening extremes of temperature in the valleys produce condensation of the moisture in the form of mist or fog, while the upper slopes may be entirely exempt from these.

An important climatic element of any country exists in the character of its surface. Its ability to absorb and retain moisture governs in large share its temperature, and the temperature of the soil in a marked degree governs the temperature of the air. They are usually alike. A loose, porous soil covered by a heavy tree growth furnishes the best surface for equalization of evaporation and uniformity of temperature. The earth's surface is charged with negative and the overlying atmosphere with positive electricity. The latter is much more marked in elevated regions broken in sharp mountain ranges. This produces in regions of considerable elevation, during the heated season, thunder storms of great intensity.

A mountain or elevated climate is advantageous to a variety of diseases influenced by a change of circulation. The lessening of the atmospheric pressure causes the diminution of the blood flow in the brain and central organs, and increases it in the cutaneous surfaces. Imperfect nutrition, as exhibited in anæmia, indigestion, loss of appetite, etc., is greatly benefited by the pure, bracing air and exercise.

Neuralgia, nervous prostration, loss of sleep, headache, hypochondria, etc., lessen under the stimulus of a better nerve nutrition. The improved circulation and nutrition of the respiratory organs give relief in most cases of asthma dependent upon changes of the bronchial mucous membrane as well as upon innervation. Bronchial inflammations are usually benefited, and the increased respiratory function lessens the conditions favoring consumption ; and often the disease itself, in its incipiency, is arrested.

The invalid suffering from extreme weakness induced by any cause had better not attempt a residence in an elevated region unless by the advice of a competent physician, for while an elevated climate is stimulating and has a powerful therapeutic action on most functions, it requires a certain integrity and resisting power, which the patient may not possess.

Organic diseases of the heart and great vessels are, almost without exception, made worse by the overwork demanded of the circulatory apparatus.

Perhaps the most important of all conditions to be considered is that of the mental state of the invalid when directed to any locality for the benefit of his health. They should not only be guarded against extremes of exposure, exercise, care as to diet, etc., but above all be given, as far as possible, a bright, hopeful, happy state of mind. All these prerequisites to improvement are so essential that the invalid does well to place himself under the care of a resident physician. Occupation to direct the attention from self should, as far as possible, be obtained. The sportsman finds recreative pleasure in the rod and gun, the botanist in the wide diversification of plant life, the geologist and mineralogist in the ever-interesting outcropping minerals about him. Indeed, Western North Carolina abounds in mineral wealth. Here are found the richest corundum mines of the world, rich ores of various kinds—gold, iron, and copper—mica blocks, from six inches square to two feet, and marbles of most exquisite beauty, from pure white, pale flesh-color to coal black, variegated by seams and stripes of every color.

"The bliss of a spirit is action," is the unwritten law of life, and he who seeks the renewal of its pulses must come under its universal requirement. To the invalid resting under condemnation from the violation of nature's laws, a wise selection of residence in the mountain regions of the great Appalachian chain holds out a hope often denied to the dweller in the cities of the plain. Everywhere mountains and streams, cliffs and valleys, gaps and glens, add charm to the scene and inspire delight in the lover of the beautiful and sublime, and while health is borne upon the breeze, beauty and grandeur fill the soul.

LOCAL CONDITIONS AND YELLOW-FEVER.

THE LATE JACKSON FEVER, AND PREVIOUS EPIDEMICS ELSEWHERE.

By E. H. ANDERSON, M.D., Jackson, Miss.

I PROPOSE in this article to treat of the recent fever that invaded a limited area in Jackson, Miss., and compare it with previous epidemics in Canton, Grenada, and Memphis; and endeavor to show that each and all were of local origin and not from an imported germ.

In the last, the Jackson fever, it was my fortune to have been a frequent visitor to the locality where it originated, and from which it showed no disposition to spread. Previous to the invasion, I had reviewed the ground, and from my medical experience thought I saw abundant cause for the production of some form of malarial-fever of pernicious type, at least. An old depot building had been razed and a large new building erected, for the foundation of which much earth was necessarily disturbed; and, besides, a railroad bed had been dug up, occasioning the upturning of soil for one hundred yards or more. The building torn down was said to have been used as a yellow-fever hospital in 1878, and two patients died there. There were piles of upturned dirt along the track and heaps of trash standing about the new building, in process of erection. All this was going on during the months of July, August, and September, the fever making its appearance about the 20th of the latter month.

This depot is situated in West Jackson on the lowest city level, and through which a slough runs south emptying into Pearl River. This may be called the paludal district of the city. In the months of July and August there were frequent heavy showers, which extended into September with less frequency. The range of thermometer was high both in July and August, but in the latter month interrupted by cool days and especially cool nights and mornings, and this latter condition prevailed through September. The range of thermometer, however, was at no time as continuously high day or night, with the exception of one night, as it had been in previous epidemics, according to my observation. There was an effluvium about the depot very perceptible to the sense of smell, and a closeness of atmosphere that rendered it very uncomfortable. In the progress of building the large depot, there was necessarily an immense amount of painting material used ; and owing to the limited space between the old and the new depots, there was but little circulation of air. Add to this the refuse material, incident to constant crowds of both white and colored citizens and travellers, and you have the *materies morbi*, which only lacks heat and moisture to vitiate air and generate in the human system the worst form of malignant fever. In the Jackson fever the cause seems to have been operative upon those alone who were constantly subjected to its influence, and though sick at home, away from the seat of infection, did not propagate the disease. The inference plainly is, that the contagium was not infectious beyond its original seat. With these facts before me, and having seen on one or two occasions, while on the spot, every depressed surface full of water after showers, and the earth saturated, soon to be exposed to a hot sun, I ask, would not this condition of things naturally suggest, as it did to me, that the result would be sickness of malarial form ? In my opinion an imported germ was not at all necessary to produce the results that have been realized.

Going back now to the epidemic invasion of Canton in 1855, I will remark that I was on the spot when the first case occurred there, in the latter part of August. The court-house had been razed to the ground a short time previously and there was a great dearth of water, the quality generally bad. Before the first case appeared there had been a few light showers, but during its progress a heavy rain fell at night, and rains continued thence on. There was much speculation as to the cause of the fever, and some were disposed to think it had been brought in some blankets from Vicksburg some time before.

A description of the topography of Canton will be necessary to give a correct idea of the condition of things at that time.

The court-house stood on a square, in the centre of the business portion of the town, upon an elevation sloping to the west and also to the north and south, with residences extending in all directions along the streets, which run at right angles. A slough runs on the north of the town, from east to west, emptying into Bear Creek, a mile to the west. From this sluggish creek many families procured their water supply. The town was then generally in a bad sanitary condition, and had always been subject to malarial and typhoid-fevers. The pulling down of the court-house was simultaneous in this instance with the invasion of the fever, which was supposed to be yellow-fever. There was a barbecue and mass-meeting held in the court-house yard while the first case was on hand. The fever very gradually spread from this central point to those more remote. The slough on the north side generally contained a quantity of stagnant water, and stock were constantly being watered there. The season was characterized by high temperature, running continuously day and night. There was another feature noticeable about it, which I emphasized at the time, and has been coincident with every epidemic that has prevailed in our State at different localities since 1855. This is a stillness of atmosphere, or calm, observable about one hour before sunset and continuing on to nine at night. There is no agitation of air whatever; not the stir of a leaf; all nature seems to be in profound repose. The effect upon the human system is that of oppression. As the night advances the difference between the air without doors and within is most marked; that without feeling too chilly, while that within feels oppressively hot. As this is the period at which the earth is returning to the atmosphere, by radiation, the heat which it has absorbed through the day, we may presume there is a current established by which the emanations are carried from the surface of the earth into the air, and until this ceases and the vacuum is filled by fresh and pure air, our respiratory organs are inhaling deleterious matter and a highly vitiated air, especially in localities that abundantly furnish morbid material.

I wish to emphasize this condition of atmosphere, as by means of it, though having lived in an exempt region, I have been enabled to predict, for years past, the advent of epidemics elsewhere. This condition has, in fact, been an infallible harbinger of this dread disease. In this epidemic, I often contrasted the condition of my country home, far away in the hills, with those about Canton, and thought then, as I do now, that the local conditions in the latter were sufficient, on known medical principles, to account for the fever then prevailing there, without looking up a mysterious and unknown imported germ.

An accidental circumstance furnished me, in two of the refugees who fled to my house, and were heartily welcomed, the opportunity of seeing something of the character of the disease. They were two young ladies. One of them was quite sick the night of her arrival; nausea and vomiting of blood were the initial symptoms. This I attributed to fright and natural causes. This patient, however, continued to have fever for several days with slight remissions, apparently of malarial character, with complexion of decided icteric hue. She was treated as I usually treat our local fevers, and she was soon convalescent. The other was attacked on the third day with slight chill, followed by fever of same character, treated in same way, and was soon convalescent. These patients contracted their fever in the same locality where the first case occurred in Canton. Had they remained at home they would probably have had a virulent form of fever. My family consisted of wife, self and two young children. The patients occupied a room next to my own, and there was the freest intercourse. No other sickness ensued. This would prove the fever to be non-infectious and non-contagious when removed from its original source.

I now pass to a consideration of the fever at Grenada, 1878, also Memphis and Canton. That in Grenada was of unknown origin, though there was much speculation on the subject and many theories as to its source. Some supposed it to have been brought in a lady's dress made in New Orleans. If a bacillus germ of a tangible shape had ever been identified in connection with the fever, I would be willing to accept it as a theory, and should conclude that there could be no yellow-fever without this specific germ; but in its absence, I shall continue to look to recognizable and well-known local and atmospheric conditions as the factors in its production. As will be remembered, the uncovering of a filthy slough in the centre of the town had been perpetrated just previous to the accession of the fever. This slough was said to have been the receptacle of the filth of the place; this too in midsummer, when a hot sun is changing into putrid fermentation every substance, vegetable or animal, that is susceptible of fermentation. This was done in violation of one of the laws of nature, and in opposition to all the well-established laws of hygiene, and the victims of the fever were the atoning sacrifice. The meteorological conditions prevailing at the time were similar and almost identical with those of 1855.

That of Memphis in same year was of questionable origin. At the time, as well as at this writing, I could not look outside of local causes for its appearance, under such propitious circumstances as then existed. At that time, the drainage system, since made so perfect, was in its incipiency, and the condition of Bayou Gayoso was such as to make it a hot-bed for breeding pestilential malaria. No medical mind could have reviewed its topographical features then without the conviction that it needed only suitable atmospheric conditions to be afflicted by some malarial form of fever of malignant grade. Those who reside in large cities, from habitude, become so accustomed to their surroundings, as to utterly ignore facts in reference to hygiene that have long since been established; and absorbed by their pecuniary interests, are prone to neglect the more important matter of public health, until suddenly and fearfully aroused by some outburst, the seeds of which have long lain dormant in their daily walks. This remark, however, is much more applicable to other cities than to Memphis, as she has expended her means largely in measures for rendering herself salubrious. The fever of that year was remarkable for its percentage of mortality. This by many would be imputed to a want of skill on the part of the medical staff. I think it unjust and illiberal to take this view, but rather to look to the causes then in operation that gave type and virulence to the disease. This view seems to be sustained by its recurrence the following year, when the type was milder and they were well under way with their system of drainage; and since this latter has been made almost perfect, they have enjoyed an exemption. Some may impute this exemption to non-importation of germs. Well, when they prove existence I will surrender at discretion; but until then will think, as many of my confrères now do, that the germ is indigenous, and will not leave its hidden haunts until called into active life by neglect of proper hygienic measures and meteorological causes. I shall perhaps have something more to say of the germ before I close this paper.

At the time of the invasion of the fever in Canton in 1878, its hygienic condition was bad and its topographical features not very different from 1855. There had been many new buildings erected in the ten or fifteen preceding years, and a great influx of negro population. It was better supplied with cistern water than formerly, but still had a scant supply, and was dependent upon the season for that. There were no unusual circumstances that could be connected with the outbreak except those incident to a town of its size and the character of its population and its surroundings. The atmospheric conditions, however, were unusually favorable, and the fever was confined to the most densely populated part of the town, which was subjected also to the influence of the bayou on the north. The drains were inadequate to carry off rain water rapidly; there was no system of thorough drainage.

The opinion of the resident physicians was that the disease was imported, and that the town was in good sanitary condition; and so it would appear, thought the Jackson physicians this year. If those of Canton will compare the present condition of their city, and especially the condition of their bayou on the north, which has since been cut off from public usage and has been well drained, and the general condition of their drainage system with what it was in 1878, they will see a vast difference, and the effect has been manifested in the diminution of fever. This epidemic was preceded by an unusual amount of malarial fever, and a high range of thermometer prevailed from May on to September, with frequent rains, as I am informed by one of their local physicians, who bore himself bravely through it; and the season was considered by him "an extremely sickly one" previous to the epidemic. On tenable medical grounds, it appears to me that the latter and severer form was due rather to the intensification of the same causes producing a severer grade than to the supervention of a new and different one. The death-rate amounted to about ten per cent of all cases that were considered yellow-fever. Dr. Beemis visited Canton as well as other points, after the subsidence of the fever, looking up the germ. What the result was I am not informed.

Now it is a well-known fact that, in all invasions of this epidemic, it has been a difficult matter for experienced physicians to decide the type of the disease in the formative stage of the first cases. This was so to a greater extent this season than usual, owing to the fact of the prevalence of yellow-fever within the borders of the United States.

This difficulty arises from the fact that epidemics vary in their mildness or virulence, and in the early stages may not present the typical features characteristic of the disease ; and may again so closely resemble bilious remittent, as not to be distinguishable. They likewise are closely allied in features to many forms of malarial-fevers, and their visitations are generally made to territory and localities where the malarial type usually prevails.

In the Jackson fever of this year and that of Canton in 1855, I think I see a similarity of causes, though differing in many features. This difference was doubtless due to a larger area of infectious atmosphere in the one case than in the other. The house removed here was a small one, that of Canton a very large one. The temperature in that at Canton ranged high, and was for a longer period continuously high day and night. As to contagiousness, neither seemed to possess that quality, as only those in the infected locality had it. Its germ, if it had one, did not seem to be portable. In this quality both resemble malarial-fever.

Yellow-fever being a tropical disease, our meteorological conditions must approximate those of the tropics for its existence and especially for its prevalence. This condition of high temperature combined with moisture, which is likewise that most favorable to fermentation (thermometer ranging from 78° to 88° F. day and night), has been a concomitant of all the epidemics since 1855. In the most of them the daily range of temperature, in the shade, was from 90° to 96° and occasionally reaching 100°.

I would here venture the suggestion that a combination of external agents acting upon a system predisposed to sickness through the enervating influences of season and surroundings might be so disturbed in its physiological action, as to become a prey to inflammatory processes that would soon transform healthy into degenerative and destructive tissue, that would soon lead to disorganization and death. The phenomena manifested in yellow-fever, especially those of the stomach, liver and spleen, would justify the conclusion if they do not demonstrate the fact.

This hypothesis, when analyzed, will be found in accordance with vital laws, and though opposed to the commonly accepted germ theory, yet hath what might be termed a germ in it, if metamorphosed tissue, the result of physical agents acting from without, may be so termed. Dr. Lionel S. Beale, in his work on Disease Germs, says "he thinks the original germ came from the human body and is developed within man." I regard what he calls the fever germ, in his illustrated plates, drawn from microscopical observation, as a morbid product of inflammatory action.

In commencing this paper, it was no part of my plan to discuss the germ theory, but collect some facts in regard to this fever that would, when well considered, point out a way to prevent its ravages. I have endeavored to show that in each invasion referred to the sanitary condition was bad and defective, and that in some cases the water supply was also deficient, and in all, the meteorological conditions were favorable for epidemic disease.

Now, the question arises, and it is a very important one, is there any other mode of prevention besides quarantine? I think there is, and if it will not exclude, it will certainly modify and render infinitely milder any form either of endemic or epidemic disease. The remedy is proper drainage, sewerage and the adoption of the best sanitary and hygienic measures adapted to localities. Jackson has proved beyond all question the impropriety and danger of disturbing surface soil during the hot months of summer, and removing houses, thereby exposing filthy material to be acted upon by a hot sun and rains. This was done in defiance of all the laws of health, and the perpetrators have immolated their employés as victims for its violation. Had disinfectants been used as the work progressed, there would probably have been no fever, or a milder form only. Let the municipal authorities, who are the conservators of the interest of the city and its welfare, see to it that no violations of health laws shall occur again. Let them put and keep their city in good sanitary condition in advance of the sickly season; then they may hope, with reasonable expectation, founded on practical experience, that they may escape these fearful and disastrous visitations; and they will then have the satisfaction at least of knowing the sin does not lie at their door.

One word more in reference to the panic created by the announcement of this fever. That of this season exceeded in alarm and consternation any preceding one, and so terrorized the popular mind as to render it incapable of calm thought or reasonable action. It illustrated how human nature "or man, proud man, whose heaven-erected face the smiles of love adorn," when dominated by fear, may ignore its or his better instincts, and verify the couplet, "man's inhumanity to man makes countless thousands mourn."

I foresaw the coming of the fever from local conditions where it occurred, and hence it was no surprise. It was but the natural result of natural causes. It so proved itself, for its infection was strictly confined to its breeding ground. It affected no one not exposed to its influence. It was not propagated by transportation.

There is no doubt in my mind that the newspaper reports of the extension of the Florida fever to Decatur and elsewhere occasioned the fright as to contagion. Reflection and investigation would, I have no doubt, prove in every case, where refugees had the fever and others were subsequently stricken with it, that all the conditions were ripe for it, aided by the paralyzing and weakening influence of fear.

In conclusion I now submit this paper, well knowing the adverse criticism it may perchance elicit, but with the firm conviction that should its suggestions be utilized, I will have benefited my fellow-man.—*Memphis Medical Monthly.*

THE NORTH CAROLINA SANITARY CONVENTION.

RALEIGH, N. C., February 8, 1889.

Editor of THE SANITARIAN :

The old North State has just taken a long step in advance on matters relating to the sanitary question. The assembling of a large number of the most advanced thinkers of the State, to consider the vital questions of our public health, as affected by the sanitary or unsanitary conditions of their various cities and towns, means that hereafter there will be a body of trained and earnest men ready to unite in solid column in support of the best plans for the public welfare in this direction.

The original motion for the assembling of this convention came from Dr. J. M. Baker, of Tarborough, Superintendent of Health for Edgecombe County. The State Board of Health, under the active guidance of Dr. T. F. Wood, of Wilmington, the Secretary of the Board, took up the matter, and by their influence and active work made the convention both practical and successful. Very great credit is due to these gentlemen in particular, but the effort was promptly seconded by the hearty co-operation of the associate members of this most efficient board and the leading physicians throughout the State.

The first session of the convention was called to order by Mayor Alfred A. Thompson, of Raleigh, in the mayor's office at ten o'clock on February 7th.

An address of welcome was delivered by Governor Fowler, who announced the coming Quarantine Convention to be held at Montgomery, March 5th, and asked that this convention designate delegates to that convention, to be commissioned by the governor.

The objects of the convention were explained by Dr. R. H. Lewis, of Raleigh, defining some of the leading questions to come up : the duty of sanitarians to seek out and destroy the disease germs ; to inquire into the best methods of getting rid of the filth of cities ; to provide and preserve a sufficient supply of pure drinking-water ; to devise proper inland measures against infectious diseases and epidemics, and to stimulate public interest in all questions connected with sanitary science.

The convention then proceeded to the election of the temporary officers, who were afterward made permanent, as follows: Mayor A. A. Thompson, President; Mayor J. J. Fowler, of Wilmington, First Vice-President; W. E. Fountain, of Tarborough, Second Vice-President; E. B. Neave, of Salisbury, Third Vice President; and Mr. J. C. Chase and Dr. Julian M. Baker, Secretaries.

Committees on Ways and Means and for other purposes, and an enrolment of the delegates present was made, showing some seventy members present, as follows: N. M. Johnson, Superintendent Board of Health, Durham; J. J. Summerell, Salisbury; E. B. Neave, Mayor of Salisbury; Dr. B. F. Dixon, Oxford; Dr. A. J. Buffaloe, Raleigh; Dr. H. J. Bahnson, Superintendent Board of Health, Salem; Dr. Thomas F. Wood, Secretary Board of Health, Wilmington; Dr. J. H. Tucker, Henderson; Dr. H. W. Lewis, Superintendent Board of Health, Jackson; Dr. L. L. Sasser, Smithfield; Dr. J. M. Hays, Oxford; Dr. W. P. Beall, Greensborough; Dr. R. W. Tate, Greensborough; John C. Chase, Hydraulic and Sanitary Engineer, Wilmington; Dr. Eugene Grissom, Raleigh; A. A. Thompson, Mayor, Raleigh; Rev J. H. Clewell, Salem; Dr. John MacDonald, Washington; Dr. W. G. Curtis, Southport; Dr. W. T. Ennett, Burgaw; Dr. R. F. Lewis, Superintendent Board of Health, Lumberton; Dr. H. B. Battle, State Chemist, Raleigh; Dr. T. R. Henderson, Henderson; Dr. J. F. Crowell, President of Trinity College; Dr. Kemp P. Battle, President of the University; Dr. J. W. Jones, President State Board of Health, Tarborough; Dr. A. Cheatham, Henderson; Dr. J. E. Malone, Louisburg; W. E. Fountain, Mayor of Tarborough; J. L. Ludlow, Civil and Sanitary Engineer, Winston; Dr. J. J. Mann, Superintendent Board of Health, Nashville; Drs. J. W. McGee and A. W. Knox, Raleigh; John J. Fowler, Mayor of Wilmington; Mr. Oscar Pearsall, Wilmington; Dr. Julian M. Baker, Superintendent Board of Health, Tarborough; Dr. P. E. Hines, Raleigh; Dr. R. H. Lewis, Superintendent Board of Health, Raleigh; Dr. W. F. Morse, of the Eagle Sanitary and Cremation Company of New York; Dr. F. T. Sutton, Raleigh; Dr. S. H.

Rogers, Raleigh ; Dr. E. Burke Haywood, Raleigh ; Dr. W. H. Wilson, Gastonia ; W. P. Mercer, M.D., Toisnot ; J. D. Roberts, M.D., Durham ; C. J. O'Hagan, M.D., Greenville ; F. P. Venable, Chapel Hill ; W. F. Beasley, Oxford ; G. W. Hinshaw, Winston ; W. A. Blair, Winston ; Hubert Haywood, M.D., W. I. Royster, M.D., Raleigh ; F. H. Fries, Salem ; A. S. Halton, High Point ; T. B. Keogh, Greensborough ; N. M. Johnson, M.D., A. G. Carr, W. J. Vickers, J. P. Monroe, J. D. Roberts, Durham ; E. B. Engelhard, Raleigh ; J. A. Hodges, Fayetteville ; Dr. L. A. Hanks, Pittsborough ; Dr. K. Battle, Jr., Dr. James McKee, Dr. R. H. Lewis, Raleigh.

The first paper of the session was read by Dr. J. W. Jones, of Tarborough, the President of the State Board of Health, on "The Gains from Sanitation."

It was an able statement of the necessity of sanitary knowledge, and an admirable presentation of the growth and spread of beneficial results of such knowledge. This paper, with all others read at the convention, was referred to the Committee on Ways and Means for publication in the transactions of the convention.

Dr. W. G. Curtis, the quarantine physician at Southport (mouth of Cape Fear River), read a paper on "Maritime Quarantine," following which, on motion of Dr. Wood, the convention put itself on record as favoring an appropriation to rebuild and enlarge the quarantine station at the mouth of Cape Fear River.

The paper of Dr. George G. Thomas, on "Inland Quarantine," was read in the absence of Dr. Thomas by Dr. Bahnson. This very able paper presented forcibly the difficulties of enforcing the quarantine in inland towns, and suggested a complete and practical plan for the solution of the same. It abounded in practical suggestions of great value, and awakened much interest.

At the evening session the first address was made by Dr. H. T. Bahnson, of Salem, upon "The Water Supply of the Cities and Towns of North Carolina."

This very elaborate and comprehensive essay was received with the utmost interest by the convention. Dr. Bahnson had devoted a year to the study of the question, and the results of his observations were in the highest degree valuable and instructive.

Professor Venable, of the State University, read a paper on "The Adulteration of Food and Drugs," which closed the first day's proceedings.

At the second day's session, after some routine business, Mr. J. L. Ludlow, Civil Engineer, read a paper on the disposal of the refuse of towns, and gave many facts and figures in support of his proposition.

Dr. T. F. Wood, Secretary of the State Board of Health, read a short paper upon the disposal of the waste of cities by cremation, and cited several striking examples of the evil effects of the usual practice of depositing effete matter on unoccupied ground. He gave a short account of various places he had visited where cremating furnaces of different patterns were in use; and at the close of his remarks asked permission to present to the convention Mr. W. F. Morse, representative of the Engle Sanitary and Cremation Company, who was present, for the purpose of explaining the Engle Furnace. At the request of the convention, the President called upon Mr. Morse, of New York, who explained at some length the construction and operation of the Engle Cremator, for the destruction of all refuse of cities and towns.

The explanation was accompanied by the criticisms, testimonials, and reports of practical tests and repeated trials of the Engle process in many places where the furnaces are in active use.

A paper was then read by Dr. J. H. Tucker, of Henderson, upon the duties and responsibilities of the superintendents of health in the various counties.

The convention appointed a special committee to present to the Legislature a bill for the protection of the water sources and supply of the State. This committee comprised Drs. McKee, Tucker, and Professor Venable.

At the close of the session the convention accepted an invitation to call upon Governor Fowler, and afterward adjourned *sine die*.

The assembling of upward of seventy-five men of the leading learned professions of the State, for the consideration of the sanitary condition of the commonwealth, is certain to result in a great increase of interest, both among the professional men, whose duties make it obligatory in a certain sense to take note of these matters, and in the minds of the general public, whose anxiety for the healthy condition of their respective cities is very noticeable at this time.

The personnel of the members of this first Sanitary Convention of the State was the best possible guarantee for the future success and prosperity of this new movement.

The officers of the convention (now made permanent under the title the North Carolina Sanitary Association) are among the most active and progressive men in their respective communities, and the very great interest shown, the high character of the papers read, and the eagerness with which all new ideas and information was received, is indicative of the future good work which will be done in the State.

FRANCIS.

WHERE HAS 'OPKINS GONE?—The *Hospital*, of England, states that nurses in hospitals are rather apt to lay too much stress on the advantages received by the patients and their duty of thankfulness. Witness the following true story: Chaplain: So poor Hopkins is dead. I should have liked to speak to him once again, and soothe his last moments; why didn't you call me? Hospital orderly: I didn't think you ought to be disturbed for 'Opkins, sir, so I just soothed him as best I could myself. Chaplain: Why, what did you say to him? Orderly: "'Opkins," sez I, "you're mortal bad." "I am," sez'e. "'Opkins," sez I, "I don't think you'll get better." "No," sez'e. "'Opkins," sez I, "you're going fast." "Yes," sez'e. "'Opkins," sez I, "I don't think you can 'ope to go to 'eaven." "I don't think I can," sez'e. "Well, then, 'Opkins," sez I, "you'll go to 'ell." "I suppose so," sez'e. "'Opkins," sez I, "you ought to be wery grateful as there's a place perwided for you, and that you've got somewhere to go." And I think 'e 'eard me, sir, and then 'e died.

PROPHYLAXIS IN SCARLATINA.

BÆUMLER (*Münch. med. Wochenschr.*, 1888, No. 42, 703) gives some statistics showing the high rate of mortality from scarlet-fever, and reviews the complications which may occur. Prominent among these is albuminuria, to which he calls especial attention. A careful distinction is to be drawn between the albuminuria frequently occurring early in the disease, accompanying high fever, and lasting but a few days, and that developing at the third or fourth week, which is often very persistent and may be attended by all the evidences of a severe nephritis, though the amount of albumin be small in amount. Regarding the prophylaxis against scarlatina, the two questions arise—whether this is possible, and whether it is necessary. Though this disease is so much more dangerous than measles, the disposition to get it is very much less. Only in a few of the early years of childhood is there a really considerable tendency to catch it from others, and this rapidly grows less with advancing age. An important point, therefore, is that the longer the child can be protected from the disease, the greater is the likelihood that it will escape it entirely.

As is well known, the contagium of scarlatina is always derived from some other case ; it possesses a very great vitality ; it is active from the earliest beginning of the disease until far into convalescence ; and it usually requires a very short period for its incubation. The author reports cases to show that the breath may carry the contagion before the appearance of any eruption, though the chief danger is during the stage of desquamation. It is therefore absolutely necessary to isolate patients as soon as possible. The clothes can be disinfected, but it is virtually impossible to disinfect the epithelial covering. A fixed time during which the patient must be isolated cannot, therefore, be named, but the child must remain away from others until the shedding of the epithelium, especially that of the palms and soles, is entirely completed. The author has known this to require sixty-three days from the onset of the disease, and a still larger number has been reported by others. Desquamation can perhaps be hastened by bathing with warm soap-water, and the dissemination of scales hindered by inunctions. It is very important that the scalp be treated in this way, as the scales of this part are fine and are shed early. A convalescent room is of especial value for those patients who feel well, but who cannot with safety mingle with others.

Children who have come in contact with cases of scarlatina should remain under observation ten or twelve days before again joining other children. Those in attendance upon the patients should wear some outside garment in the sick-room, and change their clothes and wash their hands in carbolic water on leaving it. The sick-room should be thoroughly aired every day, with proper precautions that the patient take no cold. All the linen used about the patient is, while still in the sick-room, to be put in a three per cent carbolic acid solution, and then boiled with a strong soap. Shoes are to be disinfected with the carbolic water, and clothes treated with steam. The walls of the sick-room, if painted or papered, are to be rubbed down with bread after the patient has been removed, the iron and wooden furniture and the floors washed with a carbolic solution, and the curtains, mattresses, etc., subjected to steam. Special vehicles should be employed to bring children with scarlatina to hospitals. Finally, precaution should be observed against the carrying of the disease by third persons, domestic animals, books, letters, milk, etc.

In connection with the above, a communication of A. Whitlegge (*Lancet*, January 5th, 1889) is of interest. It seems to him probable that a lull in the infectiousness of the disease may occur about the end of the first week, at the time when the acute symptoms are subsiding and desquamation has hardly commenced. To determine this point, he analyzed 1700 cases, of which he had exact particulars, and found, in fact, that the infectiousness suddenly decreased at about the sixth day, and increased again about the twelfth day, reaching its maximum by the sixteenth day.—*American Journal of Medical Sciences.*

PROPOSITION TO IMPROVE THE ORGANIZATION OF LOCAL BOARDS OF HEALTH, AND TO PROMOTE THE SANITARY CONDITION OF PUBLIC INSTITUTIONS.

REPORT OF THE COMMITTEE ON HYGIENE OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK, AT THE ANNUAL MEETING OF THE SOCIETY, ALBANY, FEBRUARY 6TH, 1889.

Mr. President and Gentlemen of the Medical Society of the State of New York:

Your Committee on Hygiene would respectfully report that the line of observation followed in the year just completed has been in regard to the success in the working of the present system of organization of the local boards of health in this State, and also as to their efficiency of administration.

Through the efficient efforts of the State Board of Health over 1200 local boards have been established during the past eight years, and a consequent vast improvement in sanitary conditions has been the result.

But in the experience of the State Board, as well as in local organizations, constant failures to secure such a completeness of administration as is reasonably expected are experienced.

Your committee has devoted considerable time and consideration to the recognition of the causes of such failures, to ascertain, if possible, means by which existing sources of embarrassment may be removed. Their idea has been so to examine the organization of the local health board as to learn in what part of its structure possibility of imperfect administrative work may commence.

They would present the result of their observations in three statements:

FIRST, as regards the *position* and duties of the *health officer.*

SECOND, as to the *composition of the board.*

THIRD, as to the so-called *unit of territory* upon which the *organization* is based.

First. The position of health officer is necessarily filled by a man of medical training. It is the medical profession which must furnish the material for practical sanitation. Your committee, however, recognize the fact that while physicians make the best sanitary *teachers*, they do not necessarily make the best *sanitary administrators*. Hence, the conclusion is reached that a *practising* physician does not make the most successful sanitary administrator. The lines of mental thought of the sanitarian and practising physician are different, since the one is wholly occupied with the *prevention* of disease and the means for its accomplishment, while the other is equally occupied with the recognition of forms of disease and the means of *curing* them. The practising physician cannot, as such, have the necessary mental habits which the purely sanitary administrator acquires, and which are vitally necessary for successful working of the organization.

The sanitarian is also free from the element of professional and personal embarrassment to which the practising physician is subject to a great degree. The inadequate salary paid the health officer is another point noted, since the occupant of such position cannot devote the time necessary, on account of the insufficient compensation, to fully perform duties which would require his entire time.

And last, but not least, the embarrassment arising from political influences and control in sanitary matters, goes far to destroy effectiveness of sanitary administration.

The *second* cause of imperfect administration is found in the composition of the average health board. While the intent of the law organizing them is in the direction of appointment of fit persons, its effective working is not so clear. Political considerations and influences are the chief disturbing factors.

Control by partisan combinations and failure to secure capable commissioners of sanitary, legal, engineering, and business qualifications, are the pregnant causes of inefficient administration. With an organization so constituted, even the ideal health officer must be thwarted in his best-conceived efforts of administration, since the appointees of such a board, being selected on a *political* and not a *sanitary* basis, must fail to secure that perfection of detailed work so essential.

The *third* cause of failure noted lies in the so-called *territorial unit of organization.*

Under the present law this is the village, town, or city.

It has been a question of serious consideration with the members of your committee whether this secures the greatest efficiency of administration. With the existing difficulties, connected with the positions of health officer and composition of the board, the multiplication of small and loosely organized boards, with small districts to cover, seems to complicate and render more complex the insuring of generally efficient administration.

The work of our State Board is supervisory, not executive.

The present able Secretary of the State Board of Health, Dr. Balch, in his report for 1887, calls attention to some of these defects in the working of the local boards, and suggests the advisability of such changes in the powers of the State Board in emergencies as to, in part, relieve them by giving the State Board the power, in such conditions of ineffective organization, to effect a proper organization.

It has seemed to your committee that a change in the unit of territory might secure better results. That by establishing the *county* as the unit, the number of health boards in the State would be greatly reduced. The relation of the State Board to the local boards would be greatly simplified and more direct, and hence that greater efficiency and uniformity of sanitary administration could be secured.

The economy of such a system is also apparent. The health officer could be ensured a sufficient salary to devote his entire time to the work, and also, which is very important, could be a trained sanitarian, not a practising physician, and be continued in office. The county seat would thus become the sanitary centre of the district.

Your committee has aimed to present very briefly the results and conclusions of the observations of the past year. They believe this to be a very important subject for further consideration by this society.

In interviews with sanitarians in other States, whose general board is similarly organized with our own commonwealth for sanitary work, the growth of similar views is apparent.

It is the object of your committee to present the subject to this society, without any suggestions as to the character of the changes or details of organization which they feel can be made. They do not think that it lies within their present province to do more than forcibly emphasize the existence of evils which may be remedied. They consider the subject of so much importance, as thus far developed, as to lead them to suggest that the Committee of Hygiene be instructed to make this a special line of observation during the coming year, and, at the next annual meeting, to report in a definite form upon existing embarrassments in the administration of the local health boards of the State, with suggestions for their remedy looking to future legislative action.

From the assistance of the State Board of Health, in addition to the individual work of the Committee on Hygiene of this Society, much can be accomplished.

They would invite special consideration of the question as to the change from the *village* to the *county*, as the unit of territorial organization. This is not a new thought, but has been for a time under consideration, though not generally entertained and urged among the profession; but we believe, when fully comprehended, must recommend itself to those acquainted with sanitary organization and interested in securing its efficiency.

During the past year no extensive prevalence of epidemic disease has occurred within the State. Recently several outbreaks of *variola* have occurred, but prompt resort to general vaccination and isolation of the sick and exposed have proved sufficient to place the disease within bounds and cause its gradual disappearance in affected localities, though there still exist in several parts of the State small groups of cases.

In the public institutions of the State sanitary conditions are in general fairly maintained. Your committee would, however, specially invite the attention of this Society to the hygiene of the county insane asylums. A growing evil exists which demands immediate action looking to radical reform.

The retention of the acute insane in many of the county asylums, with the injurious conditions consequent of noise and filth, calls for some action on the part of this Society.

The report recently made to the State Board of Charities by its Standing Committee on the Insane, and by the State Board adopted and transmitted to the Legislature, is a record of facts, which are confirmed and in substance verified by the experience and knowledge of general medical practitioners, as well as of alienists and specialists, in the treatment of the insane.

Your committee is so fully impressed with the importance of this subject that they would offer the following resolution:

"*Resolved*, That the detention of acute and chronic insane in all of the county asylums, as shown by the report of the State Board of Charities, is an evil which should not be tolerated in any case, whether pauper, indigent, or private patient, and should be forthwith abated. That the recommendations of said report for the regulation and restriction of county care and for the radical reforms therein should be acted upon affirmatively and immediately."

While the State Board of Charities may not be justified, by their political or legal relations, in either affirming or denying the expediency of exclusive State care of the insane, the Medical Society of the State of New York is emphatic in affirming the necessity for such exclusive State care.

Before closing this report your committee feel that they must emphasize the importance of greater vigilance in the prevention of diphtheria and typhoid-fever, and would refer again to the reports of this committee on the subject at the meetings of this society three and four years since.

E. V. STODDARD, M.D.,
A. N. BELL, M.D.,
WILLIAM H. BAILEY, M.D.,
J. P. CREVELING, M.D.,
WILLIAM C. BAILEY, M.D.,
Committee.

WHY HE WAS SO LEAN.—A lean, misanthropic physician, in a small hamlet, had as his only opponent a handsome robust man. The strife between the two was violent. One day a lady asked the first why he was continually in bad health, whereas the other was so well all the time? "You see, madame," he replied, "the only man who can treat him I am, the only physician whom I can get is he."—*Jour. de Medé. de Paris, according to The Scalpel.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.

By Dr. HORATIO R. STORER, Newport, R. I., Member of American Public Health Association, etc.

X. *Epidemics.* Continued from page 145.

III. SMALL-POX.

γ. *Vaccination.*

A. THE UNITED STATES.

DR. J. M. TONER, of Washington. "The Propriety and Necessity of Compelling Vaccination." Philadelphia, 1865. Already described under Section I.

B. ENGLAND.

Dr. Edward Jenner (1749–1823). "Inquiry into the Causes and Effects of the Variolæ Vaccinæ." 1798. "Continuation of Facts and Observations Relating to the Variolæ Vaccinæ." 1800. "Address of the Royal Jennerian Society for the Extermination of Small-pox." London, 1803, 8°. A copy of this, in the Redwood Library at Newport, R. I., contains a MS. letter by Dr. Jenner, and MS. notes by him.

926. Obverse. Apollo presents to Britannia, who is holding a civic crown bearing the name Jenner, a sailor who has been preserved by vaccination. Legend: Alba Nautis Stella Refulsit· 1801.

Reverse. An anchor. Above, Georgio Tertio Rege. Below, Spencer Duce (Viscount Althorp, First Lord of the Admiralty, and subsequently Earl Spencer). Gold.

Schlichtegroll, i., p. 156; Rudolphi, 1829, p. 81, No. 338; Kluyskens, ii., p. 68, No. 1; *ibid.*, Numismatique Jennérienne, No. 1; Duisburg, p. 230, dcix., No. 1; P. and R., p. 139, No. 385.

Presented to Jenner by the Surgeons of the Royal Navy. Its locality now unknown.

927. Obverse. Don. Soc. Med. London. Anno Salut. 1773. Institut. E. Jenner. M.—D. Socio Suo Eximio Ob Vaccinationem Exploratam. Reverse apparently plain. Gold.

Biog. Medic., v., p. 574; Rudolphi, 1829, p. 81, No. 339; Kluyskens, ii., p. 68, No. 2; *ibid.*, Num. Jenn., No. 2; Duisburg, p. 230, dcix., 2; P. and R., p. 139, No. 386. Presented by the Medical Society of London, March 4th, 1804. This medal also is no longer to be traced.

928. Obverse. An infant with rose in its hands, between a rose-bush and a cornucopia, points to its arm. Beneath the bush, L(oos). Inscription: Eduard Jenner's Wohlthaetige Entdeckung. Exergue: Vom 14 Mai | 1796.

. Reverse. Zum | Andenken | An | Erhaltenen | Und | Mitgetheilten | Schutz | —·— | Gereicht Vom | Doctor Bremer | In Berlin | 1803. Silver. 25 mm.

Rudolphi and Kluyskens add to reverse 8 L. 6 Gr., which is upon the reverse of the following:

Rudolphi, p. 82, No. 340; Duisburg, p. 230, dcix., 3; Kluyskens, ii., p. 68, No. 3; *ibid.*, Num. Jen., No. 5; P. and R., p. 141, No. 393. In the Fisher collection.

929. Obverse and reverse as preceding, save with the date of 1811, and the addition of 8 L. 6 Gr. Silver. 16 mm.

Rudolphi, 1829, p. 82; Kluyskens, Num. Jenn., No. 6; Duisburg, p. 231, dcix., 3, note; Bremer, Die Kuhpocken, Berlin, 1804, fig.; P. and R., p. 142, No. 394. This is in my own collection. Reference will be made to these two medals when speaking of Dr. Bremer of Berlin. They were struck for distribution, as rewards to mothers who brought their children to the Bremer Vaccination Institute at Berlin.

930. Obverse. Bust, to left. Beneath shoulder, F. Loos. Inscription: Eduard Jenner Entdecker Der Schutzimpfung· D·14 Mai 1796.

Reverse. An angel from clouds garlanding a cow, around which seven children are dancing. Legend: Ehre Sey Gott —In Der Höhe (Hohe, Kluyskens). Exergue: Und Freude | Auf Erden. Silver, bronze. 23. 36 mm.

Kluyskens in his figure omits the first dot in inscription of obverse, and in that of reverse has Here instead of Ehre.

Rudolphi, 1829, p. 82, No. 341; Kluyskens, ii., p. 69, No. 4; *ibid.*, Num. Jenn., No. 7; Duisburg, p. 231, dcix., No. 6; P. and R., p. 140, No. 387, fig. In the Lee and Fisher collections.

931. Obverse as preceding.

Reverse. Hygeia, with serpent upon her right arm, defends an infant against a demon by a shield which bears a cow. Legend: Triumph! Getilget Ist Des Scheusals Lange Wuth· Silver, bronze. 28 mm.

Rudolphi, 1829, p. 82, No. 342; Kluyskens, ii., p. 69, No. 5; *ibid.*, Num. Jenner., No. 13; Duisburg, p. 231, dcix., No. 7; P. and R., p. 140, No. 388. In the Lee and Fisher collections.

932. Obverse. A child, between a rose-tree and the rising sun, exhibits its arm. At its feet, a serpent. Legend: Dank Der Gütigen Vorsehung. Exergue: Krüger (either Fr. Heinrich or Chr. Jos. K.).

Reverse. Within a pearled octagon, Wohl | thätige | Entdeckung | Der | Schutz-pocken | Durch | Ed: Jenner. Silver. 30 mm.

Kluyskens has Vorschung and Kruger, and on reverse Wohlthatige. Kluyskens, Num. Jennér., No. 8; Duisburg, p. 231, dcix., No. 8; P. and R., p. 142, No. 397. Unknown to Rudolphi.

933. Obverse. Within palm branches, Jenner's bust, facing. Beneath, 1749 (the date of Jenner's birth), and to left, Hamel (Namel, Kluyskens) Et Lecompte (Lecomte, Kluyskens). Inscription: Edward Jenner.

Reverse. Between laurel branches, Médaille De Ire Classe. Inscription: Comité Central De Vaccine Du Département Du Nord. Silver. 40 mm.

Kluyskens has dots after each word on the reverse. Kluyskens, Num. Jennér., No. 9; P. and R., p. 145, No. 416. Unknown to Rudolphi, Duisburg, and Rüppell.

934. Obverse similar to preceding.

Reverse. A laurel wreath, beneath which, Médaille de 2e Classe. The field vacant, for the name of the recipient. Silver. 36 mm.

P. and R., p. 146, No. 417. The obverse is figured. Unknown to Rudolphi, Kluyskens, Duisburg, and Rüppell. I presume that this and the preceding are French, as intimated by P. and R., although it may prove that they are Belgian. As to this, see under Dr. Demanet, a little further on.

935. Obverse. Portrait of Jenner upon an oval shield, between two females holding a crown above. Beneath, an elongated shield, upon which a cow, to right.

Reverse plain. Plaster of Paris. 37 mm.

Designed by Charles Wiener, of Brussels. Unique. Alvin. Revue belge de numismatique. April, 1888, p. 243. Unknown to Kluyskens, Duisburg, Rüppell, and P. and R. Reference is also made to Jenner upon both of the medals of Vraneken, of Antwerp, and the two of Sacco, of Milan, to be described in the present Section.

C. HOLLAND.

Dr. Phoebus Hitzer Themmen, of Amsterdam, President of the Vaccine Society at Amsterdam.

936. Obverse. Bust, to right. Beneath, Lageman F. Inscription: Phoebus Hitzerus Themmen·M·D· Instituit MDCCCIII.

Reverse. Laurel wreath, with field vacant for name of recipient. Inscription: Het Amsterdamsch Koepokinentings Genootschap· Silver. 35 mm.

Rudolphi, 1829, p. 158, No. 654; Kluyskens, ii., p. 496; *ibid.*, Num. Jennér., No. 25; Duisburg, p. 184, ccccxcvii.; P. and R., p. 146, No. 418. Dr. Jan le Francq Van Berkhey (1729–1812). "Vervolg op de natuurkundige Vergelijkingen betreffende de zo veel gerugt maakende Koepokken," etc. Leyden, 1801, 8°.

937. Obverse. Within beaded circle, bust very much resembling that of B. Franklin, to right. No inscription.

Reverse. Hulde | Aan | De Wetenschappelijke Verdiensten | Van | · | Jan Le Francq Van Berkhey, | Med. Doct. En Lector Der Nat. Historie | Aan De Hoogeschool. | Geb. Te Leyden Den 23 Jun. 1729. | Overl. Den 13 Maart 1812. (Homage to the Scientific Merit of, etc.) Composition. 52. 80 mm.

Bom and Zoon Cat., p. 160, No. 2945.

In my collection. Unknown to Rudolphi, Kluyskens, and Duisburg.

Dr. L. H. J. Vrancken, of Antwerp (1773–1853). Distinguished for his zeal in favor of vaccination.

938. Obverse. Bust of Napoleon I., to right.

Reverse. Inscription, engraved : Antverp : Civit : Doctori. Medico Domino Ludovico Henrico Josepho Vrancken Methodi Jennerianæ Propagatione In Anno MDCCCVII Perillustrato. Gold. 55 mm (65, Kluyskens).

Kluyskens, Num. Jennér., No. 17; Mertens en Torfs, Geschiedenis van Antwerpen, vii., p. 51, fig.; P. and R., p. 146, No. 419.

D. Belgium.

Dr. Adolf Peter Burggraeve, of Ghent (1806–). "Le Vaccin vengé." 1855. "Monument a Edw. Jenner, ou Histoire Générale de la Vaccine," etc. Brussels, 1875, 4°.

His medal was described, No. 58, under Section I. He will again be referred to in the present section under Cholera and Syphilis, and in Section XII., Climate.

Dr. Guillaume Demanet, of Ghent (1747–1831). Founder in 1800 of the Comité Central de Vaccine.

939. Obverse. Bust of Napoleon I., to right.

Reverse. Ministère De L'Intérieur—Société Générale de Vaccine.—M. Demanet, Chirurgien A Gand. Silver. 35 mm.

Kluyskens, i., p. 245, No. 1; *ibid.*, Num. Jennér., No. 18; P. and R., p. 146, No. 420.

Unknown to Rudolphi and Duisburg. Curiously enough, no mention whatever is made of this distinguished fellow-countryman of his by Kluyskens in his subsequent publication, the "Numismatique Médicale Belge."

940. Obverse. The sacred cow of the Hindoos, marked by a star. Legend: Jupiter E Terra Genitam Mentitur Ut Auctor

Desinat Inquiri. Poterat Non Vacca Videri. (Ovid. Metamorphoses, i., 615.)

Reverse plain. Silver, gilt. 40 mm. Engraved by L. De Bast.

Kluyskens, i., p. 245, No. 2; *ibid.*, Num. Jennér., No. 19; P. and R., p. 146. No. 421. Unknown to Rudolphi and Duisburg. It was presented to Demanet at a banquet on July 22d, 1821, and is unique.

Demanet was also the recipient of one of the Royal Belgian Vaccine medals of gold, to be described hereafter. Dr. Charles Kluyskens, of St. Gilles (1788–1858). Cantonal vaccine officer.

Dr. Kluyskens not only received one of the royal gold medals last mentioned, but one from Willem I., and three others from Leopold I. I have not as yet ascertained their exact character. They were probably of the third of the types mentioned hereafter, as Belgian premium medals for vaccination.

Dr. Joseph François Kluyskens, of Ghent (1771–1843). "Verhandeling over de Koeypokjes." 1801, 8°.

941. Obverse. Lucina standing, with bouquet and torch. Legend: Voto Parturientis Ades. Exergue: Artis Obstetritiæ Præmium.

Reverse. S. P. Q. G. (Senatus Populusque Gandensis.) Art. Obst: Prot. D. D. Josephus Franciscus Kluyskens 1791. Gold, adorned with silver gilt. 44 mm. Engraved by Tiberghien.

The second word in exergue of obverse has tiæ in Kluyskens' work of 1859, and ciæ in that of 1884; he has a dot after the second D of the reverse in the first, and not in the second. When describing this medal in my paper upon the medals of obstetrics and the diseases of women,* I pointed out that Kluyskens' name should have been in the dative, not the nominative case, as he was the recipient; and at the same time scarcely twenty years of age. The device of the obverse is the same as that of a medal to Wedenberg, of Stockholm, which I also described in the monograph mentioned above. Kluyskens, ii., p. 109; *ibid.*, Num. med. belge, p. 18.

942. Obverse. Bust, facing, in academic robes, seated at table, with handkerchief and snuff-box.

Reverse. Joseph-François | Kluyskens | Né A Alost | Le IX Sept. MDCCLXXI. | Mourut | À Gand Le XXIV Oct. | MDCCCXLIII. Gold. 37 mm.

In both his descriptions Kluyskens differs from his figure in having the dates in Roman numerals, and also Sept. and Oct. In his work of 1859, he has also Mort. In the two descrip-

* *New England Medical Monthly*, December, 1886.

tions he materially varies as to the size of the medals. Kluyskens, ii., p. 110, fig.; *ibid.*, Num. med. belge, p. 19.

943. Obverse. Bust, to right. Beneath, Barre F. Inscription: Carolus Augustus Dux Saxoniæ (Saxe Weimar).

Reverse. Within a garland of flowers, Doctarum Frontium Præmia. Gold. 35 mm. Kluyskens, i., p. 110.

This medal was conferred upon Dr. Kluyskens in 1827, by the Duke of Saxe Weimar, in acknowledgment of his work upon Materia Medica. It is unmentioned in the "Numismatique medicale belge."

944. Obverse. Bust, facing, in official garb. Beneath, Lemaire Gand. Inscription: Joseph-François Kluyskens | Nè A Alost Le 9 Septembre 1771. Mort A Gand Le 24 Octobre 1843.

Reverse. Il Releva | Le Chirurgie | De Son État D'Abjection | Et Contribua | Par Ses Lecons Cliniques | A Étendre | Les Progrès | De Cette Science | En Belgique. Silver, bronze. 60 mm. Kluyskens, Num. med. belge, p. 19; Rüppell, 1875, p. 58.

E. FRANCE.

Dr. Jean Baptiste Bousquet. "Traite de la Vaccine," Paris, 1833, 8°; "Sur le cow-pox," etc., Paris, 1836, 8°; "Nouveau traite de la vaccine," Paris, 1848, 8°.

945. Obverse. Bust. Beneath, engraved, Barre, 1829. Inscription: I. B^te^ Bousquet De L'Acad^e^ Roy^e^ De Médec^e^. Bronze. Duisburg, p. 73, cxc. Unknown to Kluyskens.

François Alexandre Fréderic, Duc de Larochefoucault-Liaincourt. President of the Comité de Vaccine.

946. Obverse. Bust, to right. Inscription: Larochefoucault De Liancourt N. 1747.

Reverse. Les Arts Et L'Humanité Honorent Sa Mémoire. —Mort Le 27 Mars 1827. Silver. Kluyskens, ii., p. 125. Unknown to Duisburg.

Dr. A. A. Parmentier, of Paris. An ardent advocate of vaccination.

His medal already described in Section I., and further reference made to him under Sections IV. and VI.

F. GERMANY.

Leopold, Graf von Berchthold. Induced extended vaccination in Asia and Africa.

16

His medal described previously, under Section X., The Plague. Not mentioned by P. and R. in either edition (1880 and 1882) of their "Pestilentia In Nummis," though added to a reprint from the former, without date, upon the medals of inoculation and vaccination.

Dr. Johann Emmanuel Bremer, of Berlin (1745–1816). "Die Kuhpocken." Berlin, 1804. His two medals have been described in the present Section, Nos. 926 and 927, with those of Dr. Edward Jenner.

Dr. Friedrich Wilhelm Ludwig Hirt, of Zittau (1761–). Did much for the extension of vaccination.

947. Obverse. An infant, bending its knees, holds a flower and points to its left arm. Inscription: Diess Erhaelt Mir Leben, Gesundheit U. Wohlgestalt.

Reverse. Zum | Andenken | An Die | Schutz | Blattern. Exergue: Von Dr. Hirt | In Zittau. Silver. 21 mm.

Duisburg has Diss. Rudolphi and Kluyskens have Und, and D for Dr.

Rudolphi, 1829, p. 76, No. 318; Kluyskens, ii., p. 35; Duisburg, p. 140, ccclxxvii.; P. and R., p. 142, No. 395.

Dr. Johann Friedrich Stromeyer, of Göttingen (1749–1830). Introduced vaccination into Germany.

948. Obverse. Minerva placing three crowns upon an altar; an owl at her feet. Inscription: Sollennib. Mvn. Profess. Qvinqvagenariis. Exergue: A. MDCCCXXVI. | G. Loos D. Pfeuffer F.

Reverse. A crown of stars. Beneath, Triumviris | Joanni Frid. Erico | Blumenbach | Jo. Fr. Stromeyer | Jo. Godefr. Eichhorn | Grata | Georgia Aug. On rim of Kluyskens' specimen, Ex officina Monetaria G. Loos. D. Loos. Fil. Berolin. Silver, bronze. 42 mm.

Ampach, 9931; Rudolphi, 1829, p. 21, No. 79; Kluyskens, i., p. 136; Duisburg, p. 160, ccccxxviii., No. 2. In the Fisher collection and my own.

F. Sweden.

Dr. Heinrich Callisen, of Copenhagen (1740–1824). Court physician, he introduced vaccination throughout Denmark.

949. Obverse. Bust. Beneath, S. Jacobson F. Inscrip-

tion: Henr. Callisen, Med. Doct. Chirurg. Prof. Prim. Et Direct. Gen. Nat. 1740. D. II Maii.

Reverse. A crown of oak leaves. Inscription: Senescenti Doctori Discipulorum Pietas. Die 29 Martii 1805. Silver. 57 mm.

Kluyskens calls the crown, of laurel. Rudolphi, 1829, p. 30, No. 114; Kluyskens, i., p. 175; Duisburg, p. 212, dlxiii.

G. ITALY.

Dr. Ludovico Sacco, of Milan (–1836). Introduced vaccination into Italy.

950. Obverse. Bust, to left. Beneath, P(ietro)·T(adolini)·F· Inscription: Aloysius·Sacco·Mediol·Med·Et·Chir·Prof·

Reverse. Within a wreath of oak leaves, tied below by a serpent, Jenneri·Aemvlo· | Amici·Bononienses· | A·I·Ab·Ital·Rep·Cons· Bronze, lead. 55 mm.

Kluyskens omits several of the dots, and in his larger work has A.B. instead of Ab. Upon rim of his specimen, the word Copie, engraved.

Millin, Suppl. hist. métall. Napol., pl. 64, No. 404; Brasseux ainé, Cat. des méd. de l'Hist. Num. de Nap., fig.; Rudolphi, 1829, p. 141, No. 587; Kluyskens, ii., p. 411; *ibid.*, Num. Jennér., No. 3; Duisburg, p. 36, ciii., No. 1; P. and R., p. 140, No. 389.

This is in the Lee and Fisher collections and my own. It was struck by Napoleon I.

951. Obverse. Hygeia, with serpent on her arm, and a nude vaccinated boy are placing a wreath upon the bust of Sacco, upon whose base a cow. Beneath, L. M(anfredini). Legend: Sic Morbvs Morbo Cvratvr. Exergue: VIII Kalendas Mai I | Anno I Reip. Italicæ | MDCCCII.

Reverse. Aloysio· Sacco | Jennerianæ· Insitionis | Primo·In·Coenomani | Propagatori·Benemer | Municipium | Grates Bronze. 55 mm.

Rudolphi and Kluyskens omit the initials of the engraver. They have Calend., and the date in Roman letters. They omit Italicæ, though Kluyskens gives it in his figure. Kluyskens has Grate in his description, but not in his figure. Duisburg has Calendas. Upon the rim of Kluyskens' specimen, the word Copie. P. and R. have Coenomanis.

Millin, Suppl., pl. 64, No. 405; Brasseuxainé, Cat., fig.; Rudolphi, 1829, p. 141, No. 588; Kluyskens, ii., p. 411, fig.; *ibid.*, Num. Jennér., No. 4; Duisburg, p. 36, ciii., No. 2; P. and R., p. 140, No. 390, fig. of obverse. Struck by Napoleon I.

H. RUSSIA.

Mullah Hassan Daut, of Astrakhan.

952. Obverse. Beneath a crown, the irradiated monogram of Alexander I. Below, five lines of Russian (for services rendered to Mullah Hassan Daut, the son of Hadschi, 1805).

Reverse. Above, the Russian crown, irradiated. Beneath, three lines of Tartar language (as above). Gold, bronze. 52 mm.

Rüppell, 1875, p. 68; P. and R., p. 148, No. 431. For vaccination of the nomad tribes. Dr. Johann David Lange, of Gorzda in Lithuania.

953. Obverse. A child pointing to its upper left arm; in that hand it has a rose. Before him a cornucopia; to right a rose-bush, beneath which, L(oos). Inscription: Donatum A Doctore Med: Joh: David Lange. Exergue: Gorzda | 1811.

Reverse. Ad | Gloriam | Dei | Utilitatemqui (sic) | Magni | Imperii | Russici | Silver. 26 mm.

Kluyskens, Num. Jennér., No. 11; P. and R., p. 149, No. 433.

The device of this is the same as of No. 926. Dr. Lange was an earnest advocate of vaccination.

Premium medals for the encouragement of vaccination have been instituted by several countries.

A. BELGIUM.

954. Obverse. A cow, with Fame holding a trumpet and the staff of Æsculapius. Beneath, Fabriek H·D·Heus· Legend: Volitat·Jam·Fama·Per·Orbem· Exergue: MDCCCIX.

Reverse. Garland of oak leaves. Legend: Pro·Variol· Vacc·Insit·Plus·C(entum)·Civib(us)·Uno· Ann·Gratis·Administr* Gold. 40 mm.

Kluyskens omits several of the dots and the star, and has Arabic numerals. In describing the Charles Kluyskens medal, he has Fabrick and Anno. Kluyskens, i., p. 245, No. 3; *ibid.*, Num. Jennér., No. 20; P. and R., p. 147, No. 422.

Conferred by the King of the Belgians upon physicians who had vaccinated at least one hundred times in a year. Unknown to Rudolphi and Duisburg. The dies are at the Mint at Utrecht.

I have already mentioned that this medal was given to Drs. Demanet, of Ghent, and C. Kluyskens, of St. Gilles. In the former case the inscription upon the field of the reverse was Aan M. Demanet Te Gent. 1824, and in the latter Aan C. Kluyskens Heelmeester Te St. Gilles Waas. 1825. They are wrongly spoken of by previous authorities as different medals.

Kluyskens, ii., p. 111; *ibid.*, Num. Jennér., No. 21; *ibid.*, Num. med. belge, p. 23; P. and R., p. 147, No. 422, note.

955. Obverse. Head of the King to left. Beneath, Braemt F. Inscription: Leopold Premier—Roi des Belges.

Reverse. A cow, to right; under its head an open lancet. Above, in two straight lines, Propagation | De La Vaccine. Exergue: the staff of Æsculapius. Gold, bronze. 33 mm.

In P. and R.'s first edition, 1880, they have Propogation.

Kluyskens, Num. Jennér., No. 28; P. and R., p. 47, No. 423. In the Lee collection.

956. As preceding, save in exergue of reverse instead of the staff: D'Apres E. Verboeckoren | Braemt F. Bronze. 33 mm.

Kluyskens, Num. Jennér., No. 27; P. and R., p. 147, No. 424. This is a pattern piece. It is in my collection.

957. Obverse. Head of the King, to left. Beneath, S·Wiener· Inscription: Leopold II· Roi Des Belges·

Reverse similar to that of the last but one. Gold. 33 mm.

Kluyskens, Num. Jennér., No. 29; P. and R., p. 147, No. 425.

This and the last but one were for the reward of public vaccinators of the poor, but were not conferred after 1868.

B. France.

The general "Central Vaccine Committee" seems to have been founded in 1800 at Paris. One with the same name, also conferring medals, was instituted at Tours in 1810. There was also a "General Vaccine Society" and a "National Vaccine Society" dating from 1829, all of them apparently under Government auspices. This diversity of name has created much confusion.

958. Obverse. Laureated head of Napoleon, to right. Beneath, Andrieu F. Inscription : Napoleon—Emp. Et Roi.

Reverse. Æsculapius, leaning at right upon his staff, has his left arm around the nude Venus de Medicis, who points to her vaccinated arm. To the left a cow, and to right an open lancet above a vaccine point. Below, to left, Andrieu F. To right, Denon Dir. Exergue : La Vaccine | MDCCCIV. Silver, bronze. 41 mm.

Laskey, Description of the Medals struck at the National Mint by order of Napoleon Buonaparte, No. xlvii. ; P. and R., p. 143, No. 400.

Laskey states that this was conferred by the Société Centrale de Vaccine. The dies are preserved at the French National Mint.

959. Obverse as preceding, save Denon Dir· | Andrieu F·, and only the title Empereur.

Reverse as preceding. Silver, bronze. 41 mm.

Ibid., p. 143, No. 399. The reverse is figured.

In the Lee and Fisher collections and my own. The dies are at the National Mint at Paris.

960. Obverse. Device as preceding. Upon shoulder, Droz Fecit· Beneath : Denon Direxi (?) | M·DCCC·VI· Inscription : Napoleon—Emp·Et Roi·

Reverse. Two laurel branches. Field vacant for inscription. In the descriptions by P. and R. the inscription is as follows : Vaccine· | Mr. Bouriat | A Tours· | 1806 Et 1807· Upon rim, Ministère De L'Intérieur*** Silver. 40 mm. *Ibid.*, p. 143, No. 401.

961. Obverse as preceding.

Reverse. E. Credet Ministre De L'Intérieur. Within, Comité Central | De Vaccine | Formé Le XI Mai | MDCCC· Below, MDCCCVIII· Ampach, 3131 ; Hist. mét. de Nap., pl. lxviii., No. 449[a] ; P. and R., p. 143, No. 402.

962. Obverse. A cow, to left. Above, a vaccine lancet and point. Beneath, to left, De Paulis·F· Exergue : Ex Insperato | Salus.

Reverse. Within an oak wreath, | Vaccinations | Municipales | De Paris· | MDCCCXIV. | Silver. 32 mm.

Kluyskens, Num. Jennér., No. 16; P. and R., p. 144, No. 403.

In the Lee and Fisher collections.

963. As the last, but from different dies. *Ibid.*, p. 144, No. 404.

964. Obverse. Head of the King, to right. Under shoulder, Gayrard F., and beneath this, De Puymaurin D. Inscription: Louis XVIII Roi—De France Et De Nav·

Reverse. Device like that of No. 956. Beneath, to left, Andrieu; to right, Fecit· De Puymaurin D. Exergue: La Vaccine | — | MDCCCIV

Upon the rim of P. and R.'s specimen, engraved: Mr Lombal, Officier-De-Santé A | Dombasle· 1820· 41 mm. *Ibid.*, p. 144, No. 405.

965. Obverse. Head of King, to right. Beneath, Puymaurin D., and on shoulder, Andrieu F. Inscription: Louis XVIII· Roi De—France Et De Navarre.

Reverse as the last, save Di· for D. 41 mm. *Ibid.*, p. 144, No. 406.

966. Obverse as reverse of No. 962.

Reverse. A laurel wreath. The field vacant for inscription.

Kluyskens, Num. Jennér., No. 15; P. and R., p. 144, No. 407. This is in my collection.

967. Obverse. Bust, to right. Beneath, De Paulis F. Inscription: Louis XVIII Roi De—France Et De Navarre.

Reverse. Ministère | De L'Intérieur | — | Comité Central | De Vaccine | Formé Le XI Mai. | MDCCC. | —

P. and R. have dot after XVIII, and on reverse omit the De and dot after Mai; they have one after XI, and the date in Arabic numerals. Silver. 42 mm.

Kluyskens, Num. Jennér., No. 22; P. and R., p. 144, No. 408.

This is in my collection.

968. Obverse as that of No. 962.

Reverse. Within a laurel wreath, Ministère De L'Intérieur. Société Générale De Vaccine. 42 mm. Kluyskens, *loc. cit.*, No. 23; P. and R., p. 144, No. 409.

969. Obverse. Head, to right. Beneath, De Paulis F. |

De puymaurin·D· Inscription : Charles X Roi—De France Et De Nav·

Reverse like that of No. 956. 41 mm. *Ibid.*, p. 145, No. 410. The dies are at the National Mint at Paris.

970. Obverse. Laureated head, to right. Beneath, Caqué F· Inscription : Louis Philippe I—Roi Des Français.

Reverse like that of No. 956. Upon edge of the Lee specimen, Mr. Thore Medecin A Sceaux (Dept. of the Seine) 1836. Silver. 41 mm. *Ibid.*, p. 145, No. 411. In the Lee Collection.

971. Obverse as that of last.

Reverse. An oak wreath, with field vacant. Inscription : Société Nationale De Vaccine Fondée En 1829· Kluyskens, *loc. cit.*, No. 26 ; P. and R., p. 145, No. 412.

972. Obverse. Device as that of No. 960.

Reverse. Département D'Indre Et Loire. Within, Comité | Central | De Vaccine | Fondé A Tours | Le 23 Juin 1810 | Et Réorganisé | Le 25 Juillet 1839. Silver. Octagonal. 30 mm. *Ibid.*, p. 145, No. 413.

973. Obverse. Female head, with diadem and wreath, to right. Beneath, E. Rogat. Inscription : République | Française.

Reverse like that of No. 956. *Ibid.*, p. 145, No. 414. The dies are preserved at the French National Mint.

974. Obverse. Laureated head, to right. Beneath, Barre. Inscription : Napoleon III—Empereur.

Reverse like that of No. 956. *Ibid.*, p. 145, No. 415. The dies are at the French National Mint.

975. To Mr. Hauch, of Orchies. 1843. Bronze.

Tarlier Cat., Paris, 1879, No. 421. This does not seem to have been known to P. and R. It may have been of the preceding group.

The medals of the Comité Centrale De Vaccine Du Département Du Nord have already been described among those of Jenner, Nos. 933–34.

976. Obverse. Bust, to left. Inscription : Napoleon III Empereur. Caqué Graveur d. s. m. L'Empereur.

Reverse. Conseil Central d'Hygiène et de Salubrité de la Seine Inférieure. Vaccine à Mr. Legris Médecin—1865 within oak wreath. Lecomte à Rouen. Upon edge, Argent. Silver, gilt. 28. Unknown to P. and R. It is in the Lee Collection, and it is to Dr. Lee's courtesy that I am indebted for the description.

C. Germany.

977. Obverse. Bust of King, to right, with cloak and decoration. Beneath, Abramson. Inscription: Frid. Wilhelmvs III Boruss· Rex Pater Patriæ·

Reverse. Hygeia, with patera and serpent, crossing the sea upon a cow. Legend: In Te Svprema Salvs. Exergue: Vaccinationis Præmivm. Gold, silver, tin. 65 mm. 44. Kluyskens, *loc. cit.*, No. 24; P. and R., p. 141, No. 391, reverse figured.

In the Lee and Fisher collections. The dies are at the Imperial Mint at Berlin.

978. Obverse. Head of King, to right. Beneath shoulder, Goetze F. Inscription: Friedrich Wilhelm III·—Koenig Von Preussen.

Reverse. A physician, seated, vaccinating two children brought by their mother. To right, a third child. Behind, a cow. Rauch Inv.—Goetze F. Legend: Dem Verdienste Um Die Schutzimpfung. Silver. 53 mm. *Ibid.*, p. 141, No. 392. The reverse is figured. The dies are at the Imperial Mint at Berlin.

979. Obverse. An angel, upon whose shield is a cow, overcomes a dragon. To the left, a kneeling woman and child. Exergue: G·Loos Dir·L·Held·Fec·

Reverse. Für | Willige | Mittheilung | Des Impf- | Stoffes. Silver. 25 mm. Kluyskens, *loc. cit.*, No. 10; P. and R., p. 142, No. 396. In the Lee Collection.

980. Obverse. A kneeling woman points to the arm of her child. To the right, a vase with flowers, and shield bearing a lion. Above, the All-Seeing Eye. Legend: Wir Dancken Dir—Für Diese Wohlthat· Exergue: A. Guillemard f.

Reverse. The staff of Æsculapius, between wreaths of oak leaves and roses. Legend: Gestalt Gesundheit·—Leben Geschützt· Exergue: Schutz-pocken | Commission· | 1803. 27 mm.

Duisburg, p. 231, dcix., 5; Kluyskens, Num. Jennér., No.

12; P. and R., p. 143, No. 398. Struck at Prague, for Bohemia. In the Fisher Collection and my own.

The medals of the Bremer-Institut at Berlin have been already described, Nos. 928–29.

D. Italy.

981. Obverse. Bust of the Pope, to right. Beneath, Giu· Cerbara F. Inscription: Pivs Septimvs—Pon. Max. Anno XXIII (1822).

Reverse. Within united oak boughs, De Salvt. Pvb | Benementi Beneath, L·G· Silver. 41 mm. *Ibid.*, p. 147, No. 426.

982. Obverse. Bust of the Pope, to left. Beneath, Girometti·F· Inscription: Pivs Septimvs Pont·—Max·Anno XXIV· (1823.)

Reverse as preceding. 42 mm. *Ibid.*, p. 148, No. 427.

E. Sweden.

983. Obverse. Head of King, to right; beneath, M. Frumerie. Inscription: Carl XIII Sveriges G·Och V·Konung (King of Sweden, the Goths and Vandals).

Reverse. Within an oak wreath: För Befrämiad Vaccination (For encouraging V^a^). Silver. 39 mm. Ampach, 4886; P. and R., p. 149, No. 434.

984. Obverse. Head of King, to right; beneath, L(udwig)·P(ersson)·L(undgren)· Inscription: Carl XIV Johan Sveriges Norriges G·Och V·Konung·

Reverse as preceding. 35 mm. *Ibid.*, p. 149, No. 435.

985. Obverse. The same device. Beneath, L·P·L·F· Inscription: Oscar Sveriges Norr·Göth·O·Vend·Konung.

Reverse as preceding. 35 mm. *Ibid.*, p. 149, No. 436.

986. Obverse. The same device. Beneath, L·A· Inscription: Carl XV·Sveriges Norr·Goth·O·Vend·Konung.

Reverse as preceding. 35 mm. *Ibid.*, p. 149, No. 437.

987. Obverse. The same device and initials. Inscription: Oscar II·Sveriges Norr·Göth·O·Vend·Konung· 35 mm. *Ibid.*, p. 150, No. 438.

The dies of all the above are preserved at the Royal Mint at Stockholm.

F. RUSSIA.

988. Obverse. Bust, to left. Inscription, in Russian: Ecatharina II, Czarina and Empress of Russia.

Reverse. Hygeia surrounded by seven naked children. Upon her head, a star. Inscription, in Russian (For Vaccination). Bronze. 66 mm. *Ibid.*, p. 148, No. 428.

989. Similar, with slight differences. Bronze. 40 mm. *Ibid.*, p. 148, No. 429. The reverse is figured.

990. From still different dies, but in the main the same. Bronze. 30 mm. *Ibid.*, p. 148, No. 430.

991. Obverse. Head, to right. Below shoulder, B·A· Inscription: Nicolai I· Keisari·Kokovenään Itsevalt·Suomen Suuriruhtin· (Nicholas I., Emperor of Russia, Czar, Grand-Duke of Finland.)

Reverse. Device as in the three preceding. Inscription: Vaksinin Istuttamisen Edesta (For Vaccination). Bronze. 40 mm. *Ibid.*, p. 148, No. 432.

Struck for Finland. The dies are at the Imperial Mint at St. Petersburg.

(*To be continued.*)

THE BIRTH OF MAN.—The ethical question how far it is pusillanimous and even religious to profit by the annihilation of pain which anæsthesia affords under surgical operation and in parturition has recently undergone discussion anew in some of the French papers. The discussion is antiquated and out of date in this country, and many of the stories told would hardly bear repetition in this serious country. Sir James Simpson long ago disposed of the argument, now revivified, which charges the women who accept anæsthesia in childbirth with evading the biblical injunction of pain. An indignant Frenchwoman has revived an old argument with some flippancy, but not without a reckless wit. "You quote," she says, "some verselets in the Bible against us; but let me remind you that the only one of your sex who took his part in the act of giving birth profited by anæsthesia; for when Adam gave up a rib toward the creation of Eve, he was thrown into the deep sleep of insensibility."—*British Medical Journal.*

THE MONTGOMERY QUARANTINE CONFERENCE.

Editor of THE SANITARIAN :

PURSUANT to the call issued by the Governor of Alabama, as announced in your February issue, the representatives of the Gulf and Mississippi Valley States assembled in the Hall of the House of Representatives, Montgomery, at ten o'clock, March 5th, 1889. There were present, besides, Surgeon-General John B. Hamilton, U. S. Marine Hospital Service ; George M. Sternberg, Major and Surgeon U. S. Army ; Daniel M. Burgess, Medical Officer to the Havana Consulate, and Dr. William H. Van Bibber, of Maryland, who, by vote, participated in the proceedings.

The conference was organized as follows :

President, Dr. C. B. Wilkinson, Louisiana ; Vice-Presidents, Hon. D. B. Hadden, Tennessee ; Dr. T. George Simono, South Carolina ; Mr. E. Berkley, Georgia ; Dr. William Bailey, Kentucky ; Mr. J. C. Clark, Alabama ; Dr. Robert Rutherford, Texas ; T. Y. Porter, Florida ; R. F. Gray, North Carolina ; Dr. B. M. Griffith, Illinois ; Dr. J. M. Taylor, Mississippi ; Secretary, Dr. J. N. McCormack, Kentucky ; Assistant Secretaries, Mr. J. N. Ludlow, North Carolina ; Dr. J. B. Baird, Georgia.

The chair announced the following as the Committee on Order of Business :

Drs. J. Cochran, Alabama ; R. P. Daniel, Florida ; W. D. Bizzell, Georgia ; T. G. Simmons, South Carolina ; J. D. Plunket, Tennessee ; R. Rutherford, Texas ; T. F. Wood, North Carolina ; J. O. McReynold, Kentucky ; J. W. Du Pree, Louisiana ; R. S. Toombs, Mississipi ; G. S. Sternberg, U. S. Army ; J. B. Hamilton, U. S. Marine Hospital Service.

On motion, the chairman appointed a committee to whom should be referred all papers on quarantine, as follows : Messrs. Foster, of Georgia ; Conyngton, of Alabama ; Wall, of Florida ; Griffith, of Illinois ; Thompson, of Kentucky ; Smith, of Louisiana ; Allen, of North Carolina ; Pires, of Texas ; Van Bibber, of Maryland ; Horlbeck, of South Carolina ;

Thornton, of Tennessee; Hyer, of Florida, and Hutton, of the Marine Hospital Service.

Dr. Jerome Cochran read, by permission, propositions to be submitted to the Conference. Dr. P. C. Wilkinson, of Louisiana, read a paper on the subject of disinfecting vessels arriving in port, gave a detailed report of the methods followed in the maritime quarantine at New Orleans, which was discussed pending the report of committee. At the afternoon session Colonel J. C. Clark, of the Mobile and Ohio Railroad, submitted a paper with propositions as a basis for action on matters pertaining to inland quarantine, which after discussion was referred to the Committee on Quarantine. Mr. Voyle, of Florida, read a paper on the yellow-fever at Gainesville, Fla. The evening session was devoted to the discussion of the papers presented by the Business Committee. These topics were selected from a lengthy series of questions and propositions submitted for the information and guidance of the Conference, as read by Dr. Cochran at the morning session: by Dr. A. N. Bell, of New York; Dr. J. B. Hamilton, Surgeon-General U. S. Marine Hospital Service; Dr. J. McCormack, Secretary Kentucky State Board of Health, and Dr. Jerome Cochran, State Health Officer, Alabama. They covered the whole question, Dr. Bell's being devoted to maritime quarantine; Dr. Hamilton's eleven short questions covering each point of dealing with a supposititious outbreak of fever, notification, etc. Dr. MacCormack proposed four resolutions regarding co-operative work of health authorities, the closing of ports, notification of fever, and importance of isolation. Dr. Cochran's propositions were elaborate, on the quarantine of railroads, comprising a complete schedule for proceeding under all possible cases.

These propositions were digested and their substance submitted by the Business Committee to the Conference for action in the form of a series of propositions, as follows:

I. What form of notification shall be adopted in case of occurrence of yellow-fever?

Resolved, That this convention urges upon all health authorities of States represented in it the importance of strict compliance with the argeement of inter-state notification adopted by the National Conference of State Boards of Health and the Sanitary Council of the Mississippi Valley, in regard to all communicable diseases, and especially in regard to yellow-fever. Adopted.

II. Under what circumstances should an epidemic be declared to exist? After long discussion this was laid on the table, no action being taken.

III. Should we advise depopulation in the event of the appearance of yellow-fever in any place, and if so, how soon? After lengthy discussion the following was substituted:

In the beginning of an outbreak of yellow-fever there is no need of depopulation at all, except of infected houses or infected districts; but if people who are able to afford the expense desire to leave they should do so quietly and deliberately, and no obstacles should be placed in their way; and those who leave healthful districts of the city or town should go wherever they please, without let or hindrance.

Persons living in infected houses or in infected districts should be encouraged to leave, but should be allowed to leave only under such restrictions as will afford reasonable guarantees of safety to the communities in which they find asylum; and they should be sent only to such communities as are willing to receive them.

In the depopulation of infected houses or of special infected districts, the inhabitants should be removed into camps of probation, or into vacant houses in the adjacent country. After ten days' detention, if they remain well, and under proper regulations, such as disinfection of baggage, they should be considered free from danger, and allowed to go freely into any community willing to receive them. Adopted.

This closed the first day's proceedings.

Preliminary to the business of the Conference, on the second day, Col. W. F. Morse, of New York, described the methods of the construction and operations of the Engle garbage cremater for the final destruction by fire of garbage, night soil, refuse, and offensive matter of all kinds. He gave a concise description of the furnace, exhibiting a diagram and giving estimates of costs, proportioned to the size of each place and of the matter to be destroyed. He showed that its use had been adopted by many places with uniform success; that this method had been ordered by the city of Jacksonville, was under consideration by Savannah, Charleston, Raleigh, Wilmington, and many other places. He stated that the Engle Sanitary Company were prepared to make examination at any place and submit estimates for furnaces of requisite size, to erect same and put them into use, and guaranteeing the perfect operation before any payment could be made. The whole question of cremation was one of the utmost interest and importance, and of great value as concerning directly the whole question of sanitation by the various towns and cities. Many questions were asked and much interest was shown by the members of the Conference.

The report of the Committee on Quarantine being ready, the report following was adopted by the Conference, after a long discussion covering all the day.

A substitute for one section was offered by Colonel Foreman, of New Orleans, referring the whole question and management of quarantine to the General Government, both maritime and inland, and providing for a board of commissioners to inquire into the numerous epidemics which had been prevalent in the country. He supported this by a strong speech, and called for a vote by States. Under rules previously adopted, each State had ten votes, and his substitute was lost by a vote of 97½ to 12½.

The following report of the committee, as amended, was adopted as the voice of the Conference.

SECTION I. During the prevalence of yellow-fever epidemic, passengers and freights should be brought from infected localities only under such regulations and restrictions as may be established by the State health authorities along the lines of the roads concerned.

The regulations and restrictions governing railroad transportation during yellow-fever epidemics should be of such character as to afford all reasonable guarantees of protection to the communities in danger of invasion by the disease, but should not be more onerous than the circumstances warrant, and should be framed with due consideration of the extent of the danger in each particular case, and as affected by latitude and seasons of the year, and other qualifying conditions.

At all seasons of the year, and under all circumstances, the simple passage of railroad trains should be allowed, without obstruction, even when carrying sick refugees from infected places to healthful localities willing to receive them.

SEC. 2. A well-digested quarantine formula, making and promulgating the necessary rules and regulations for enforcing the same, should be prepared ready to be put in force when necessary to do so, at all points where it is necessary to put quarantine in force. These rules should be published for general information, to enable all persons to comply with the same, and displayed by placard in every depot.

SEC. 3. At all quarantine stations, accommodations should be provided for caring for such persons, if any, that may be detained, or are not permitted to pass through such stations while in transit until they can be disposed of.

SEC. 4. Only competent physicians who have had experience with contagious and infectious diseases should be made inspectors of quarantine stations, whose duty it shall be to inspect and examine the condition of passengers, baggage, and express matter. All inspectors should have the power to administer oaths and to remove from the trains at quarantine stations and detain such passengers, baggage, or express matter as may be found necessary to prevent the introduction or spread of infectious or contagious diseases of any kind.

SEC. 5. State boards of health should be the powers authorized to put quarantine in force. They should determine when, where, and for what length of time quarantines should be maintained; provide the means necessary for enforcing the same, and promulgate rules and regulations for conducting quarantines. Presidents and secretaries of State boards should be required to visit and inspect all quarantine stations as often as practicable during the existence of such quarantines, and to make public over their signatures and official positions the general condition of the public health at the points where quarantines are established and the localities affected by such quarantines. Local health officers, municipal or county authorities may establish quarantine regulations, conferring with the State board, if deemed necessary for co-operation. The regulations for governing local quarantines should not conflict with the rules and regulations adopted by the State boards of health for enforcing quarantine regulations.

SEC. 6. The refugee stations as at present operated on the sea-coasts of the United States are, in the opinion of this body, of infinite service, and we would recommend their continuance in a full equipment for all requirements.

SEC. 10. Railroad agents at way stations should be required to refuse to sell tickets to any persons who cannot show that they have not in twelve days been exposed to any source of infection, and conductors should be required by law to refuse to transport passengers from way stations who are not supplied with tickets.

SEC. 11. Health certificates should be required from persons whenever yellow-fever prevails in this country. They should be issued only by the health official, under official seal, or, in the absence of such seal, under the seal of the municipal or county court where the certificate originated. In each certificate the person to whom it is issued should be so described as to admit of his identification, and should state the facts of the case fully and circumstantially. And to such certificates full credence should be given by all health authorities. We must have honesty and mutual confidence among those charged with the protection of the public health.

Upon examination of Dr. Wilkinson's paper the committee offers the following resolution :

Resolved, That this Conference endorse the Holt quarantine and disinfection system, as at present operated in New Orleans, as the best one known for the prevention of the introduction of yellow-fever into the ports of the United States, and recommend its uniform adoption.

After the adoption of the report the session adjourned until three o'clock P.M.

On reconvening in the afternoon, consideration of the topics on the various papers reported by the committee was continued:

IV. Is it practicable to cause depopulation of large cities? Tabled.

V. Are probation camps desirable? By whom should they be managed and supported? Tabled.

VI. On the occurrence of a case of yellow-fever, what immediate measures of isolation are desirable?

The following was substituted :

When one case or a few cases of yellow-fever occur in any community, it does not follow of necessity that the disease must spread and become epidemic. On the contrary, the experience of many countries through long periods of time shows conclusively that in the majority of such instances and without the observance of any special means of prophylaxis, the disease fails to spread.

When one case or a few cases of yellow-fever occur in any community, in the light of our present knowledge of the habits and modes of propagation of the disease, it is generally possible, by the employment of the proper prophylactic measures, to prevent the development of an epidemic.

The golden rule for the prevention of the spread of yellow-fever is non-intercourse—isolation—the keeping of the well away from the sick, away from infected things, and very specially away from infected localities.

In the enforcement of this rule, non-intercourse, two problems present themselves for solution. (*a*) To keep the people generally from coming into the infected houses and the infected localities ; and (*b*) to keep doctors and nurses and other attendants and the well members of sick families from visiting and mingling with people outside of the infected houses and localities. The solution of the first of these problems is comparatively easy. The solution of the second is sufficiently difficult. But it is possible to solve them both.

In the densely settled sections of cities, guards may be useful for the enforcement of non-intercourse. They are much less needed in sparsely settled towns. In villages and county neighborhoods, as a rule, they are not needed at all. In all cases every intelligent family should be able to take care of itself—should be able to keep all of its members away from infected houses and localities, and to guard its own premises from invasion by dangerous persons and things.

Non-intercourse may be practised in the very centre of an infected district with considerable probability of escaping the fever. Cloistered convents and prisons in infected cities, with yellow-fever raging all around them, usually escape invasion ; and there are numerous instances on record in which private families in the midst of epidemics have passed the ordeal safely by the vigorous enforcement of non-intercourse. Adopted.

VII. What means of disinfection should be adopted for chambers and dwellings where cases of fever have occurred ?

"That this Conference recommends that all approved methods of disinfection, ventilation, fumigation, or chemical effusion of infected or suspected things should be used during an epidemic or until danger of its spread shall have passed, and that all places should be disinfected after the recovery of the sick." Adopted.

VIII. What system of disinfection should be adopted for the disinfection of personal baggage of persons fleeing from an infected place? No conclusion was *reached* on this topic.

The night session was devoted to the papers of Dr. G. M. Sternberg, U. S. Army, on the "Researches for the Bacilli of the Yellow-fever," and by Dr. Vaughan, of Michigan, who had written a paper, but, owing to the lateness of the hour, gave only a brief *résumé* of it. (Dr. Sternberg's will appear in full in our pages hereafter.)

Third day. The Conference was called to order at 9.30 A.M.

The following committee, proposed by Colonel Clark's resolution Wednesday night, was appointed by the president: J. C. Clark, J. B. Baird, J. F. Porter, R. S. Starkweather, William Bailey, H. B. Horlbeck, J. Black, R. Rutherford, R. T. Gray, O. R. Earley, and C. M. Smith.

Dr. Burgess read an interesting paper on yellow-fever, giving in detail experience with the treatment of that disease on the island of Cuba. The paper detailed fully the method of issuing health certificates in Havana to outbound vessels. Dr. Burgess, in concluding his paper, stated that the greatest danger of the introduction of disease into this country from Cuba was by means of smuggling schooners carrying on their illegal traffic between that island and Florida.

A general discussion of this paper and description of the method of inspection was given by Surgeon-General Hamilton.

Resolutions were adopted asking the United States Government to break up the practice of smuggling from Cuba into Florida, and for the appointment of sanitary inspectors in foreign ports where infectious diseases are endemic.

Dr. Van Bibber, of Maryland, read a lengthy paper "On the Quarantine of the Future." Dr. Gaston, of Georgia, read a paper entitled "A Plea for Yellow-fever Inoculation as a Prophylactic Measure," which he closed with a resolution that the theory of inoculation be thoroughly investigated.

To the question, When may refugees return to their homes? The following was adopted:

(1) After the occurrence of ice.

(2) After the occurrence of three killing frosts.

(3) After the occurrence of no case of fever for the period of two weeks, and of the thorough disinfection and ventilation of all localities infected, and bedding and such other articles as are capable of carrying fever germs.

The following resolution was adopted:

Resolved, That this Conference is of the opinion that it is a duty devolving upon all nations to take measures to eradicate any plague centre from its territory, and that the existence of such plague centre is a menace to all other nations, and that our State Department be requested to take measures through proper diplomatic chambers for the conveyance of this opinion to the governments deemed obnoxious to the opinion herein expressed.

Dr. Baird, of Georgia, reported that the committee, consisting of one from each State, appointed under Col. Clark's resolution, had appointed a sub-committee to prepare and promulgate rules and regulations to govern quarantines. The sub-committee was composed of Colonel Clark, of Alabama, and Dr. Baird, of Georgia; the appointment was concurred in by the convention, and the committee continued with instructions to formulate rules, and report the same, to be published in the report of the proceedings of the Conference. After votes of thanks to the officers, the Conference adjourned *sine die*.

This Conference was remarkable for being the first organized attempt to unite in one concerted action the Southern States under uniform rules for the suppression of epidemics. The Florida experience showed that some uniformity of procedure was necessary for the safety of the community and protection of business interests, and if the rules suggested by this Conference be acted upon, there will result a uniform and universal effort on the part of the local, the State, and the Government officials, which will accomplish, as far as human agency can, the suppression of the dread scourge.

The relative powers to be given to local, State, and municipal health officers was the subject which provoked most discussion, and one which was left in the most indefinite state. The feelings of bitterness engendered by past encounters sometimes found expression, and several times there were indications of a strong inclination to bring on a general battle, but wiser measures prevailed, and the general harmony was not disturbed except in one case.

The Mayor of Decatur made a passionate and forcible statement of the grievances of that city in regard to the inattention of the Health Officer of Alabama to the petitions of the citizens for a thorough disinfection. It was met by the statement of Dr. Cochran, that "all the proof went to show that there was not a particle of evidence that the infection still existed in Decatur. The State had the money to do the work asked for, and he had control of it, but he would cut off his right hand before he would do this. If the Conference granted the prayer of Mayor Austin, it would controvert the whole fever history of the world."

It was the expressed opinion of Dr. Hyer, of Mississippi, and Dr. Thornton, of Memphis, that the prayer of Decatur should be answered, but the resolution of Mr. Hadden, of Memphis, that the city of Decatur be disinfected by the proper authorities, was lost, and the whole subject tabled.

To the scientific questions relating to the hibernation of the germs of yellow-fever, the inoculation theory for the prevention of the fever, no conclusion was formulated. The disposition of the Conference was eminently practical and business-like, but little speculative or theoretical discussion being allowed. A valuable fund of information as to observation and treatment of the fever was brought out, and the general result will do much to produce a harmonious system of quarantine, should the occasion arise hereafter. FRANCIS.

THE "WARING SYSTEM."—The San Diego City Councilmen last week unanimously voted not to approve a bill of Colonel George E. Waring for $2,231.91, the balance of the $20,000 he was to be paid as engineer of the sewer system. It was held that the sewer system was not in successful operation. One trouble arises from the tide, which forces the water back to the pipes and causes the sewer gas to burst the smaller pipes.—*Pacific Lumberman and Contractor, December 13th,* 1888.

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

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"DEFEND YOURSELVES FROM TYPHOID-FEVER."

Under this heading the *Medical Record* of February 2d repeats the words of Professor Carlo Ruata, of Perugia, in the striking account he has recently given of the prevalence of typhoid-fever in Italy. "Every year," he says, "this disease attacks from 200,000 to 300,000 individuals, and causes a mortality of 27,700. One third of the persons in Italy who reach the age of forty-five are attacked with typhoid-fever. In several districts over three per cent of the inhabitants die from the disease annually."

"The extraordinary prevalence of typhoid-fever in Italy," the *Record* remarks, "can be better realized by a comparison with the rates in this country. Massachusetts, with a population of 2,000,000, has annually less than 1000 deaths from typhoid-fever. Italy, with a population fourteen times as great, has twenty-seven times more deaths from this disease.

"It is inexcusable that civilized States at the present day should allow a disease relatively so controllable to make devastations such as those in Italy. Well may Professor Ruata exclaim, 'Defend yourselves from typhoid-fever.'"

Apropos to this, the Berlin correspondent of the *Medical Press*, March 28th, 1888, reports a persistent epidemic that played havoc in a garrison artillery barracks, in Berlin, from 1873 to 1885, attributed to soiled clothing. A case of typhoid-fever was imported in 1873, and from that date to the close of the epidemic 146 cases occurred. Every possible source of disease was looked into and everything kept in the best possible condition, but the disease baffled all inquiry. The closing of the barracks finally came up for consideration, but previously suspicion fell upon the bed linen and clothing, because the vast majority of cases were furnished by the men of one battery alone. On close investigation, it was found that the linings of the trousers were, almost without exception, soiled by dry fecal matter. The clothing was submitted to renewed careful treatment by means of chlorine and dry heat, from which time (November 18th, 1885) no more cases of the disease occurred.

"HYGIENE, however, is the direction in which the finger-board of future glory seems to me to point," says Dr. S. S. Turner, U. S. Army, in discussing the question, "Is the Practice of Medicine a Failure?" (*Medical Record*, February 2d, 1889.) "Few people, relatively, require the art of the surgeon. All are intensely interested in the causes which develop disease, and the means of removing the causes or preventing the development. Of course there are certain causes inherent in the race which science cannot remove. It can only point the way, and trust to the slow process of evolution to make man master of his appetites, every one of which, indulged to excess, becomes a source of disease. But man's environment is more easily controlled, and there is reasonable hope that the plagues and epidemics which have decimated communities in the past will be substantially, if not literally, banished. A widespread epidemic of yellow-fever, with a percentage of death below the rate of most acute febrile diseases, is certainly remarkable, and, in spite of Sternberg and soda, it is too early to give the credit to therapeutics; for did not the negroes say that the colored people who sent for the doctors died, while those who threw 'physic to the dogs' got well?"

"The time is fast approaching," says the *New York Medical Journal*, of February 2d, 1888, "when hygienic and preventive medicine must supersede in great degree the methods of the old healing art. Less credit given to drugs results in greater reliance on measures that render them unnecessary. And thus a knowledge of limitation becomes an increase of power. It is the physician alone who can lift to a higher level public conceptions of life, death, and disease. In order to fulfil his high vocation of supreme educator—controlling the relations of human life to the outer world—an exhaustive knowledge of all the surroundings of man is essential, a survey of the whole of nature. Without it, the best-intentioned must inevitably fail. To place medicine upon the plane of biology is to give it the only foundation that accords with the spirit of the times. Any effort in this direction deserves recognition and encouragement. When man rises—by means of modern medical instruction—to the momentous cognition that he has power over his own destiny and that of his offspring, life for the masses will begin to be truly worth living."

THE PREVENTION OF DIPHTHERIA by sanitary work, in many towns in Michigan, affords an example which other communities should not fail to profit by. Dr. H. B. Baker, Secretary of the State Board of Health, reports that—

"In those outbreaks of diphtheria in Michigan in 1887, where the recommendations of the State Board of Health as to isolation and disinfection were fully carried out there were only about one fourth as many cases and deaths as in those outbreaks where these measures were not taken. Compared with those outbreaks in which either isolation or disinfection, or both, were neglected, there was in the 78 outbreaks in which isolation and disinfection were both enforced a saving of 160 lives and 721 cases of diphtheria. Although this is a record of a saving of human life of which those officers who contributed to it should be proud, yet the saving of life in Michigan during the year 1887 from this disease was undoubtedly much greater than is shown by such a comparison, because, if in each of the 398 outbreaks reported there had been as many cases and deaths as there were in each of the 118 outbreaks in which either isolation or disinfection, or both, were neglected, there would have been 1079 deaths and 4692 cases. So that, without counting the saving which probably occurred in outbreaks in which only one of the essentials (isolation and disinfection) was neglected, there is indicated a saving in Michigan in 1887, from this one disease, diphtheria, of 518 lives and 2371 cases of sickness.

"The evidence of the experience in 1887 is all the stronger because it is in harmony with the facts previously reported relative to the year 1886. It is to be regretted that in 202 outbreaks the health officers' reports were not sufficiently definite to make it certain just what was done ; but there is cause for congratulation that the local work by those health officers who made these imperfect reports was apparently better than their reports ; because, if in each of these 202 outbreaks there had been as many cases and deaths as in each of the 118 outbreaks in which isolation or disinfection, or both, were known to have been neglected, there would have been 357 more deaths and 1650 more cases than was reported to have occurred."

POISONING BY CHROME YELLOW USED AS A CAKE DYE is the subject of two important contributions to the *Medical News* (December 31st, 1887, and January 26th, 1889), by David Dennison Stewart, M.D., reporting 79 cases with 8 deaths, and a large proportion of the other 71 irrecoverably ill with the various phases of lead poisoning from this cause. Lead, Dr. Dennison believes, is a more frequent cause of chronic endocarditis than gout, syphilis, or alcoholism.

It may be that the general prevalence of heart disease, with its relatively large proportion of deaths in the statistics of mortality, generally, hitherto for the most part unaccounted for, is due to this and other compounds of lead used for coloring candies as well as cakes, for glazing cooking utensils, and for flesh powders and hair dyes.

"THE OLD OAKEN BUCKET," as revised and edited by the accomplished President of the Board of Health of New York, which, since it was read by Dr. Edson at the Academy of Medicine a few months ago has been going the rounds of the press, was first published in THE SANITARIAN from the original manuscript of the author, nearly ten years ago, Vol. VIII., p. 38. But we are glad of its extended circulation.

"EX" AND "SEL" are the especially distinguished contributors to several exchanges which come to our table ; particularly, we regret to say, to some new health journals : publications conducted by persons too contemptibly mean to accredit the source of the material they use and who, instead, commonly append one of these abbreviations. Sometimes they append other signatures to pithy extracts which would be tolerable enough if they did not, by extreme carelessness with regard to printers' proof or ignorance of the gist of the extracts they make, indicate the same purpose as *ex* and *sel*, to divert attention from unqualified plagiarisms of the context. The following are examples from a health journal less than a year old, which claims a circulation of 5000 monthly :

"When a factory is blown up or a sloop sunk there is an immediate cry for the punishment of some individual whose selfishness or carelessness has led to the calamity, in order that all men may be warned against the direliction of duty in time to come. Yet, how few remember that besides these occasional droppings, which so startle the *year*, there is a great stream of death and misery holding its onward course, as to which they have never asked the question whether or not the bulk of its dark waters may be lessened."

"BELL."

"Cleanliness and refinement bear the same relation to each other in the progress of civilization as do *faith* and moral uncleanness in the degradation of uncivilized communities ; and the connection of cleanliness with civilization is everywhere manifest in direct ratio with mental culture."

"IBID."

We have italicised the substitutes for ear and filth in these extracts, and omit the name of the periodical from which they are taken, with the hope that, considering the extraordinary circulation of our youthful contemporary in so short a time, its editor will appreciate the importance of the distinction, and see his way clear at some future time how to explain it to such of his numerous readers as may be like himself, too intent on a wholly different purpose, to appreciate the importance of correcting his proofs.

SANITARY AND ECONOMIC COOKING.

Garbled Abstract by the New York Herald.

Dr. Irving A. Watson, Secretary of the American Public Health Association, has issued a circular letter to the public, calling attention to the forfeited faith of the New York *Herald.*

It appears that soon after the Milwaukee meeting of the American Public Health Association, "Mr. Henry Lomb received a telegram, signed by James Gordon Bennett, asking for the Lomb Prize Essay entitled 'Practical Sanitary and Economic Cooking for Persons of Moderate and Small Means,' which had just been awarded the $500 prize, for publication in the New York *Herald*. In response to this, Mr. Lomb and the Secretary, believing that it would be a good medium through which to present this very able and valuable essay to the public, went to New York, and had an interview with Mr. Bennett's representative.

"Almost the first question propounded by the representative was, 'What do you ask for the essay?' He was informed that it was not for sale at any price, but that if the *Herald* would publish it in full, it should have the privilege of first presenting it to the public. The representative critically examined the manuscript, acknowledged its great value, accepted the proposition, and agreed to and did pay for a typewritten copy of the same. Mr. Lomb and the Secretary then left, with the full understanding that the entire essay was to appear in the *Herald* at its first convenience.

"The Secretary ordered fifty copies of the *Herald* that was to contain the essay. Our astonishment and disgust were unbounded, when, on January 31st, we received the fifty copies containing a terribly mutilated and distorted article in place of the complete essay."

The *Herald* was immediately written to by the Secretary, properly characterizing "the manner in which the Lomb Prize Essay appeared in the Sunday *Herald* of the 27th inst. as an insult to the Association, to the Committee of Award, to those who competed for the prize, and to the public. . . .

"Your course reflects such a degree of mediocrity upon the American Public Health Association that a statement of the facts will be publicly made at once by the Association, unless the *Herald* fully removes the gross misrepresentation it has made. The fifty copies of the *Herald*, sent in response to an order for that number containing the Lomb Prize Essay, await your order, since, not containing the same, the Association has no use for them."

After waiting nearly a month, and receiving no reply, the circular was issued. It particularly specifies a number of the misleading sub-headings and vulgar qualifications of the *Herald's* publication.

"The essay, which will soon be given to the public in an authorized form, needs no defence. The concluding remarks in the report of the Committee of Award show their appreciation of it, after a critical examination :

"'The committee consider it a duty, in awarding the prize, to emphasize the fact that of all the essays submitted the one selected is not only pre-eminently the best, but that it is also, intrinsically, an admirable treatise on the subject.'

"'It is simple and lucid in statement, methodical in arrangement, and well adapted to the practical wants of the classes to which it is addressed.'

"'Whoever may read it can have confidence in the soundness of its teachings, and cannot fail to be instructed in the art of cooking by its plain precepts, founded as they are upon the correct application of the scientific principles of chemistry and physiology to the proper preparation of food for man.'"

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000 : Reports 64 deaths during January, of which 14 were under five years of age. Annual death-rate, 19.2 per 1000. From zymotic diseases, 10, and from consumption, 10.

CALIFORNIA.—For the month of January, 1889, the Secretary's abstract of the reports received from 66 cities and towns, with an aggregate population of 700,850, the number of deaths was 992. Annual rate, 16.92. Deaths from consumption during the month, 165—16.62 per cent. From zymotic diseases : Diphtheria and croup, 43 ; typhoid-fever, 29 ; typho-malarial-fever, 1 ; remittent-fever, 3 ; cerebro-spinal fever, 11 ; diarrhœal diseases, 7 ; whooping-cough, 7 ; scarlatina, 1 ; small-pox, 3.

San Francisco.—During the month of January, 1889, the number of deaths was 517. From zymotic diseases, 33 ; 2 of which were from small-pox. From consumption, 90—17.4 per cent.

Los Angeles, 80,000 :. 57 ; from zymotic diseases, 12 ; consumption, 7.

Oakland, 55,000 : 61 ; from zymotic diseases, 11 ; consumption, 6.

San Diego, 32,000 : 19 ; from zymotic diseases, 2 ; consumption, 4.

Sacramento, 35,000 : 30 ; from zymotic diseases, 1 ; consumption, 5.

CONNECTICUT.—The Secretary of the State Board of Health reports for January, 1889, 892 deaths from 167 towns, comprising a population of 737,276, representing an annual death-rate of 14.5. Deaths under five years of age, 178—24.0 per cent. Deaths from zymotic diseases, 140—15.7 per cent. From consumption, 112—12.5 per cent.

FLORIDA.—The Legislature has passed the bill creating a State Board of Health, which has received the signature of the governor, and is now the law. The law contains all the provisions insisted on by the friends of Florida. The Board is given ample powers as to all sanitary matters, has a right to call on the governor for any assistance that may be required to enforce its orders, and is amply provided with funds, $50,000 having been voted to carry out its orders. The Board can restrict travel, and destroy, when it deems it necessary, all infected property, to be paid for out of the special health fund.

IOWA.—Monthly *Bulletin* for January, 1889, reports :

Keokuk.—Total deaths, 19. Consumption, 4.

Davenport.—Total deaths, 36. Diphtheria and croup, 13. Death-rate, 12.81.

Des Moines.—Total deaths, 51. Consumption, 10 ; typhoid fever, 2 ; diphtheria, 2.

Populations not reported.

ILLINOIS.—*Chicago*, 830,000 : Reports 1255 deaths during January, of which 625 were under five years of age. Annual death-rate, 18.10 per 1000. From zymotic diseases, 282, and from consumption, 112.

LOUISIANA.—*New Orleans*, 248,000 : Reports for four weeks ending January 26th, 444 deaths, of which 87 were under five years of age. Annual death-rate per 1000 among whites, 20.79 ; among colored, 30.13. From zymotic diseases there were 44 deaths, and from consumption, 65.

A good deal of commotion has been excited in the city on account of the governor's appointment of Dr. W. G. Austin, Quarantine Officer, in the place of Dr. T. Y. Aby, who has so successfully served for several years. Dr. Austin is a physician of excellent repute, and with the same aids as Dr. Aby had—which he promises—there appears to us no reason to fear an equally good service.

MAINE.—The Secretary of the State Board says in the *Sanitary Inspector :* "Maine stands alone among the New England States in having no system of registration of vital statistics, and consequently is like a ship at sea without a compass as regards her knowledge of where she stands in the health scale. We think we have good reasons for *surmising* that there is no State in the Union with a lower general death-rate. If this is true, the proof of the fact would be worth something. If, on the contrary, the local death-rates in some of our towns were making the general death-rate higher than it ought to be, the absolute demonstration of that fact might lead these towns to remove their bad record."

MARYLAND.—*Baltimore*, 500,343 : Reports 612 deaths during the four weeks ending January 26th, of which 194 were under five years of age. Annual death-rate, 15.91 per 1000. From zymotic diseases, 71, and from consumption, 100.

MASSACHUSETTS.—*Boston*, 415,000 : Reports 813 deaths during January, of which 261 were under five years of age. There were 120 deaths from zymotic diseases, and 132 from consumption. Annual death-rate, 23.5 per 1000.

MICHIGAN.—The Secretary reports that, for the month of January, 1889, compared with the preceding month, the reports indicate that scarlet-fever and neuralgia increased in prevalence.

Compared with the preceding month, the temperature was slightly lower, the absolute humidity was slightly less, the relative humidity was slightly more, and the day and the night ozone were less.

Compared with the average for the month of January in the three years 1886–88, intermittent-fever, inflammation of kidney, consumption of lungs, and pneumonia were less prevalent in January, 1889.

For the month of January, 1889, compared with the average of corresponding months in the three years 1886–88, the temperature was much higher, the absolute humidity was more, the relative humidity was less, the day ozone and the night ozone were more.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of January, 1889, at sixty places, scarlet-fever at ninety-four places, typhoid-fever at thirty-eight places, measles at eleven places, small-pox at eleven places.

Reports from all sources show diphtheria reported at eight places more, scarlet-fever at thirty-seven places more, typhoid-fever at eight places more, measles at seven places more, and small-pox at five places more in the month of January, 1889, than in the preceding month.

A part of the increased prevalence of communicable diseases is doubtless only apparent, because a knowledge of a large number of outbreaks, not otherwise reported, was obtained from the annual reports of health officers and clerks sent to the office of the Secretary during the month of January.

Detroit, 230,000: Reports 284 deaths for January, of which 78 were under five years of age. Annual death-rate, 14.53 per 1000. From zymotic causes, 45, and from consumption, 31.

MISSOURI.—*St. Louis*, 440,000: Reports for January 716 deaths, of which 274 were under five years of age. Annual death-rate, 19.53 per 1000. From zymotic diseases there were 136 deaths, and from consumption, 76.

For the year 1888 there were reported 9015 deaths, of which 3659 were under five years of age. From zymotic diseases there were 2133 deaths, and from consumption and pulmonary tuberculosis, 800. Death-rate per 1000 for the year, 20.49.

NEW HAMPSHIRE.—For the month of January there was reported to the State Board of Health quite a prevalence of diphtheria and scarlet-fever, although neither of these diseases has assumed epidemic proportions. Diphtheria was reported from Dover, Nashua, Somersworth, Wolfeborough, Rochester, Bedford, Manchester, Langdon, Acworth, Epping, Concord.

Scarlet-fever was reported from Pittsfield, Dover, Nashua, Jaffrey, Henniker, Farmington, Somersworth, Rochester, Mount Vernon, Rye, Manchester, Claremont, Troy, Lebanon, East Kingston.

The largest number of cases of diphtheria reported from any one place was eight or ten in Bristol; and the greatest number of cases of scarlet-fever was nine, in Claremont, of a mild type.

The character of both these diseases was usually non-malignant. The action of local boards of health has undoubtedly restricted the spread of these diseases in several localities. In some towns the schools were closed; in others, isolation and disinfection were deemed sufficient.

No unusual prevalence of other diseases is reported.

NEW JERSEY.—*Hudson County*, 282,254: Reports 565 deaths for January, of which 221 were under five years of age. Annual death-rate, 24.0 per 1000. From zymotic diseases there were 142 deaths, and from consumption, 69.

Paterson, 80,000: Reports 122 deaths during January, of which 37 were under five years of age. Annual death-rate, 18.2 per 1000. There were 16 deaths from zymotic diseases, and 22 from consumption.

NEW YORK.—The number of reported deaths for January is about the same as in December, and a little less than in January, 1888. From a population of 3,980,000 there were 7100 deaths reported, which gives a death-rate per 1000 annually of 21.40; this includes the cities and larger villages. The infant death-rate is higher than in the preceding month. Zymotic diseases caused 17.00 per cent of all deaths (17.90 in December). A moderate increase in the prevalence of scarlet-fever continues; typhoid-fever is materially diminished; diphtheria is credited with causing fewer deaths than last month, 7.30 per cent of all deaths. From small-pox deaths are reported from Lyons, Rome, Marengo in Wayne County, Middlebury in Wyoming County, and from the Onondaga County alms-house. New localities for its development are the towns of Burns, Allegany County, and Sheridan, Chautauqua County, and a single mild case in Fort Plain. At Syracuse and Lyons, previously reported, the outbreak is almost controlled. Consumption caused 12.55 per cent of all deaths and 19.25 of deaths over five years of age.

Maritime District.—New York City, 1,571,558, 25.28; Brooklyn, 814,500, 22.93; Gravesend, 5000, 9.60; New Utrecht, 4742, 36.00; Long Island City, 21,000, 28.00; Newtown, 10,000, 38.40; Oyster Bay, 12,000, 22.00; Hempstead, 18,000, 12.00; North Hempstead, 8000, 18.00; Huntington, 8100, 19.26; Jamaica, 10,089, ——; Southold, 7267, 14.00; Sag Harbor, 3000, 24.00; New Brighton, 15,000, ——; Edgewater, 12,000, ——; Northfield, 7014, ——; Westfield, 7000, 22.28; Yonkers, 30,000, 14.80; Westchester, 6900, 22.28; Sing Sing, 6500, 16.62; New Rochelle, 5500, 26.18; Port Chester, 4000, 9.00.

Hudson Valley District.—Albany, 103,000, 20.97; Cohoes, 20,000, 12.00; Troy, 65,000, 23.26; West Troy, 13,000, 24.00; Hoosick Falls, 6000, 26.00; Lansingburg, 10,000, 20.40; Green Island, 5000, 7.20; Greenbush, 8000, 22.75; Coxsackie, 4000, 18.00; Catskill, 4500, 10.67; Hudson, 10,000, 13.20; Kingston, 21,000, 16.60; Ellenville, 3000, 4.00; Marbletown, 4000, 9.00; Esopus, 4736, 15.20; Saugerties, 4000, 12.00; Poughkeepsie, 20,200, 24.35; Fishkill, 10,732, 17.88; Wappinger Falls, 5000, 16.80; Newburg, 20,000, 24.60; Port Jervis, 9500, 16.42; Middletown, 10,000, 33.60; Goshen, 4387, ——; Ramapo, 5000, 12.00; Haverstraw, 7000, 25.70.

Adirondack and Northern District.—Greenwich, 3861, 27.50; Argyle, 3700, 19.46; Salem, 3500, 20.58; Fort Ann, 4267, 11.50; Fort Edward, 4880, 12.30; Glens Falls, 10,000, 20.40; Crown Point, 4287, 8.38; Malone, 9000, 16.00; Potsdam, 4000, 18.00; Ogdensburg, 11,000, 14.18; Gouverneur, 5500, 15.28; Plattsburg, 7000, 12.00; Watertown, 12,200, 19.75; Lowville, 3188, 30.00; Clayton, 4314, 16.75; Ellisburgh, 4811, ——.

Mohawk Valley District.—Schenectady, 20,000, 14.40;

Schoharie, 3350, 21.50; Cobleskill, 3371, 15.00; Middleburgh, 8376, ——; Amsterdam, 14,000, 6.00; Johnstown, 6000, 6.00; Gloversville, 10,000, 16.80; Little Falls, 7200, 20.00; Herkimer, 3000, 8.00; Ilion, 4200, 50.71; Utica, 50,000, 16.08; Rome, 12,045, 21.00; Boonville, 4000, 21.00; Camden, 3400, 21.18; Waterford, 5400, 24.44; Ballston Spa, 3200, 18.75; Saratoga Springs, 10,000, 24.00.

Southern Tier District.—Binghamton, 30,000, 9.60; Owego, 6000, 12.00; Candor, 4323, 19.41; Waverly, 3000, 20.00; Hornellsville, 10,000, ——; Elmira, 25,000, 14.40; Horseheads, 3500, ——; Bath, 3500, 20.57; Corning, 8000, 18.00; Olean, 8000, 15.00; Salamanca, 6000, 8.00; Jamestown, 15,000, 11.20; Westfield, 3000, ——.

East Central District.—Walton, 3540, 7.00; Delhi, 3000, 20.00; Cooperstown, 3000, 12.00; Oneonta, 7000, 8.57; Worcester, 3000, 8.00; Cazenovia, 4363, 13.75; Brookfield, 3685, 16.25; Hamilton, 3912, 15.38; Baldwinsville, 3000, 4.00; Skaneateles, 4866, ——; Syracuse, 80,000, 16.65; Cortland, 9000, 12.00; Homer, 3000, 16.00.

West Central District.—Auburn, 26,000, 16.65; Ithaca, 10,000, 10.80; Groton, 3450, 24.35; Waterloo, 4500, 26.67; Hector, 5000, 7.20; Manchester, 4000, 9.00; Phelps, 7000, 5.14; Canandaigua, 6300, 9.52; Geneva, 6000, 22.00; Penn Yan, 4500, 16.00; Dansville, 3700, ——; Batavia, 7000, ——.

Lake Ontario and Western District.—Oswego, 24,000, 10.50; Richland, 4000, 12.00; Fulton, 4000, 15.00; Clyde, 3000, 16.00; Lyons, 6000, 20.00; Newark, 3500, 13.80; Palmyra, 4800, 22.50; Rochester, 110,000, 17.35; Brockport, 4500, 16.00; Medina, 4000, 12.00; Albion, 5000, 14.50; Buffalo, 230,000, 15.30; Tonawanda, 4900, ——; Amherst, 4578, 15.50; Lockport, 15,000, 8.80.

New York City and Yellow-fever.—Last November, when yellow-fever was prevailing in the South, the Dock Board, with the assistance of the Health Department, started an investigation of the water front. Dr. Moreau Morris was detailed by the Board of Health to make an examination. He found that many of the old bulkheads were far inland, and that when the tide receded a large area of the river bed was left exposed. This area was covered with "sewage-saturated mud." The eddies in the slip kept objects revolving until they sank. Foul gases are constantly arising, and people who work along the piers are subject to colic and typho-malarial-fever. Dr. Morris was twice prostrated while he was pursuing the investigation. He suggests that the sewers which now only reach the bulkhead be extended to the end of the pier. He thinks this "sewage-saturated mud" forms hotbeds for the lodgment of yellow-fever, cholera, and other disease germs.

NORTH CAROLINA.—In sixteen towns in the State, representing a population of 60,635 white, 50,165 colored (total, 110,800), there were 4 deaths from typhoid-fever, 1 from scarlet-fever, 6 from malarial-fever, 1 from diphtheria, 24 from pneumonia, 30 from consumption, 6 from brain disease, 11 from heart disease, 4 from neurotic diseases, 4 from diarrhœal diseases, 43 from all other diseases, 3 from accident and violence, 2 from suicide, and 12 were still births. Tarborough, Greensborough, and Statesville did not send in any mortuary reports. Four more towns have been added to the list—namely: Wilson, Hillsborough, Monroe, and Salem. Gradually we are interesting other towns in the State in the necessity and desirability of accurate mortuary statistics. Renewed efforts are being made in this direction by this office.

OHIO.—Official *Monthly Record* of the Secretary reports 1248 deaths during the month of January, representing an annual death-rate per 1000 population of 49 cities and towns of 13.05. Deaths under five years of age, 393. From zymotic diseases, 251—chiefly croup and diphtheria, 107; typhoid-fever, 43; scarlatina, 14; whooping-cough, 13. Deaths from consumption, 182. Severally, the populations and death-rates were as follows:

Akron, 30,000, 9.60; Alliance, 7000, 8.57; Ashtabula, 6500, 9.07; Bellaire, 12,000, 12.00; Bellevue, 3500, 10.28; Canton, 25,000, 12.00; Chagrin Falls, 1400, 17.13; Chillicothe, 14,000, 13.71; Cincinnati, 325,000, 16.51; Cleveland, 235,000, 14.25; Clyde, 3000, 12.00; Columbus, 101,000, 10.95; Conneaut, 1500, 32.00; Dayton, 52,000, 12.80; Defiance, 7000, 8.57; Delaware, 9000, 10.64; East Liverpool, 10,000, 14.40; East Palestine, 1600, 15.00; Gallipolis, 5000, 12.00; Hamilton, 20,000, 11.40; Hudson, 1700, 35.28; Kent, 3750, 6.85; Logan, 3700, 6.49; Mansfield, 15,000, 5.60; Marion, 8000, 16.50; Mechanicsburg, 2000, 18.00; Middletown, 7000, 13.50; Mt. Vernon, 6000, 16.00; Nelsonville, 5000, 7.20; New Straitsville, 3000, 8.00; New London, 1000, 24.00; Oberlin, 4000, 15.00; Oxford, 2000, 24.00; Piqua, 10,000, 16.80; Plymouth, 1500, 32.00; Portsmouth, 14,000, 15.43; Ravenna, 4000, 15.00; Rocky Ridge, 600, 40.00; St. Mary's, 2500, 19.20; Toledo, 80,000, 15.45; Urbana, 8000, 16.50; Wadsworth, 2500, 24.00; Washington Court-House, 5200, 6.92; Wapakoneta, 3300, 21.21; Warren, 8000, 7.50; Wooster, 8500, 12.71; Xenia, 10,000, 18.00; Youngstown, 24,300, 17.78.

PENNSYLVANIA.—*Philadelphia*, 1,040,245: Reports for four weeks ending January 26th, 1463 deaths, of which 445 were under five years of age. Annual death-rate, 13.5 per 1000. From zymotic diseases there were 162 deaths, and from consumption, 198.

Pittsburgh, 230,000: Reports for four weeks ending January 26th, 341 deaths, of which 141 were under five years of age. Annual death-rate, 19.25 per 1000. From zymotic diseases, 35, and from consumption, 24.

RHODE ISLAND.—Reports show that a larger amount of sickness prevailed throughout the State during the month of December than in the previous month, but the accounts do not make it appear that the general amount was larger than the average for the corresponding month in previous years.

Bronchitis and pneumonia had a considerably larger mortality than in any one of the seven months preceding. Diphtheria was reported from two towns only besides Providence City. In that city the disease had increased prevalence and mortality. Croup, malarial diseases, and scarlatina had largely diminished in numbers. Typhoid-fever had quite large prevalence in Providence City and surrounding towns. It had obtained considerable prevalence during the last half of November and had largely subsided before the end of December. In no other part of the State has any notice been given of its occurrence in unusual number.

The number of deaths recorded in the different towns and cities, from which returns have been received, was 455, in an estimated population of 284,152. Annual death-rate, 19.2 per 1000.

Newport, 22,000: Reports 23 deaths during January, of which 8 were under five years of age. Annual death-rate, 12.5 per 1000. Diphtheria caused 2 deaths, and consumption, 5.

TENNESSEE.—Official *Bulletin* reports for the month of January the principal diseases, named in the order of their greater prevalence: Pneumonia, catarrhs, bronchitis, malarial-fever, tonsillitis, consumption, erysipelas, rheumatism, pleurisy, and dysentery.

In the chief cities the respective annual death-rates for the month per 1000 of population are reported as follows:

Chattanooga,	white,	4.00;	colored,	26.76:	11.40
Clarksville,	"	4.80;	"	20.00:	10.50
Columbia,	"	12.00;	"	18.00:	14.88
Knoxville,	"	8.83;	"	12.88:	9.66
Memphis,	"	25.01;	"	31.34:	27.89
Nashville,	"	14.62;	"	17.49:	15.64

WISCONSIN.—*Milwaukee*, 210,000: Reports for the month of January 270 deaths, of which 69 were under five years of age. Annual death-rate per 1000, 15.4. From zymotic diseases there were 44 deaths, and from consumption, 19.

FOREIGN REPORTS AT THE MOST RECENT DATES.

Brusselles Report for the year ending October 1st, 1888: Population (December 31st, 1887), 177,523. Births, 5058—1449 or 29 per cent illegitimate; deaths, 4139—increase over previous year 819, or a little more than 4 per 1000, but still small as compared with other European cities, being 21.8 per 1000 of population; and when computed for a series of fifteen years shows a nearly uniform decrease.

The number of marriages was 1815—1 to 106; divorces, 1 to every 35 marriages.

Vaccinations and revaccinations, 4779.

CUBA.—*Havana*, 200,000: Deaths reported for the month of January, 497; under five years of age, 117. From consumption, 111—22.33 per cent of total mortality. From *yellow-fever*, 19; other fevers, 28. Death-rate, 32.

INFECTIOUS DISEASES ABROAD.

Small-pox in Italy, especially, has for a long time had free sway, and the prospect of its early arrest is not encouraging.

The *Lancet* correspondent at Rome, under date of December 1st, 1888, writes:

"Vigilant, however, she must never fail to be, if the bad traditions—the laxity, the negligence, the apathy bequeathed by the old *régime*—are not sometimes to assert themselves disastrously. Under the heading of 'Delizie Ferroviarie' (railway delights), the *Tribuna* announces that a day or two ago, while the up-train from Naples was stopping at Cecchina, within some ten miles of Rome, five gentlemen got into a second-class compartment from which, to their horror, three peasants, all ill with small-pox, and one of them, indeed, very seriously so, had just been taken. It was in vain that the incoming passengers protested to the guard against such an outrage on the travelling public. Their protestations were disregarded, and they had to pursue their journey to Rome a prey to the most disquieting anticipations. On reaching the Roman terminus, they were subjected to a sanitary inspection, and, this concluded, they lodged a strongly worded remonstrance with the 'Direzione generale.' Certainly, such a flagrant breech of good faith with the railway-faring community would not be tolerated in England, still less if the management were vested, not in a company, but in the State.

". . . From all parts of Italy, but especially from the southern provinces and the islands, comes an appeal for systematic vaccination under duly qualified medical surveillance. Town councils have proved inadequate to the strain imposed upon them by recent small-pox epidemics, and, indeed, something worse than mere incompetence is alleged of some of them. The *Tribuna*, an ably conducted and widely diffused organ of the advanced liberal party, publishes, under the heading 'Vaiuolo e Camorra' (Small-pox and the Camorra) some scandalous details as to the mode in which the malady, still unsubdued in Sicily, is sought to be combated. The public health it seems is not sufficiently *sacrosanct* for the avaricious contractor, and from the most sordid of motives the vaccine lymph supplied to the municipalities (that of the Catina is specified by the *Tribuna*) is so largely adulterated with glycerine as to be worse than useless. Town Councillor De Felice, according to the *Tribuna*, has tabled a series of charges inculpating certain prominent Catanese with this nefarious traffic in the resources of sanitation. and the names of the leaders in this Camorra or ring are to be made public in connection with a criminal prosecution. We hope that a severe example will be made of the culprits, and that erelong a well-ordered system of State-controlled prophylaxis will put Italy on an equal footing hygienically with Germany and France. Meanwhile, there are symptoms that the small-pox epidemic has, for the time, seen its worst in the Sicilian towns, Catania now recording ten cases and Messina only two per diem."

Three months ago it was officially announced that an "Instituto Vaccigeno," or depot for the supply of pure vaccine lymph, would at once be opened under the direction of the Ministry of Health, in Rome, but its fruit has not yet become apparent—six deaths reported during the week ending February 12th. The reports from Rome are very irregular, this being the only one received since that for the week ending December 29th, during which there were reported two deaths from small-pox.

But it also prevails extensively in other foreign cities besides the Italian. According to the most recent reports at hand, the number of deaths reported from it is as follows: During four weeks ending February 16th: Paris, 10; Lyons, 8; Amiens, 24; Ostend, 82; Wasmes, 2; Roulers, 2; Arlon, 13; Tamise, 8; Trieste, 15. During the four weeks ending February 9th: Prague, 75; Bucharest, 16; Venice, 5; Warsaw, 18. During the month of January: Marseilles, 11; Rouen, 5; Nice, 2. During the month of December: Milan, 23; Bologne, 19; Madrid, 23; Saragossa, 5. During the month of November: Carthagena, 52; Buenos-Ayres, 8; Rio de Janeira, 12.

In India during the twenty years ending 1885, says Surgeon-General G. Bidie, the deaths from small-pox averaged over 33,000 per annum, and for every death about ten persons had the disease and suffered mutilation. In the Madras Presidency the four great destroyers of human life are cholera, small-pox, fever, and bowel complaints, the average number of deaths from these diseases alone being about 339,000 every year. In the fifty years ending 1886, the total losses to England, France, Germany, and Austria on battle-fields amounted to but 386,000, against the annual 339,000 of the Madras Presidency from disease. The country is studded by towns and villages that have been rendered terribly foul by the filth of centuries.

Diphtheria and *scarlet-fever* prevail far less extensively in foreign cities, according to the most recent reports, than in those of the United States.

Yellow-fever is prevailing extensively in Rio de Janeiro, the number of deaths from it daily, according to the most recent accounts, being about 20. By Surgeon-General Hamilton's Weekly Abstract, March 8th, the total number of deaths registered in Rio during the week ending February 3d was 463—from yellow-fever, 127; typhus-fever, 26; enteric-fever, 11.

In Havana, during the month of February, deaths from yellow-fever, 12.

In Panama the tribute of valuable lives paid to the insalubrity of the Panama Isthmus (says *Engineering*) has been very heavy. M. A. Nicholas, who had the organization of the sanitary measures for the protection of the workmen, states that among the European element there have been 5200 deaths during a period of two years and three months, the burials averaging about seven per day, and the death-rate being 98 per 1000. In one station, among 159 young men specially selected for their physical vigor, 23 have died within twenty-two months. Among the colored workmen the loss has not been anything like so heavy, only 51 having died out of 2100 during the period considered.

LITERARY NOTICES.

HANDBOOK OF HISTOLOGICAL AND GEOGRAPHICAL PHTHISIOLOGY, WITH SPECIAL REFERENCE TO THE DISTRIBUTION OF CONSUMPTION IN THE UNITED STATES. Compiled and arranged by GEORGE A. EVANS, M.D., Member of the Medical Society of the County of Kings, N. Y.; of American Medical Association; formerly Physician to the Atlantic Avenue, Bushwick, and East Brooklyn Dispensaries, etc. 12mo, pp. 295. New York: D. Appleton & Co.

The chief originality of this work consists in such an arrangement of the mortality statistics of consumption throughout the United States as to show, so far as such statistics can, the relation of that disease to climate, locality, and density of population.

It opens with a historical sketch of the subject, fortified with citations of the most reliable authorities, ancient and modern, and a concise statement of the recent investigations of Koch and others in determining the existence and nature of the tubercle-bacillus. This is followed by a short chapter on the Geographical Distribution of Phthisis over the Globe, condensed from Hirsch's Handbook of Geographical and Historical Pathology.

The topography and climate of the several States and Territories, cities and counties of 10,000 population and upward, and groups of those with analogous conditions, are described, and the number of deaths from consumption per 1000 inhabitants on the last census year are given.

Other causes of death—as related to local and climatological conditions—are taken into account, and numerous tables adduced, showing not only the ratios of deaths from consumption to populations in the different regions and localities, but to other diseases, and, measurably, to density of population.

Next follows a series of meteorological tables giving the monthly and annual means of Barometrical, Thermal, and Hygrometrical observations at the chief stations of the United States Signal Service.

The chapter on Etiology summarizes the views of the most distinguished authorities on the special effects of the different elements of climate and local conditions: temperature, moisture of air and soil, altitude, etc.; and the relative prevalence of consumption among the different nationalities and races in the United States.

Altogether, it is a good abstract of the best literature on the most important subject that can engage the attention of the medical practitioner—how to reduce the mortality from pulmonary consumption.

ELECTRICITY IN THE DISEASES OF WOMEN, WITH SPECIAL REFERENCE TO THE APPLICATION OF STRONG CURRENTS. By G. BENTON MASSEY, M.D., Physician to the Nervous Department of Howard Hospital; Late Electro-therapeutist to the Philadelphia Orthopœdic Hospital and Infirmary for Nervous Diseases; Member of the American Neurological Association; of the Philadelphia Neurological Society; of the Obstetrical Society of Philadelphia; of the Medical Jurisprudence Society; of Franklin Institute, etc. 12mo, pp. 212. Philadelphia: F. A. Davis.

A thoroughly practical work, comprehending so much of the laws of electricity and apparatus for utilizing it as are necessary for its intelligent use in this branch of medicine and surgery, and such a detail of illustrative cases in which it has been successfully used as every medical practitioner ought to be familiar with.

THE POPULAR SCIENCE MONTHLY for April will contain a scientific explanation of the power to ensnare the human mind possessed by the leading delusion of the present day. The article is by Professor Joseph Jastrow, and is entitled "The Psychology of Spiritualism." It contains accounts of the manifestations by the Fox Sisters, Dr. Slade, Eglinton, and other mediums, all of which have been proved to be "gross intentional fraud throughout."

THE VEST-POCKET ANATOMIST. (Founded upon "Gray.") By C. HENRI LEONARD, A.M., M.D., Professor of the Medical and Surgical Diseases of Women and Clinical Gynæcology in the Detroit College of Medicine. Fourteenth revised edition, containing one hundred and ninety-three illustrations, "Dissection Hints" and "Visceral Anatomy." Cloth, 12mo, pp. 304. Price, $1. Illustrated Medical Journal Co., Publishers, Detroit, Mich.

The new fourteenth edition of this work has been increased in size by the addition of over one hundred pages of text and one hundred engravings; the page of the book has also been somewhat enlarged to accommodate better the engravings. The Brain and its Membranes, the Eye, Ear, and Throat—in fact, the entire Viscera and the Generative Organs of both Sexes, form the new subject-matter in this edition.

MEDICAL EXCERPT.

DIPHTHERIA; TOPICAL TREATMENT WITH INSUFFLATIONS OF FINELY PULVERIZED SUGAR.—C. Loray, of Frankfurt am Main (*Deutsche med. Woch.*, Nov. 15th, 1888), as the result of more than eighty observations in children from one year upward and in adults, in all gradations of the disease, finds that the duration and extent of the deposit are much diminished, the fœtid odor quickly overcome, the membrane readily detached under copious mucous secretion, and the cough facilitated in many cases of involvement of the larynx. In several cases of extensive ulceration, fatal by sepsis or by pneumonia, Professor Weigert and his assistants found separation of the membrane in a much more advanced stage than in similar cases which had been treated by other methods. Loray neglects to state the frequency with which he makes the insufflations.

Vinegar is highly recommended by Dr. Friedrich Engelmann, of Kreutznach (*idem.*), as the very best agent of a very extensive detailed series with which he has made experimental observations.—*American Journal of Medical Sciences.*

BORAX IN THE TREATMENT OF DIPHTHERIA.—Dr. L. Noël, of Noyers-Saint-Martin, has had considerable success with the following treatment, practised by him for the last four years.

Starting with the belief that diphtheria is not a local but a constitutional disease, he sought a remedy which could be introduced into the system in quantities large enough, so to speak, to "crowd out," and not merely modify the action of the poison. The author thus selected borax from all other antiseptics, as bearing administration in large doses without danger to the patients.

In epidemics of diphtheria, the author administered nothing but borax, with but three deaths out of sixty cases thus treated.

The author claims that this agent produces a rapid and abundant salivation; and, in being eliminated by the salivary and muciparous glands of the throat, it softens and detaches the false membranes.

The dose is from 8 to 15 grains in an infant below one year of age; of from 15 to 22 grains for two to five years; of 30 grains for five to ten years; and from 45 to 75 grains for adults, according to the strength of the patient and the severity of the disease. No better results were obtained from 200 grains or over than were obtained from 60 to 75 grains. The doses are to be equally divided, and given hourly, except during sleep.

In order not to disgust the patient, the correctives in which this salt is given must be frequently changed, as the administration of this medicament must be continued for some time after all symptoms of the disease have passed off, the author having administered it to two patients uninterruptedly for four and six weeks.—*Revue Thérapeutique, December 15th,* 1888.

APPLICATION OF STEAM TO THE THROAT.—The *Medical Times* says: "Apropos of the treatment of diphtheria by eucalyptol inhalations, we note that a Scotch physician advocates strongly the use of steam. The child, he says, should live in an atmosphere of steam; with or without the addition of sulphurous acid generated by burning sulphur in the room. He states that since adopting this method he has not lost a case."

In acute tonsillitis, especially the follicular variety, very few remedies at our command give such prompt and decided relief as the application of steam directly to the inflamed surfaces. By using a small gas stove or oil stove on which to generate the steam, it can be carried through three feet of tubing directly into the patient's mouth, as hot as he can bear it. It allays irritation, and relieves spasms of the laryngeal muscles.

A NEW REMEDY FOR CHOLERA.—This remedy Dr. Loewenthal announces that he has found in *salol*, the salicylate of phenol, discovered in 1886 by Nencki, of Berne. This powerful antiseptic is decomposed in the organism by the pancreatic juice, the same agent which renders toxic the cultures of the cholera bacillus in the pancreatic paste. A multitude of experiments have assured him that salol in presence of fresh pancreatic juice is invariably fatal to the cholera bacilli in his laboratory culture-tubes ; and he has determined the quantity which is sure to effectually sterilize his cultures—namely, two grammes of salol to every ten grammes of the paste ; a smaller dose, however (as ten centigrammes). renders the bacilli inactive.

It is known that salol can be taken in pretty large doses (as much as ten to fifteen grammes a day) by man with comparative impunity.

It must be added that the above interesting laboratory experiments, conclusive as they seem to be to their author, who has full faith that he has now found a sure specific for cholera, still lack clinical confirmation, as well as that confirmation which comes from a series of carefully conducted experiments on animals.—*Acad. des Sciences, Session, December*, 1888.—*Boston Medical and Surgical Journal, February 7th*, 1889.

SALOL IN CYSTITIS.—The results in the treatment of catarrhal cystitis by salol have been so satisfactory, says Dr. E. L. Vansant, of Philadelphia, in a contribution to the *Medical Times*, February 1st, 1889, that it seems proper to draw further attention to its use in this affection. Having used it in a number of cases, the results in each one were surprisingly rapid and beneficial.

The mode of administration followed was the same in each case ; in pill form and given in five-grain doses every four hours.

The results from this quantity were so satisfactory that other sized doses were not tried. Whether one single large dose will not perform the same work is, he thinks, worthy of investigation.

TRANSFUSION IN CARBONIC-OXIDE POISONING.—A workman who had inhaled the vapor of burning coals was taken to the Charite lately. All efforts to restore consciousness having failed, Professor Leyden ordered the injection of two hundred and fifty cubic centimetres of blood, taken from another patient, into one of the veins of the right arm. The patient showed signs of life five hours after the transfusion, then slept for about ten hours, and awoke in excellent spirits. His further recovery was rapid, and he is now quite well.—*Lancet, January 5th,* 1889.

CARDIAC TONICS.—*Digitalis* still holds its place as the most powerful heart-tonic which we as yet possess, and the most permanent in its effects. But there are good reasons for the zealous efforts made of late years to find some other means of strengthening the heart's action in cases of failure of compensation.

Strophanthus has been on trial for over two years, and it is difficult to decide in exactly what cases of cardiac disease it is preferable to digitalis. Nearly all observers confirm Fraser's original statements without adding any important new facts. However, Guttmann maintains that it cannot compare, either as a heart drug or as a diuretic, with digitalis. On the other hand, it was used in Bamberger's clinic with success.—*Dublin Journal of Medical Science, December,* 1888.

COCOANUT AS A VERMIFUGE.—Professor Paresi, of Athens, when he was in Abyssinia happened to discover that ordinary cocoanut possesses vermifuge qualities in a high degree. He took, one day, a quantity of the juice and pulp and shortly afterward felt some amount of gastric disturbance, which, however, passed off in a few hours. Subsequently he had diarrhœa, and was surprised to find in the motion a complete tænia, head and all, quite dead.

After returning to Athens, Professor Paresi made a number of observations which were most satisfactory, the tænia being always passed and quite dead. In only one case was the head wanting. He orders the milk and the pulp of one cocoanut to be taken early in the morning fasting, no purgative or confinement to the house being required.—*Lancet, August,* 1888.

A correspondent of the *Times,* of India, writes that the cocoanut has been used as a vermifuge in India for probably forty generations by the beef-eaters of the country, and is so well known there as a means of expelling the flat worm, that he cannot conceive how information of the fact has not reached England before. When properly prepared and intelligently administered, so says the writer, the cocoanut is equally efficacious with male fern oil, kousso, pomegranate root, or turpentine, while it is as pleasant to the palate as they are offensive.—*Pharmaceutical Journal and Transactions, November 3d, 1888.*

THE ALKALOIDS OF COD-LIVER OIL.—Gautier and Mourgues have found in cod-liver oil six toxic leucomaines; butylamine, hexylamine, amylamine hydro-dimethyl pyridine, aselline, and morrhuine.

Aselline is not abundant, and only acts in large doses, producing stupor, fatigue, and dyspnœa. Three milligrammes of the chloro-hydrate killed a green finch in fifteen minutes.

Morrhuine is quite abundant, as a teaspoonful of dark oil contained two milligrammes. Given to guinea-pigs and to birds, as a chloro-hydrate, it proved stimulant, diaphoretic, and especially diuretic, a guinea-pig weighing 250 grammes having lost 13.5 grammes in two hours, after taking 29 milligrammes of the alkaloid hypodermically.—*Medical Times.*

A MEDICO-LEGAL QUESTION DECIDED.—On December 30th last a woman twenty-five years of age was admitted to Braun's Clinic for the removal of a foreign body from the uterus.

She pretended that she had used an injection in the morning, and that the canula remained in the vagina. This latter was found to be empty, but the vaginal portion of the uterus was softened and painful to the touch. On introducing a sound into the cavity of the uterus a foreign body was discovered, and after dilating the neck, removed.

It proved to be a small instrument, which she admitted she was accustomed to use by the advice of a midwife, to swab out the vagina after sexual intercourse, because she had four children, and was unwilling to increase her family. To insure success, a piece of cloth was wound around the instrument and the parts thoroughly cleansed.

The easier to accomplish this, she placed herself in a squat position, the buttocks against the heels, pressed down the diaphragm and firmly contracted the muscles of the abdomen in order to bring the mouth of the uterus within easy reach of the instrument.

This case proves that a woman may, herself, introduce a foreign body into the womb for the purpose of producing abortion, etc. ; hence its great interest.

Hoffman, of Vienna, has reported two similar cases.—*Soc. de Méd. de Vienne, Janvier* 11, 1889 ; *Journal de Médecine de Paris.*

PHENACETIN occurs in small slightly grayish white crystals of a slightly aromatic odor. It is of value as a hypnotic in neuralgia, cephalgia, migrain, and as a marked antipyretic. It has not yet caused cardiac depression, and is best given in doses of 5 to 12 grains in pill or capsule. It causes skin eruptions sometimes.—*W. Dr.*—*Pharmaceutical Era.*

NAPHTHALIN occurs in colorless, resplendent, scale-like crystals of a tar-like odor and pungent taste. It is insoluble in water, sparingly soluble in cold alcohol, readily in hot, or in hot fatty oils. It is used as a local antiseptic, also in typhoid-fever and gastro-intestinal catarrhs at all ages in two-grain doses in powder. It can be advantageously combined with sugar of milk and ground coffee. Its untoward effects are chiefly skin eruptions and digestive disturbances.—*Ibid.*

OLEUM LANÆ (copyrighted synonyms Agnine, Lanolin) is derived from the wool of the sheep. It has been found of great value as an ointment vehicle. It is quickly absorbed by the skin, and should not be used in ointments intended for local purposes. It is of value as a medium to secure endermic medication in children. Combined with conium it produces rapidly beneficial effects on rectal ulcers and fistulæ. It is an excellent means of securing mercury absorption in syphilis. If unmixed with a small percentage of water it causes irritation of the skin when applied, by absorbing water therefrom. —*Ibid.*

PARALDEHYDE is a colorless fluid of a pungent odor and "sickish" taste. It is used as an hypnotic. It is given in 30 to 60 grain doses. It is soluble in cold water (1 to 10) and alcohol. It often deranges the digestion and produces urticaria. It is best administered in brandy or syrup of orange peel mixed with water.—*Ibid.*

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WATER ANALYSIS.*

By CHARLES SMART, M.D., Surgeon U. S. A.

WHEN a water is concentrated by evaporation and tested by chemical reagents the inorganic substances dissolved in it give notable and well-known reactions. Formerly these mineral matters were separated one from the other and weighed; and the report of the analysis gave a tabular view of their quantity and supposed constitution when the various bases and acids were recombined on paper in accordance with known chemical laws. This constituted the formal or scientific analysis of the water. The sanitary analysis of this period consisted of an endeavor to find out, by some ready method, the general character and approximate quantity of the dissolved solids. The organic matter present was known only by its odor, by the color which it gave to the residue after evaporation, the blackening and loss of weight which the residue suffered on ignition, and by some liquid reactions, as the decoloration of permanganate solution, so indefinite in their indications as to be in reality little more than interesting laboratory experiments. But as the progress of sanitary medicine developed the importance of the obscure organic matter in the causation of disease, the time which was formerly spent in formal analyses of the mineral ingredients became devoted to inquiries into the organic constitution of the water. The weight lost by the residue on ignition was investigated, and the error caused by the dissipation of carbonic acid was recognized and eliminated. The residue was submitted to combus-

* Abstract (by permission from advance sheet) of article contributed to Reference Handbook of the Medical Sciences: William Wood & Co., New York.

tion by processes which revealed with more or less accuracy the quantities of carbon, hydrogen, nitrogen, and oxygen contained in it. Easier methods of approximating to the quantity of one or other of these elements were suggested and perfected by patient work in the laboratory. Such, for instance, were the approximation to the quantity of nitrogen by the estimation of the ammonia produced from it, and the view presented of the whole of the elements by the amount of permanganate of potash required to oxidize them. In a word, the analysis of a potable water became the analysis of its organic constituents, while the mineral matters, which received so much attention at the hands of former analysts, came to be considered only in so far as they gave information concerning these less known and more dangerous organic substances.

A good deal of feeling was displayed by the authors and advocates of some of these processes, each contending that his favorite method was superior, and all that was needful to enable the operator to give an opinion on the quality of an examined water. Certain arbitrary limits of organic impurity were assigned within which waters were assumed to be wholesome or allowable, and beyond which they were condemned as unwholesome or dangerous. But since it was asserted that instances had occurred where waters which were approved as pure by one mode of analysis had been reported by another mode as of doubtful or even dangerous quality, there was ground for suspecting that not one of these processes was, in all cases, of itself sufficient to warrant a positive opinion as to purity, and still less as to wholesomeness or unwholesomeness. In view of these differences of opinion the writer, before entering on an extended series of analyses in connection with the yellow-fever epidemics of 1878–79, decided that an official opinion ought not to be given on the quality of the water-supply without a careful consideration of all the evidence procurable, and that the sanitary analysis of a water ought to consist not of one process, but of

1. A determination of the *total solids*, for the purpose of ascertaining whether the sample comes within the limits of potability, with incidental observations on the general character of the inorganic salts.

2. The loss suffered by the total solids on ignition, as afford-

ing a view of the organic matter *in toto*, and possibly a further insight into the character of the saline constituents.

3. An estimation of the quantity of *oxygen necessary to oxidize* the *oxidizable matters present* in the water, as affording a view, when taken in connection with other experiments, of the organic matter on its carbonaceous side.

4. An estimation of the *amount of ammonia* which may be obtained as the last stage of the destruction of the *organic matter present*, as giving a view of the said organic matter from its nitrogenous side.

5, 6, and 7. Determinations of the ammonia, nitrous and nitric acids, as indicating the amount of organic matter which may have been present in the water at a *period more or less remote*, and defining the period, when viewed in conjunction with other considerations.

8. A determination of the *chlorine* present, as bearing on sewage-contamination.

9. The examination of the *sediment by the microscope*, as yielding corroborative evidence as to grade and kind of impurity.

10. A study of the *source* and *surroundings* of the *water-supply* in connection with the results of the investigations above enumerated, to furnish a proper appraisement of the value of the said results.

There are, in addition, some preliminary points which require attention, such as the characters presented by the water to the senses of sight, taste, and smell. The sample may be turbid from a variety of suspended matters, and such a water is always an impure water, but not necessarily an unwholesome one. The words pure and wholesome are occasionally used without discrimination. The first is of chemical application, and implies absence of all substances foreign to the substance in question. The second is of sanitary application, and implies the inability of any of the substances in the substance in question to produce evil effects on the human system. A pure water may not be as wholesome as one that is chemically impure. Distilled or condensed water disagrees with many people on account of its flat taste and the feeling of oppression which it causes in the stomach. On the other hand, a spring water which is notably impure from the presence of certain inorganic salts may be unobjectionable on the score of wholesomeness.

A water, although it may be transparent and colorless, is not of necessity either a pure or a wholesome water, for it may contain saline, earthy, or organic substances which are harmful. Graveyard-waters, which are noted for their clear and sparkling appearance, are largely charged with nitrates, and may not be free from suspicion of evil effects. Turbidity may be owing to minute particles of inorganic matter, as sand, clay, soot, etc., to the *débris* of animal or vegetable matter, or to the presence of microscopic forms; it varies from simple loss of lustre through all degrees of haziness and cloudiness to well-defined turbidity from particles visible to the unaided eye. Occasionally the question arises as to the propriety of permitting a turbid water to settle before examining it. This should not be done in ordinary analyses. The water-sample furnished for examination should represent the supply as used, and should be examined without any preliminary purification by sedimentation.

The presence of minute particles of suspended matter oftentimes gives a color to a really colorless water. Thus rain-waters may be darkened by minute carbon particles. But color may be due to matters in solution. Dissolved vegetable matters frequently give a yellow or dark tint to the water. Some observers determine the color by looking down at a well-lighted white surface through a long tube filled with the water. Pure waters are generally bluish.

Odor, if faintly present, may be detected by shaking a bottle half-filled with the water and testing by the sense of smell the air which has been thus washed with the water. Some well-waters which have lain in contact with a stratum of clay have an unpleasant odor and taste, due to a decomposition of sulphides, but no injurious effects have been attributed to their use; and if the well is so frequently used that the water is not permitted to stagnate, the odor ceases to taint the supply.

Ready methods of determining the quality of a water are in great request. A reagent which will strike a brilliant color in an unwholesome water, while it leaves a wholesome water clear and colorless, forms one of the unrealized dreams of the amateur sanitarian. Hopes of this kind originated in the decoloration of permanganate solutions by organic matter. The ready methods appear from time to time in sanitary and family journals, but none of them has the scientific value which attaches to the easily performed experiment of evaporating a small quantity of the water in a porcelain or platinum capsule and igniting the residue. If there are no fumes nor odor, and the slight darkening of the color of the film is immediately dissipated, the water may be approved as wholesome with as much assurance as after a thorough investigation by all the processes. On the other hand, if fumes are evolved, and especially if these are nitrous or manifestly of animal origin, while the carbon film is thick and oxidized with difficulty, the water may be condemned as likely to prove unwholesome, for certainly a more extended examination will only give further demonstration of its undesirable qualities. But between these extremes, comparative organic purity on the one hand and great organic impurity on the other, instances constantly occur where all the light which the processes of organic analysis are capable of throwing upon the quantity and quality of the organic matter is needful to the formation of an authoritative opinion.

In such cases, instead of igniting the organic residue in this primitive manner, its combustion is effected with all the precautions which experience has suggested for the avoidance of error, and the carbonic acid, nitrogen, and nitric oxide evolved are collected and measured for the quantitative determination of the carbon and nitrogen respectively. This constitutes the process of Frankland and Armstrong. In it a certain quantity of the water, depending on the probable amount of impurity present, is evaporated to dryness. To prevent contamination by atmospheric dust during the continuance of the slow evaporation, the capsule containing the water is covered by a bell-glass which rests in a gutter, to convey away the condensed moisture ; provision is made for the automatic feeding of the capsule until the whole charge of water has been evaporated. The ammonia present in the water is fixed, and nitrogen-salts are destroyed by the addition of sulphurous acid. But as there is, nevertheless, a loss of ammonia proportioned to its total amount, its quantity has to be determined by a previous experiment, that the necessary correction for this loss may be applied when the process is finished; and any errors in the determination of the ammonia will be felt in the determination of the organic nitrogen in the residue. The dry residue is mixed with oxide of copper, and transferred to a combustion-tube which is attached by an air-tight joint to a Sprengel pump. After the air has been exhausted from the tube heat is applied, and the gases evolved are withdrawn by the pump and collected over mercury. They are then transferred to an accurately graduated measuring apparatus, where the loss of volume, after the introduction of a little potassic hydrate, indicates quantitatively the carbonic acid yielded by the carbon of the organic matter. Pyrogallic acid is then added to absorb any oxygen which may have been liberated from the copper oxide. If oxygen was present, the residual gas is nitrogen. But in the absence of oxygen a few bubbles of this gas are introduced to peroxidize any nitric oxide present, the resulting peroxide being removed by the pyrogallate of potash; after which the nitrogen is measured. This nitrogen represents the nitrogen of the organic matter and of the ammonia present in the water, minus that of the ammonia lost during the evaporation and plus that of organic matter adventitiously introduced during the experiment. To determine this latter error, the operator has to make several experiments on distilled water. In Frankland's laboratory the control experiment on one litre of pure water gives .05 milligramme of nitrogen, or .005 part per 100,000 of the water.

The precautions taken in this process to prevent atmospheric contact during the evaporation is an acknowledgment of the liability to errors from this cause. It is claimed by some that the evaporation of a water to dryness, without loss of the organic elements, is an impossibility, especially in the presence of sulphuric acid oxidized from the sulphurous by the destruction of nitrates. Many instances have occurred, to the knowledge of the writer, in which volatile organic matter is present in the water—in such cases the analysis of the residue is of no value; they will be more definitely specified in discussing the albuminoid-ammonia process.

The corrections applied to the nitrogen in this combustion-process may in some instances be greater than the total of the organic nitrogen present. Thus, in the first analysis given in Dr. Frankland's book, where the nitrogen amounts to .007 part and the ammonia to .029 part, the correction for loss of the latter during the evaporation is equal to .006 part of nitrogen, while that for nitrogen adventitiously introduced is .005 part, making .013 part of correction for error in dealing with .007 part of material. Dr. Mallet concludes, with regard to this process as conducted by Frankland, that it cannot be considered as determining the carbon and nitrogen of organic matter in water in a sense to justify the claim of absolute value for its results. It is but a method of approximation involving sundry errors, and in part a balance of errors. But even allowing that it gives absolutely accurate results, the information conveyed concerning the organic matter is of the most general character, consisting only of the amounts of carbon and of nitrogen contained in it. Of course, if a larger quantity of each of these elements is obtained from the residue, the water which it represents must have been polluted with a larger quantity of organic matter, while a specimen which yields low results may generally be accepted as correspondingly pure.

. . . The analytical results may be similar, whether the organic substances are harmless or hurtful. Inasmuch, however, as animal matters are conceded to be more dangerous than vegetable substances, on account of their greater liability to be associated with the germs or poisons of specific diseases, it is claimed that a consideration of the ratio of carbon to nitrogen will intimate the origin of the organic matter, and in this way convey some idea of its possible qualities. The nitrogenous proximate principles of animal life do not differ in composition materially from those of the vegetable kingdom, but the latter are usually associated with carbonaceous substances which modify the results obtained by the combustion. Frankland says that if the ratio of carbon to nitrogen be as low as 3 : 1 the organic matter is of animal origin, while if it be as high as 8 : 1 it is chiefly, if not exclusively, of vegetable origin. But in the majority of potable waters the ratio falls between these extremes, and its value as an indication of origin is lost. There are perhaps few natural waters polluted solely by animal matters; and the changes which take place in decomposing animal or vegetable matters by which the elements are converted into carbonic acid and ammonia may alter their ratio.

The care, time, manipulative tact, and constant practice needful to secure trustworthy results by this method have led analysts to seek for less difficult processes which will indicate the relative position of waters on a scale of organic impurity. One of these, known as the *permanganate process*, has been strongly advocated by Dr. Tidy. The organic matter as it exists in the water is oxidized by the permanganate, which thereby loses its brilliant color, and the quantity of this salt thus discolored gives a knowledge of the amount of oxygen required for the oxidation of the organic and other oxidizable matters present in the water. Tidy's process consists in acidulating two given measures of the water-sample with sulphuric acid, adding an excess of the permanganate solution and permitting the oxidation to go on without the application of artificial heat, in one of the measures for one hour, and in the other measure for three hours. At the expiration of the proper period in each case, potassium iodide is added to the specimen. The permanganate which has remained undecomposed by the organic matter liberates a proportionate quantity of iodine from the iodide, the amount of which is determined by a solution of sodium hyposulphite and the starch-test for free iodine. A blank experiment on distilled water must be conducted at the same time to ascertain the strength of the hyposulphite solution. The sodium salt indicates the iodine, the iodine the excess of permanganate, and when this is deducted from the total of the permanganate solution originally added to the water, the oxygen given up by that portion of it which has been discharged by the organic matter may be calculated. Dr. Tidy assumes that practically the whole of the organic matter of the water will be oxidized in the experiment which is continued for three hours, while the result of that which is concluded at the end of one hour will give information of value in determining the nature of the organic matter, inasmuch as animal matters and those which are of a putrescent character are conceived to be more readily acted upon than vegetable or non-putrescent substances. But Professor Mallet has shown that the largest amount of oxygen consumed in three hours by the organic matter of a series of waters examined with reference to this point was only seventy-five per cent of that which was consumed by a more continued action, and that the average amount used in the three hours constituted but fifty-seven per cent. His experiments also indicate that while there is little difference in the rapidity of the oxidation whether the organic matters are of animal or vegetable origin, putrescent or non-putrescent, the proportionate consumption of oxygen within the first hour is rather greater for waters containing vegetable than for those containing animal matters. But although the combustion effected by the permanganate is usually imperfect and the oxygen only an approximate measure of the organic substances, waters containing the same kind of organic matter may be as accurately graded by the use of this process as by the less readily applicable method of combustion. Dr. Frankland, in making periodical examinations of water from the same source, found a remarkable agreement between the results of the two processes; and, in conjunction with Dr. Tidy, adopted the following scale of classification as parallel to that formed for the results of the combustion process.

Upland Surface-water.—Class I. Water of great organic purity, absorbing from permanganate of potash not more than 0.1 part of oxygen per 100,000 parts of water.

Class II. Water of medium purity, absorbing from 0.1 to 0.3 of oxygen per 100,000 parts of water.

Class III. Water of doubtful purity, absorbing from 0.3 to 0.4 parts per 100,000.

Class IV. Impure water, absorbing more than 0.4 part per 100,000.

Water other than Upland Surface.—Class I. Water of great organic purity, absorbing from permanganate of potash not more than 0.05 part of oxygen per 100,000 parts of water.

Class II. Water of medium purity, absorbing from 0.05 to 0.15 part of oxygen per 100,000.

Class III. Water of doubtful purity, absorbing from 0.15 to 0.2 part of oxygen per 100,000.

Class IV. Impure water, absorbing more than 0.2 part of oxygen per 100,000.

The process used by the writer is that of Kubel, in which the oxidation is conducted at the boiling temperature and the excess of permanganate ascertained by the aid of an oxalic-acid solution. The oxidation is carried further by this method than by the action at ordinary temperatures; but if volatile organic matter is present the results are not reliable. There is required a permanganate solution containing 0.1 milligramme of available oxygen in each cubic centimetre. Were the salt always chemically pure, the required solution would be obtained by dissolving .395 gram in a litre of water; but as it is not reliable in this respect, it is better to dissolve a few centigrammes more than the theoretical weight, determine the exact strength by means of metallic iron in sulphuric-acid solution, and dilute to the required strength. The oxalic-acid solution, when containing .790 gram of acid per litre, will decompose the permanganate solution volume for volume; but it is not needful that the two shall correspond exactly, as a blank experiment on perfectly pure water has to be performed to determine the relation between them. To insure purity on the part of the water used in this standardizing experiment, distilled water should be treated with permanganate and redistilled. Two hundred cubic centimetres of this pure water are put in a flask capable of holding nearly double the quantity, to which ten cubic centimetres of a 1 : 3 dilution of sulphuric acid and four, five, or six cubic centimetres of the permanganate test-liquid are added. The contents of the flask are then boiled for ten minutes, during which the brilliant color remains unaffected. The flask is removed from the gas-flame, and ten centimetres of the oxalic solution are added. Some effervescence takes place, and the color of the liquid is discharged. Permanganate is then dropped from a burette until a faint rose-tinge pervades the liquid. The quantity of permanganate destroyed is a measure of all the decomposing influences of the experiment as performed on a water which is itself passive. The oxalic acid is the principal of these influences, but there may be others, as impurities in the sulphuric acid, the effects of the boiling, etc. If, therefore, the relation between the solutions is expressed as 10 c.c. oxalic = 10.5 c.c. permanganate, it is understood that all decolorizing causes, as well as the drop or two necessary to give the tinge of color indicative of the conclusion of the experiment, are included in the expenditure of

10.5 c.c. If the experiment is repeated on an impure water, while all the conditions remain as before, saving the different character of the water, any increase in the quantity of permanganate required to produce a permanent tinge of color after the boiling will be due to the intruded influence of the impurity. If the impure water decolorize 16.5 c.c. of per manganate when experimented on in this way, and 10 c.c. oxalic = 10.5 permanganate, 4 c.c. of the test-solution will have been destroyed by the organic matter of the water; or, in other words, .4 milligramme of oxygen will have been necessary to its oxidation.

But potable waters submitted to examination by this test sometimes contain other matters which act upon the permanganate, as nitrous acid, iron, and hydrogen sulphide. If these be present their quantity must be ascertained and allowance made for their influence, or, as suggested by De Chaumont, they may be dissipated or oxidized by boiling for twenty minutes with sulphuric acid, which treatment does not affect the organic matter of the water.

The quantity of oxygen which the organic impurity of a water requires for its destruction by this method gives no intimation as to the character of the organic matter. Indeed, there are some substances, as urea, which are not affected by the permanganate. An impure water may, therefore, by this test be pronounced pure, while, on the other hand, a water containing harmless carbon-particles, the product of fuel-combustion, may stand high on the scale of impurity. It is only when the permanganate results are considered in connection with other testimony that their value can be determined.

Practically, the amount of permanganate destroyed is proportioned to the blackening of the residue on ignition. Varying quantities of oxygen may be regarded as giving expression to varying shades of blackening during combustion. A high result indicates impurity; but if there is performed at the same time on the water-sample an experiment which will give an approximative view of the nitrogen contained in it, and if this nitrogen is small as compared with the oxygen results, the organic matter may be considered as of vegetable origin as surely as if an 8 : 1 result by Frankland's process had authorized the opinion; while, if the nitrogen is relatively large, an animal derivation for the matter is as certainly indicated.

The process by which the nitrogen is generally estimated is that known as *Wanklyn's*, or the *albuminoid-ammonia process*. In it the organic matter of the water is decomposed at the boiling temperature by permanganate in the presence of an alkali, and its nitrogen, evolved as ammonia, the so-called organic or albuminoid ammonia, is collected and estimated. Most natural waters contain minute quantities of free ammonia which must be removed from them by boiling before this experiment on the organic nitrogen is performed ; but as the free ammonia, originating usually in the putrefactive destruction of nitrogenous organic matter, gives in many instances important testimony concerning the quality of a water, its quantity is always determined in the process of preparing the water for the experiment on its organic matter. Half a litre of the water is placed in a retort capable of holding as much again. A few cubic centimetres of a solution of recently ignited sodium carbonate is added to the water, which is then distilled. The condenser, attached to the retort by clean black-rubber connections, should be large and supplied with a constant current of tap-water. The distillate is collected in cylindrical glasses about 18 centimetres (7 inches) in height and 2.3 centimetres (.9 inch) in diameter. They contain about 70 cubic centimetres and have a mark at the fifty cubic centimetre level. When the distillate reaches this level the glass is replaced by a second, and while the distillation proceeds the ammonia which may be present in the first glass is estimated by the Nessler reagent. This is made by dissolving 35 grams of potassium iodide and 16 grams of mercuric chloride, each in a small quantity of water, adding the mercuric solution to that of the iodide until a permanent scarlet tinge shows the presence of a slight excess. A solution of 160 grams of potassium hydrate (or of 120 grams of sodium hydrate, the alkalinity of which is relatively greater) in 800 cubic centimetres of water is added to the mixture, which is then made up to one litre by the addition of water. A few drops of a cold saturated solution of mercuric chloride is shaken up with the prepared liquid, which, after becoming clear by sedimentation, is ready for use. A small quantity of this reagent dropped into water containing ammonia causes a coloration, the shade of which is proportioned to the amount of ammonia present: .0025 milligram of ammonia in 50 cubic centimetres of water gives a recognizable coloration, and 0.1 milligramme a deep sherry-brown color, while notably larger amounts occasion a turbidity. But to estimate accurately the quantity of ammonia present in the 50 cubic centimetres of the distillate, the color produced in it by adding two cubic centimetres of the Nessler reagent is compared with the color produced by the same means in similar glasses containing known quantities of ammonia. Thus the color of the ammoniacal distillate may be presented for comparison with a series of test-glasses containing .01, .03, .05, .07, .09 milligramme of ammonia, each in 50 cubic centimetres of ammonia-free water, and if no perfect agreement is found with any of these standard tubes a fresh standard may be prepared containing the quantity of ammonia which this first comparison has indicated as likely to be present. By the time this comparison is made the second fifty-cubic-centimetre measure, or Nessler glass, has been filled by the progress of the distillation and is ready for estimation in like manner. The distillation is continued until a measure of 50 cubic centimetres is obtained which shows perfect freedom from ammonia by giving no coloration with the reagent; and when this occurs the residual water in the retort, representing the original half-litre, may be considered free from preformed ammonia and ready for the experiment on its organic matter. The first measure of the distillate contains the largest quantity of ammonia, and it is a judicious precaution, lest it be so strongly ammoniated as to cause a turbidity with the Nessler solution, which would spoil the experiment by rendering color-comparisons impossible, to wait for the second or third measure, and decide from the quantity found in one or other of these whether the first measure should be treated as a whole or definitely diluted before attempting the colorimetric estimation. The color struck by the Nessler reagent in ammoniacal waters requires from three to five minutes for its full development. After this it remains unchanged for many hours. The amounts of free ammonia found in each of the measures distilled are added together and divided by 5, to express the results in parts of 100,000 of the water, or multiplied by 2 to express parts per million.

The permanganate solution for the destruction of the organic matter must be prepared with care to insure its freedom from ammonia, which would vitiate the experimental results. To three-quarters of a litre of distilled water, which gives no ammoniacal coloration with the Nessler reagent in a test-glass, there are added one hundred grams of caustic potash and four grams of permanganate, and the liquid is distilled from a retort until reduced to one-half litre ; the last fifty cubic centimetres of the distillate will be free from ammonia, and will thereby indicate the freedom of the alkaline solution from ammoniacal taint. It has been objected to Wanklyn's process that the permanganate solution may contain traces of ammonia, but if it does so the fault lies with the operator, not with the process.

To the residual water in the retort, from which the free ammonia has been distilled and estimated, a measure of fifty cubic centimetres of this alkaline permanganate solution is added, and the distillation is continued as before, the distillate being collected in the fifty-cubic-centimetre Nessler glasses, and the ammonia therein estimated by colorimetry, testing the second or third measure of the distillate, in the first instance, in the case of an unknown or suspicious water, lest the ammonia in the first measure should be so great as to occasion a turbidity with the Nessler reagent. The process is continued until a measure is obtained which is free from ammonia, or until no more can be distilled without danger of fracturing the retort.

The action of the permanganate in this process is allowed by Wanklyn to be imperfect. The whole of the nitrogen of the organic matter is not converted into ammonia ; but he claims that as the albuminoids in water are of similar constitution, and yield up a definite quantity of their nitrogen, the results of the process in different instances are susceptible of comparison, and enable the operator to rate a water on an arbitrary scale of nitrogenous impurity. This scale he formulates thus :

"Drinking-water falls into three classes, according to the degree of organic purity, as follows :

"Class I.—Water of extraordinary organic purity, yielding from .00 up to .05 part of albuminoid ammonia per million. This class comprises the most carefully prepared distilled water and highly filtered waters, both *natural* (*i.e.*, deep-spring waters) and *artificial* (*i.e.*, such water as has passed through a silicated-carbon filter in good working order). Occasionally, a river-water, in its unfiltered condition, falls into this class. Water of this class cannot be objected to organically.

"Class II.—Comprehends the general drinking-waters of this country. It gives from .05 to .10 part of albuminoid ammonia per million. I believe that any water falling into this class is safe organically.

"Class III.—Comprehends the dirty waters, and is characterized by yielding more than 0.10 part of albuminoid ammonia per million."

But when the albuminoid ammonia amounts to .05 part per million, he brings in the free ammonia as an element in the determination of quality, and is "inclined to regard with some suspicion a water yielding a considerable quantity of free ammonia along with more than 0.5 part of albuminoid ammonia per million. Free ammonia, however, being absent or very small, a water should not be condemned unless the albuminoid ammonia reaches something like 0.10 per million. Albuminoid ammonia above 0.10 per million begins to be a very suspicious sign; and over 0.15, it ought to condemn a water absolutely."

Most rain-waters in the United States, collected in clean dishes as they fall from the clouds, would be condemned by Wanklyn's dictum. Most of our river-waters which are in daily use would be condemned on similar grounds. In the experience of the writer, while Wanklyn's limit of allowable impurity may be accepted in the case of wells where the danger of infiltration from privies is great, it should be extended to 0.20 in the case of our river and other surface-waters, as it is not until the albuminoid ammonia reaches or exceeds this quantity that a taint becomes developed in the water during warm weather, and that diarrhœa, dysentery, or febrile conditions are connected with its use.

But while the total amount of nitrogen obtained from the organic matter of a water is the main object of the experiment, a certain value attaches to the manner in which the ammonia is evolved. Wanklyn observed that vegetable matter gave up its nitrogen as ammonia slowly. The writer found, by examining his laboratory notes with reference to this point, that in many instances where the organic matter was undoubtedly of vegetable origin the albuminoid ammonia diminished by one half in successive distillates of 50 c.c. Thus water from the swamps near New Orleans yielded, in the first measure distilled, .24 milligr.; in the second, .12 milligr.; in the third, .06 milligr.; and in the fourth, .03 milligr., equalling a total of .45 milligr. in the 500 c.c. of the swamp-water distilled, or .90 part per million. But, from many experiments on pure animal and vegetable albuminoids, it was found that their tendency to change, or putrescent character, rather than their derivation, influenced the manner of the evolution. A gradual disengagement, as in the case of the swamp-water given above, indicates the presence of organic matter, whether animal or vegetable, in a fresh, or comparatively fresh, condition, while a more rapid evolution indicates that the organic matter is in a putrescent or decomposing condition.

It has been suggested, as an objection to the albuminoid-ammonia process, that after the distillation has been concluded by the withdrawal of a measure which shows freedom from ammonia, more ammonia may be obtained from the contents of the retort on again resuming the distillation after some hours. Many experiments were made by the writer, not only on natural waters the nitrogen of which is usually readily given up, but on artificial solutions of organic matter, and in no instance was ammonia recovered from the retort, even after the lapse of days, when the original experiment had been carried far enough to show that the disengagement of ammonia had ceased. The permanganate acts slowly on some organic matters, and under the conditions of Wanklyn's experiment, with only a certain quantity of liquid in the retort, it may be impossible to carry the process far enough to show the cessation of the evolution. The experiment may have to be concluded by the exhaustion of the water in the retort before all the organic matter has been decomposed, as in the swamp-water above mentioned, and in such a case a renewal of the distillation, with an addition of ammonia-free water, would necessarily result in the evolution of more ammonia. In such cases the time which is occupied in the distillation affects the results obtained. Slow boiling with a lowered flame will give more ammonia than a rapid ebullition, which brings the experiment to a speedy termination by the exhaustion of the water in the retort.

In view of these facts, Professor Mallet, in summing up the results of an experimental investigation into the comparative merits of the various processes by which the organic matter of a water may be estimated, says of the albuminoid process, that the value of its results depends more upon watching the *progress* and *rate* of evolution of the ammonia than upon determining its total amount. But he found a good deal of general similarity between the figures for albuminoid ammonia and those for organic nitrogen (by Frankland's process), although there were frequent discrepancies of varying extent, such as prevent the one being taken as an accurate measure of the other.

(To be continued.)

THE USE OF OIL TO STILL THE WAVES.—"In June, 1885, the British ship Slivemore took fire and had to be abandoned when eight hundred miles northeast of the Seychelle Islands, Indian Ocean. The people took to the boats and made for Seychelle Islands. The third day after leaving the vessel a cyclone came up, and no one believed that the boats would live through it. Before they left the ship the boats had been supplied with oil for just such an emergency. Each boat got out a drag made of spars and oars lashed together, for what is known as a sea-anchor. Oakum saturated with paraffine was stuffed in long stockings hung over the bows of the boats. Before the oil was used the boats had been several times nearly filled with water and the occupants had to bail for their lives; but when oil was applied no further trouble was experienced. An oil-slick formed around the boats, which rode in perfect safety on tremendous swells which took the place of the previously breaking seas. Little if any water came over the sides of the boats, and the occupants could lie down and sleep. The boats eventually reached the islands, but every soul would have perished except for the forethought of Captain Conby, the captain of the Slivemore."—*Lieutenant W. H. Beehler, in the March Century.*

HUNTING YELLOW-FEVER GERMS.

AN ADDRESS DELIVERED BY SPECIAL INVITATION BEFORE THE QUARANTINE CONFERENCE, AT MONTGOMERY, ALA., MARCH 5TH, 1889.

By GEORGE M. STERNBERG, M.D., Surgeon U. S. A.

GENTLEMEN: It would have been far more satisfactory to you and to me if the subject of my address this evening could have been announced as "the Yellow-Fever Germ." I need hardly say that nothing would have given me greater pleasure than, in the presence of the experts in the clinical and prophylactic management of yellow-fever here assembled, to exhibit microscopic preparations and pure cultures of the specific infectious agent which I have been so long in search of. I shall show you presently upon the screen photo-micrographs of a variety of micro-organisms which I have encountered in the course of my researches, some of which are hitherto undescribed species, and among them some which have specially engaged my attention as possible yellow-fever germs. I shall also show you cultures and photo-micrographs of the micrococcus presented to me by Dr. Domingos Friere, of Brazil, as his microbe of yellow-fever; of the tetragenus febris flavæ of Dr. Carlos Finlay, of Havana; and of the bacillus of Dr. Paul Gibier, of Paris.

But I must announce to you, in advance, that there is no satisfactory evidence that any one of these micro-organisms is the veritable infectious agent in the disease under consideration.

I at first hesitated to accept the invitation extended to me to address you on this occasion, inasmuch as my investigations have not yet led to any definite result, and as they are still in progress and will be continued in Havana during the present summer. But the importance of the occasion and the solicitation of my good friend Dr. Cochran, the efficient Health Officer of the State of Alabama, have induced me to come here for the purpose of making a brief statement relating to the present status of the investigation with which I am charged, and especially for the purpose of demonstrating to you the methods of research employed by bacteriologists in investigations of this nature.

I may say before going any further, that my faith in a living infectious agent as the specific cause of this disease is by no means diminished by my failure thus far to demonstrate the exact form and nature of this hypothetical "germ." The present state of knowledge with reference to the etiology of infectious diseases in general, and well-known facts relating to the origin and spread of yellow-fever epidemics, fully justify such a belief. The *à priori* grounds for such faith I stated as long ago as 1873, in a paper published in the *American Journal of the Medical Sciences* (July, 1873); and the progress of knowledge since that date has all been in the direction of supporting this *à priori* reasoning. But yellow-fever is by no means the only infectious disease in which satisfactory evidence of the existence of a living infectious agent is still wanting. In the eruptive fevers generally no demonstration has been made of the specific etiologcal agent—at least none which has been accepted by competent pathologists and bacteriologists. Again, in the infectious disease of cattle known as pleuro-pneumonia, notwithstanding very extended researches by competent investigators in various parts of the world, no satisfactory demonstration of the germ has been made. The same is true of hydrophobia, in which disease we are able to say with confidence the infectious agent is present in the brain and spinal cord of animals which succumb to rabies; this infectious agent is destroyed by a temperature which is fatal to known pathogenic micro-organisms (65° C.), and by various germicide agents, yet all efforts to cultivate it or to demonstrate its presence in the infectious material by staining processes and microscopical examination have thus far been unsuccessful.

You are aware that my first effort to solve the etiology of yellow-fever was made ten years ago. As a member of the Havana Yellow-fever Commission of the National Board of Health, I had an opportunity to make researches which, in advance of the effort, I fondly hoped might lead to demonstration alike creditable to American science and useful as a basis for preventive and curative measures in this pestilential malady, which has destroyed the lives of so many of our fellow-citizens, and has so largely interfered with the material progress of certain sections of the United States. I knew, from personal experience, the malignant nature of the disease, and the futility of the various modes of treatment which had been resorted to in the effort to combat it. It was, therefore, with the deepest interest as well as with strong hopes of success, that I went to an endemic focus of the disease to search for the yellow-fever germ. The recent (1873) demonstration of the spirillum of relapsing fever in the blood of patients suffering from this disease, and the recognized facts relating to the etiology of anthrax, considered in connection with the current notions relating to the pathology of yellow-fever, led me to hope that the discovery would prove an easy one. I was familiar with the most approved methods of mounting and staining micro-organisms, and was provided with the best high-power objectives that could be procured, the one-twelfth and one-eighteenth homogeneous oil immersion objectives of Karl Zeiss, of Jena, Germany. Not only did I feel that I was equipped for the recognition of any micro-organism which might prove to be present in the blood, but I was prepared to photograph it, and thus to show to others what I might see in blood drawn from the circulation of yellow-fever patients. You know the result of this investigation; "ninety-eight specimens from forty-one undoubted cases of yellow-fever were carefully studied, and one hundred and five photographic negatives were made, which showed satisfactorily everything demonstrable by the microscope." But no micro-organism was discovered. I shall presently show you upon the screen a photomicrograph of yellow-fever blood, made in Havana at the time mentioned, so that you may judge of the performance of my Zeiss one-eighteenth inch objective, and have ocular evidence that no micro-organism demonstrable by this magnificent lens was present in it. I may say here that my culture experiments, made in Havana last spring, in which blood taken from one of the cavities of the heart, as soon as possible after death, was introduced into various nutritive media, gave a like negative result.

Out of ten cases in which I made autopsies, in the military hospital at Havana, a development of micro-organisms occurred in two only. In the exceptional cases I obtained a bacillus which subsequent researches showed to be identical with a bacillus constantly found in the alimentary canal of healthy persons—the *bacterium coli commune* of Escherich.

The absence of micro-organisms from blood drawn from the finger during life, or from the heart after death, cannot, however, be accepted as evidence that there are no parasitic organisms anywhere in the tissues. The bacillus of typhoid-fever, for example, is rarely found in the circulating fluid, although it must be transported in the blood current to the various organs in which foci of growth are found which contain numerous bacilli. Such foci are especially abundant in the spleen, but even in this organ many thin sections may be made before a single focus of development is encountered.

Having failed to find the yellow-fever germ in the blood, we may still admit that, as in typhoid, it is perhaps only to be found in the organs principally involved in the morbid process. This reasoning has led me to give special attention to an examination of the liver and kidney, both by the culture method and by the examination of thin sections. Both methods have given me positive results, so far as the occasional presence of micro-organisms is concerned, but both are in accord in failing to demonstrate the constant presence of any particular organism. In my culture experiments, made in Havana last year, the micro-organism most frequently encountered was my bacillus *a*, already referred to as found in two out of ten cases in cultures from blood drawn from the heart. Naturally, I have given much attention to this bacillus, and it was only after an extended series of comparative experiments that I gave up the hope that it might be concerned in the etiology of the disease under consideration. These comparative experiments forced me to the conclusion that this is the same bacillus as was found by Emmerich in cholera cadavers at Naples, and that it corresponds with the *bacterium coli commune* of Escherich.

In my researches by the method of staining thin sections of the tissues hardened in alcohol, I have encountered several different micro-organisms ; but no one of these has been found in a series of cases. One, the bacillus of Lacerda and Babes, I have found only in material brought from Dr. Lacerda's laboratory in Brazil, and in two only out of nine cases represented by material from this source. In one of my Havana cases, in which the material was collected by my friend, Dr. Burgess, in 1887, a long bacillus was found in the kidney, for the most part in the glomeruli. In a case in which I made the autopsy in Havana last spring a micrococcus, grouped in fours, was found in the kidney.

Evidently, if any one of these micro-organisms was found in a considerable series of cases, the fact would be decidedly significant, and would afford presumptive evidence that the parasitic organism found bore some relation to the morbid process. But, even if one and the same micro-organism was found in every case, the final proof of its etiological import would depend upon its isolation in pure cultures, and the production of the characteristic phenomena of the disease in one of the lower animals, or, in the absence of a susceptible animal, in man himself.

The method of cultivation is by far the most reliable for the demonstration of micro-organisms which will grow in our culture media, for isolated cocci or bacilli might easily escape observation when present in small numbers but would serve to start a culture. Thus the bacillus of typhoid-fever, which, as stated, is not as a rule found in the blood of the general circulation, and is only found in the spleen in scattered clumps, may be obtained from this organ in pure cultures, almost without fail, by introducing a small quantity of splenic pulp into a suitable nutritive medium.

Moreover, this method enables us to differentiate micro-organisms which look alike, and which by microscopic examination alone it would be impossible to distinguish one from another. This is a fact now well recognized by bacteriologists, but not generally appreciated by microscopists whose researches have been limited to the staining and mounting of sections.

Both methods require skill and practice in the execution and great caution in drawing conclusions, for there are a thousand traps lying in wait for the explorer, in this field of investigation. It is for this reason that pseudo-discoveries are so numerous.

Especial care is required in the microscopical examination of stained preparations of yellow-fever tissues. One encounters in the urinary tubules, mingled with the *débris* of the desquamated epithelium, stained masses of various forms which often closely resemble cocci or bacilli. These I believe to be fragments of nuclear material. The same material is often massed in the urinary tubules in the form of plugs, which are deeply stained by the aniline dyes.

Again, fragmentation of the nuclei of cells still in position may give the impression of a cell containing cocci; and the karyiokinetic figures found in the cells, especially in the liver, often resemble bacilli so closely that it is difficult to convince any one not familiar with them that they are not micro-organisms.

The "plasma cells" of Ehrlich, also, seem to have as their chief function the *rôle* of deluding amateur microscopists into the idea that they have made a discovery. They are often very abundant in the liver and in the kidney of yellow-fever cases, and so closely resemble zoöglœa masses of micrococci that experienced pathologists have been deceived by them.

In addition to these objects which resemble micro-organisms there are dangers from the post-mortem invasion of the tissues when the autopsy has been delayed beyond an hour or two, in the warm climates where yellow-fever prevails; or even in the preserving medium, or during the process of staining.

My experiments made in 1883 showed that "exposure to ninety-five per cent alcohol for forty-eight hours did not kill the bacteria in broken-down beef-tea (old stock)," and pathologists are familiar with the picture presented by the post-mortem invasion of tissues which have been left in alcohol which was not strong enough to preserve them.

Finally, inasmuch as my culture experiments with material collected soon after death, from the liver and kidney, gave a positive result in a certain proportion of the cases, it is evident that the micro-organism most frequently found by this method —my bacillus *a*—should occasionally be encountered in stained preparations.

The possibility remains that by some method of staining not hitherto employed, the specific infectious agent may yet be demonstrated in the tissues; but the fact that my culture experiments with material from the liver and kidney of ten cases failed to demonstrate any such specific microbe is opposed to this view. We may, of course, suppose that the yellow-fever germ not only requires special methods, yet undiscovered, for its demonstration in the tissues, but that it will not grow in the culture media which I have employed in my researches. I would say in reply to this hypothesis that all known pathogenic micro-organisms may be demonstrated by the staining methods employed, and that, inasmuch as the yellow-fever germ appears to find a favorable nidus in filth beds external to the body, I have been inclined to believe that, like the bacillus of typhoid-fever and cholera, it is not especially nice as to the character of the medium in which it may develop. However, this may be a mistaken idea, and I propose in my future researches to make use of various culture media not yet employed, and especially to make cultures from the tissues and the excreta in an atmosphere from which oxygen has been excluded ; for it may be that, like the bacillus of malignant œdema and the bacillus of tetanus, the yellow-fever microbe is anaërobic.

While, then, I admit that by some special method of staining, or by a modification of the culture methods heretofore employed, the specific infectious agent we are in search of may yet be found in the tissues of yellow-fever patients, I feel justified in saying that no such demonstration has yet been made. The negative results attending my researches in this direction have led me to turn my attention to the micro-organisms present in the alimentary canal, for the possibility suggests itself that this may be after all the habitat of the deadly yellow-fever microbe, which is capable of destroying life within two or three days, and that the phenomena of the disease are not directly due to its presence in the body, but result from the absorption of a poisonous ptomaine produced by it, as appears to be the case in cholera.

The famous English hygienist Parkes, from the consideration of evidence relating to the prevalence of yellow-fever during a series of years among English troops stationed in Jamaica and elsewhere within the "yellow-fever zone," in connection with the sanitary condition of their barracks, arrived at the conclusion that yellow-fever is a "fecal disease," and there are many facts relating to the origin and extension of epidemics which seem to support this view—that is, the belief that the germ finds a proper nidus in fecal matter external to the body. If in yellow-fever, as in cholera, the infectious agent is located in the alimentary canal of those who fall sick with the disease, we can readily understand how it is that new centres of infection are developed, when external conditions are favorable, in the localities where imported cases have occurred, or as a result of the introduction to such localities of fomites.

This view also accords with the demonstrated fact that yellow-fever is not directly communicated by the sick to those in attendance upon them. Pathogenic germs which multiply in the intestine no more endanger those who are associated with the infected individual than the same micro-organisms cultivated in a suitable medium in a test tube endanger the bacteriologist who is engaged in their study.

The possibility that the infectious agent in yellow-fever may have its habitat in the alimentary canal, occurred to me several years ago, and I determined, in advance of my visit to Havana last spring, to give special attention to a bacteriological study of the intestinal contents.

It is well known that the excreta of healthy persons contain a vast number of micro-organisms of various species, and that while some of these appear to be constant, others are occasional, and, we may say, accidental tenants of the human intestine, being introduced, no doubt, with the ingesta, and especially in drinking-water.

Notwithstanding the researches of Brieger, of Bienstock, of Escherich, of Vignal, and others, this bacterial flora of the healthy intestine is still imperfectly known. The attempt, therefore, to explore this field for the purpose of finding a specific microbe in any particular disease, is attended with very great difficulties, unless, as in cholera, this specific microbe occupies the field to the exclusion of the ordinary bacteria found in the intestinal contents. Koch found his "comma-bacillus" almost in pure cultures in the characteristic rice-water discharges of cholera patients, and other bacteriologists, following his methods, have had no difficulty in verifying the presence of the same micro-organism in cases of cholera occurring in various parts of the world. On the other hand, extended comparative researches, including my own investigations made in Havana and in Decatur, show that the "comma-bacillus," or rather spirillum, is not found in the alvine discharges of healthy persons, or in other diseases than cholera. If in yellow-fever, as in cholera, there was a micro-organism in pure cultures, or in relatively great abundance, capable of growing in the culture media which are suitable for the development of a majority of the known pathogenic organisms, I ought to be able, to-night, to exhibit to you cultures and photo-micrographs of this micro-organism. But my researches show that the micro-organism which is by far the most abundant, and, so far as my investigations go, the only constant form found in the excreta of yellow-fever cases, is the *bacterium coli commune* of Escherich, which is also the most constant and abundant form found in the excreta of healthy persons.

In Havana my cultures were made from material from the stomach and intestine of fatal cases obtained at the time of making the autopsy. My researches did not show that any of the micro-organisms encountered was constantly present, with the exception of the *bacterium coli commune*—my bacillus *a*. Having excluded this bacillus by comparative researches, there was nothing to point to any one of the micro-organisms present in my cultures as the probable infectious agent I was in search of.

The bacillus of Dr. Paul Gibier I only encountered in three cases out of ten, and in these it was not present in very great abundance, compared with the colon-bacillus for example.

My time in Havana, limited by my orders, was too brief to enable me to make an exhaustive research. The epidemic in Florida and Alabama during the past summer gave me an opportunity to continue the investigation, and, at my request, I was directed to proceed to the infected district for this purpose. The presence of my friend, Dr. Jerome Cochran, State Health Officer, at Decatur, decided me to locate my laboratory in that place, where I found abundant material for the researches I had in view. Having made a considerable number of autopsies in Havana, I determined while in Decatur to devote my attention especially to a bacteriological study of the alvine discharges collected during the different stages of the disease.

Evidently, if the infectious agent multiplies in the intestine, it should be found in the excreta during the earlier stages of the attack.

The cause must be present in advance of the development of the morbid phenomena which characterize the disease. But it is quite possible that during its later stages the etiological agent has perished, and, therefore, would not appear in cultures made from material obtained post-mortem.

While in Decatur, and after my return to Baltimore, I examined by bacteriological methods—Esmarch tubes—the excreta of 39 cases of yellow-fever, and for comparison of 9 convalescents and of 19 healthy individuals. A detailed account of the results reached will be given in my final report. As was to have been expected, I have encountered a variety of micro-organism. Many of these I have isolated in pure cultures, and the biological and pathogenic characters of several have been carefully studied by cultivation in various media and by inoculation experiments in the lower animals. It would be premature for me to attempt to give you the results of these researches even if time permitted me to do so. But I may repeat what I said at the outset that the germ of yellow-fever has not yet been demonstrated. It is possible, however, that one or the other of the micro-organisms which I have isolated is the long-sought germ, although I have no satisfactory evidence upon which to base a claim that this is the case.

My attention has been especially directed to the liquefying organisms found in the excreta of the 39 cases examined. In a majority of these cases the presence of liquefying bacilli was demonstrated, but liquefying colonies were not numerous as compared with the non-liquefying, among which the colon-bacillus of Escherich was by far the most abundant. In a series of Esmarch tubes No. 1 would show numerous liquefying centres, usually within twenty-four hours, very often No. 2 would contain a few liquefying colonies, while, as a rule, No. 3, although containing numerous isolated colonies of the colon-bacillus, did not contain any liquefying colonies. Further, I found that several different liquefying organisms were present in different cases, or were associated in the same case. I shall presently show you cultures and photo-micrographs of these liquefying bacilli. The one most frequently present, my bacillus *o*, I have since found in cultures from another source, and am obliged to exclude it as the possible specific etiological agent of yellow-fever. It has also been isolated by Dr. Booker, of Baltimore, from the discharges of one or more infants suffering from summer diarrhœa. The bacillus of Gibier I have only isolated from three cases, and in these it was not present in considerable numbers. I have made extensive experiments upon the lower animals, which show that this bacillus has interesting pathogenic properties, but give no special support to the view that it is the specific germ of yellow-fever. I have never observed in my cultures the black pigment which, according to Gibier, is produced during the development of this bacillus, and am at a loss to understand this discrepancy in our observations.

So far as the pigment in black vomit is concerned, I have no doubt that it is of hæmic origin. I have never failed to demonstrate, by a microscopic examination, the abundant presence of red blood-corpuscles in the numerous specimens of black vomit which I have examined. The little black flocculi are, in fact, made up of agglomerated corpuscles which have lost their pigment and appear as pale disks, often more or less swollen and distorted ; while the brownish pigment, which has been changed by the acid secretions of the stomach, remains in their vicinity in the form of granules or amorphous masses. The idea that there is something specific about this pigment, or that it is the secretion of a specific microbe, as has been maintained by Freire and by Gibier, appears to me to be untenable. In a majority of the non-fatal cases of yellow-fever and in a certain proportion of the fatal cases there is no passive hemorrhage into the stomach, and consequently no black vomit, yet these cases must result from the action of the same etiological agent as those in which this symptom is present.

I have found by experiment that the bacillus of Gibier, the micrococcus of Freire, and the tetragenus of Finlay, all grow after being exposed for an hour to a temperature of —15° C. (5° F.). Exposure outside of the laboratory in Baltimore for five days in the month of January failed also to destroy the vitality of these micro-organisms, although the temperature, during the greater part of the time at least, was below the freezing-point.

Having thus given you a brief account of the present status of the investigation in which I am engaged, I propose to devote the remainder of the time at my disposal to a practical demonstration of the methods of research employed, and to an exhibition upon the screen of the various micro-organisms to which I have referred.—*Medical News, March 9th*, 1889.

THE MICROBE AS A FACTOR IN DISEASE.—The prevailing opinion now seems to be that the microbe is not the all-important factor in disease, but that the substances elaborated by it do the harm. It is certain that in some cultivations the bodies evolved cause a cessation of the growth of the microbe, and this fact is now taken as a starting-point for a new theory of inoculation against disease. Professor Bouchard has said in his lectures that there ought to be a careful separation of the soluble matters secreted by the micro-organism from the toxic substances which might exist in connection with them. The former only were suitable for inoculation. It is possible, he thought, that they might come into use for internal medication to arrest the progress of a disease which had already begun, rather than for inoculation. Thus it might be that the substances that arrest the development of micro-organisms in cultivations could be used to combat their growth in the body, and thus to put an end to the disease the micro-organism had caused. Professor Peter said that he never had believed that the microbes themselves did any harm, but that their presence gave rise to the formation of poisonous alkaloids. Professor Bouchard was of the opinion that inoculated matter was not retained within the tissues to act as certain substances did which were put into cultivation to prevent the growth of micro-organisms, but that it modified cell-nutrition to such an extent that the cells became permanently, or at least for a long period, incapable of being again affected by the substance which had modified them originally. The inoculations practised by him of the urine of animals suffering from various diseases had appeared to confer immunity from the disease affecting the animal from which the urine had been taken. This would seem to indicate that a modification of the virus, similar to the attenuation produced artificially, as in the case of anthrax, had occurred spontaneously in the system.—*Paris Letter, New York Medical Journal, March 2d*, 1889.

SHAKING HANDS WITH A SAUCEPAN.

If ever we are seized with a desire to understand what manner of women our grandmothers and great-grandmothers were, let us not disdain the information which may be obtained by studying the cookery-books of eighty or a hundred years ago. Our great-grandmothers themselves studied little else. Some of them sighed and wept over the sorrows of Clarissa, liked to linger with Harriet Byron in her cedar parlor, were not quite sure what they thought of Pamela, got much garniture for mind and body out of the Belle Assemblée; but, for the most part, little enough reading did they do. Mrs. Glass, Mrs. Raffald, and certain well-informed persons who sheltered themselves behind the appellation of "A Lady," were quite enough for them; and these writers knew it, and, while teaching the noble art of cookery, almost always benevolently added a number of miscellaneous observations on life and conduct likely to be useful to girls whose "ornamental education had commenced before impressions of duty had been made."

These old cookery-books seem to bring us much nearer to our dead and gone progenitresses, and show us that, though they did not read much, and could do mighty little in the way of spelling, they were simpler, and perhaps sweeter, women than their granddaughters. They could scarcely fail to be so, for the mere exercise of the one art which they practised as an art brought them hour by hour in the most intimate relations with nature and her bounties. In the season when green things flourished hardly a day can have passed without these good ladies themselves going into their gardens to seek the fagot of sweet herbs which was to impart flavor and fragrance to their "ragoos" and savories; or the marigolds which poor Charles Lamb hated so much when they floated on his mess of Charter House pottage, but which Simple Susan's enemy Barbara found so tempting. The greater part of our grandmothers' lives must have been spent in culling simples, expressing juices, gathering fruits, and spying out things to pickle. This was not done haphazard. Solomon tells us that there is a time for all things, and Mrs. Raffald and her sisters tell us the time to gather fruit, and many a thing besides. "Gather your currants while the sun is hot upon them." "Pick your clary-leaves in the dry," "Pick 'something else' in the cool." It was therefore with our grandmothers a constant round of watchfulness and duty, and it seems strange that it is only recorded of one woman that she was married when she went out into the garden to pick parsley, or that little Mary in Grimm's "Household Tales" is the only one said to have found a husband when she went to cut cabbages; for lovers, and would-be lovers, ought to have known where women were likely to be found during canonical hours.

What was there—was there anything that the women of a hundred years ago did not pickle or preserve? They pickled parsley green to cheat grim winter of some of its terrors; they pickled "nasturtions"—and a very excellent pickle they make. They pickled the large shoots of elder to imitate "the Indian bamboe." "They put out in the middle of May, and the middle shoots are the most tender." They pickled green walnuts "when they will bear a pin to go into them"—which also is done to this day. They were aware that "the clusters of elder-flowers makes (*sic*) a delicate pickle before it opens," and that to effect this it was only necessary to pour vinegar over them. They also knew that the seeds of elder should be pickled while still green, as a substitute for capers, and that "large cucumbers of the kind called green turley, prepared as mangoes, are excellent, and come sooner into eating." They pickled radish-pods, young artichokes, horse-radish, samphire, marigold flowers, and more things than can well be enumerated. Having pickled nearly every green shoot, stalk, pod, and seed, they began to do the same by plums, apricots, peaches, currants, and grapes. When they set about making jams no fruit escaped them—they even attacked vegetables. When they made cakes it was the same. Parsnips, raspberries, etc., were made into cakes, and red beetroot, potatoes, and oranges into biscuits. The recipe for violet cakes reads delightfully: "Take the finest violets you can get, pick off the leaves, beat the violets fine in a mortar with the juice of a lemon, beat and sift twice their weight of double-refined sugar, put your sugar and violets into a silver saucepan or tankard, set it over a slow fire, keep stirring it gently until all your sugar is dissolved ; if you let it boil it will discolor your violets ; drop them in china plates ; when you take them off put them in a box, with paper between every layer." Can anything be more charming and ethereal than this? The only point at which it seems to touch common earth is the sugar, and that is to be double refined. The china plates doubtless were such as would now make the joy of a collector and madden his wife by their price. Would that the time when women found healthy excitement in turning this mixture out of the pan, with the color of the violets undisturbed by the rude, passionate act of boiling, were back again ; it was a time when Satan must surely have found fewer idle hands to do his work. For our own part, we never take up a paper and read some horrible story of woman's guilt or folly without wishing that the days of silver saucepans and delicate confections were once more with us ; it is more than probable that the women who err so greatly have, as Dr. Kitchener says, "never shaken hands with a saucepan in their lives." But to return to our great-grandmothers. Even after their pickles and preserves were made, flowers, fruit, and vegetables had other missions to fulfil. Tarts were made of sorrel, cucumbers were "farced," not with pearls, as in the "Arabian Nights," but with more savory compounds, and the garden supplied many a dainty dish besides.

Wine-making, too, was then a recognized branch of female industry, and every fruit in turn was chosen as a basis, and some flowers and vegetables—notably cowslips and parsnips—were promoted to the same dignity. There is a very pretty recipe for cowslip mead, made of honey, lemons, seven pecks of cowslip pips, and a handful of sweetbriar. The sweetbriar is a delicious ingredient, but think of picking seven pecks of pips! A recipe is given for making elder-flower wine "from the tree which bears white berries." We are confidingly told that "it drinks very like Frontiniac." Wine of black elderberries is said to be equal to the best Hermitage claret ; and another recipe instructs us how to make wine of white elderberries, "which is so like the fine rich wine brought home from Cyprus, in its color and flavor, that it has deceived the best judges." So says one of our grandmothers' books ; but we cannot but think of Mrs. Browning, and fear that, if "Old

Bacchus were the speaker, he would tell us with a sigh," that this elder-flower wine was never "soft as the Muses' string, tawny as Rhea's lion, bright as Páphia's eyes, or sweet as the honey made by the brown bees of Hymettus." Such as it was, it was made in days gone by, and so was Clary wine. Or sycamore, birch, walnut, blackberry, or balm wines—all these were once made by fair and dainty housewives, and now are made no more. And, then there was shrub, wherein to one gallon of new milk flavored with lemons and Seville oranges was added two quarts of red wine, two gallons of rum, and one of brandy. Sweet dishes, also, were generally made by the ladies of the family, and there is much play of fancy in the naming of them. In turning over the pages we find directions how to spin gold and silver webs for dessert, to spin birds' nests, to make a Chinese temple or obelisk, a fishpond with silver and gold fishes, a hen's nest, with strips of lemon for straw, and eggs filled with flummery, a hen and chickens in jelly, a desert island. "Take a lump of paste and form it into a rock three inches broad at the top, set it in the middle of a deep china dish, and set a cast figure on it with a crown on its head and a knot of sugar candy at its feet," etc. "If this dish is for a wedding-supper, put two figures instead of one," so the desert island is not so much of a desert after all. Next comes a "Rocky Island," and then a "Floating Island," with sheep, swans, "or you may put in snakes, or any wild animals of the same sort." Moonshine is another dish with a pretty name, and there is likewise a recipe for "Moon and Stars in Jelly," a half moon with seven stars shining out of flummery colored with cochineal and chocolate to imitate the color of the sky. We still have numbers of people among us whose eye for color is as fine as that of the inventor of this; but who now makes moon and stars in jelly? "Solomon's Temple in flummery" is a yet finer flight of the imagination. A recipe for making an amulet takes our fancy, but loses its attraction when we find it is only Mrs. Raffald's way of spelling omelet.

Who can say how much the construction of some of these quaintly-named and delicately-compounded dishes may have been to our grandmothers? Perhaps it was their poetry, their sphere of art, their one escape from the monotony of their quiet lives. The fancy of cooks of a hundred years ago played lightly about "Solids and Savories," too, and they also have taking names. We learn how "To make a Porcupine of a Breast of Veal and to Surprise a Shoulder of Mutton." Every joint, by the way, was liable to be surprised, and many were liable to be dressed to look like a hen and chickens. Veal was bombarded, pigeons were transmogrified. There are directions to Florendine a Hare (probably a bad attempt at Florentine), and also to make a Solomon Gundy, "To make an artificial Turtle," and "To Barbecue a Pig." We will not, however, enter on the more important branch of cookery; all that now concerns us is the part in which our grandmothers were most actively interested. What a pity it is that so few women now care for it sufficiently to make them overcome their fear of entering their own kitchens at odd times! What a pity that the class spoken of as those who have never shaken hands with a stewpan is now so large, and the number of those who possess a silver saucepan so infinitesimally small! The sight of a dear, white-haired lady measuring out one wineglassful of port wine, and two of what she called "fair spring water," into a bright silver saucepan, with sugar, and cinnamon and other spices from her own spice-box, when we had a cold, is something never to be forgotten. How many ladies now possess a spice-box, or could enumerate the spices which it ought to contain? and what lady could promptly answer if asked which are the four cold seeds? With the changed lives of our women, changes have taken place in our gardens too. Where are many of the old vegetables, and what has become of so many of the "pot-herbs and small salladings?" Who now, as a matter of course, grows basil, hyssop, rue, burnet, balm, "tragopogon," purslane, sorrel, tansy, or sweet cicely? Who goes out to seek these or other "sprigs of summer," or rosemary, or handfuls of sweetbriar for flavoring, or myrtle to put in the bills of pigeons? What careful housewife gathers hop shoots to eat in the place of asparagus? Such knowledge is now known no longer, and much that was pleasant and good has gone with it. Time was when women ought to have been as poetical as landscape painters, whose almanac is forever before their eyes in the diurnal changes of nature.—*The Saturday Review.*

THE CHARITY INSTITUTIONS OF PARIS—NURSING INFANTS WITH ASSES' MILK.

In recent years, in France, conscientious efforts have been made to ascertain the principal causes of the loss of population, and it has been demonstrated by numerous facts that one of these causes consists in the physical degeneration induced by deficiency of alimentation in infancy; and the most eminent physicians of Paris, and the Director of Public Assistance, have endeavored to modify and improve the system of nutrition in the public charitable institutions, providing for recently born children lactation adequate to the necessities of the temperament and constitution.

In the Hospital for Infants' Diseases, situated in Sabres Street, there exists a section for rickety boys and girls, whose miserable aspect produces an impression of pain upon the mind—unfortunate beings who have inherited the organic vices of their parents, and who suffer from anæmia's cruel tortures.

The administration of the hospital is arranged in two separated pavilions, where there is much ventilation, with large windows that look out upon a garden, and whose walls have double rows of willow cradles perfectly equipped. The newly born receive here the personal care of the establishment, beginning with being weighed in the balance the same day they make their appearance, the operation being frequently repeated almost every month in order to determine with exactness the development of the child. The little one is subjected to an especially nutritious diet of the most tonic kind, if it had been previously fed from a refractory goat liable to convey contagious germs, it having been found by experiment that the milk of this animal, although possessing nutritive principles of the most salutary kind, presents the inconvenience of communicating by absorption the effects of those nervous accidents to which the goat is subject.

The public charities of Paris, advised by the wise doctors of medicine, have substituted for the milk of goats that of the

ass, and have installed an ample yard near the pavilion of the rickety and scrofulous children, which is only separated by a short covered passage-way. Nothing is more picturesque than the spectacle of the lactation of the babes in this inclosure every morning, as graphically represented in our engraving, from a drawing by M. De Haenen.

The nurses, dressed in dark gowns with white caps and aprons, each carrying a child on the right arm and a little seat in the left hand, present themselves in exact turn to the women who have charge of the animals, and they hold the child, applying its lips to the teats of the docile animal. The children suck with avidity the liquid nutriment, which is fresh and of agreeable taste.

The Administration of Public Assistance of Paris has calculated that one young ass is able to lactate abundantly for a space of nine or ten months, and when this period has passed they are sold and replaced by others. It is well known that the milk of asses, by its vivifying qualities and its nutritious principles, assimilates in a great degree the milk of the nurse, and these disinherited and sick children, enjoying its beneficial effects by its permanent and methodical use, are restored little by little to health and vigor.—*La Ilustracion Espanola.*

PREVENTION OF RABIES BY PASTEURIAN INOCULATION.—From a return issued by the Local Government Board, it appears that 85 British subjects have been treated by Pasteur during the past two years. In 24 cases the dog was proved to have been rabid by the experimental test ; in 44, the dog was recognized to be rabid by the veterinary surgeon ; and in the remaining cases (17) the dog was only suspected of being rabid. In 4 cases the patient afterward died of rabies, and in 1 case died of rabies while under treatment. Professor Horsley, in a communication just made to the Epidemiological Society, states that the death-rate among persons bitten by dogs undoubtedly rabid averages fifteen per cent, and points out that in the same class of patients Pasteur has obtained a death-rate of only 1.36 per cent. Professor Horsley therefore regards the success of Pasteur's treatment as assured.—*London Letter, Medical Record, March 9th,* 1889.

LIGHT WITHOUT HEAT.

SOME investigations recently published by Professor Oliver J. Lodge, on the subject of artificial light, are worthy the attentive consideration of all concerned in the supply of gas or of electric light. The professor arrives at the conclusion that light is an electrical disturbance, and that light waves are excited by electrical oscillations, and goes on to remark that our present systems of generating artificial light are both wasteful and ineffective. The requirement is a certain range of oscillation, which may extend from 4000 to 7000 billions vibrations per second. Anything out of these limits is of no use, as it has no effect on the retina. Ordinary matter cannot be made to furnish such rapid vibrations by mechanical means. The strings used in musical instruments only give 1000 vibrations per second, or less. So it is necessary to fall back on atoms, and the most convenient way of getting vibrations of the necessary rapidity is the application of heat. But the vibrations thus obtained are infinite in number and mode, and only a very small proportion out of the whole come within the range above named. There is no known method of separating out the useful vibrations from the great majority, and hence it is that light cannot be produced without heat. In the case of ordinary combustion only a small percentage of the energy evolved is obtained in the form of light; and with the electric light, the energy for which first originates in the combustion of the fuel under the boiler, it necessarily follows that but a small proportion of the original energy can be realized in the form of light in the lamps. If we expose a carbon filament or a piece of quicklime to heat, as the temperature rises higher and higher, rates of vibration of the atoms are obtained until at last such rates as the retina is constructed to perceive are reached. But the low rates are not transmuted into the higher; there is simply a superposing of a comparatively small number of vibrations coming within the range above named upon the lower ones. A small range of rapid vibrations is required, and we know of no better plan than to make the whole series leading up to them, as though in order to get the sound of some one shrill note upon an organ we were obliged to depress every key and every pedal. What is wanted is how to produce the shrill note by itself, and Professor Lodge holds out the production of light waves without any others as the problem of the future. These considerations render it evident that there is a large ground to be worked in the way of increasing the proportion of light rays in the total energy produced by any artificial sources of light.—*N. H. Humphreys, in American Gas-Light Journal.*

EXAMINING AND CRAMMING.—Every teacher knows by experience that, when he has to take his place in the examination curriculum, he has to submit to the system, and he does his best to practise the examining "art." And when, as every teacher nowadays must, he has to turn crammer, he tries to acquire the crammer's art—*omnes eodem cogimur.* Teachers, examiners, crammers, and students, all have to take their place in the vast examining machine, which, like the Prussian military system, grinds out a uniform pattern. The huge examining mill grinds continually, and grinds very fast—unlike the mills of the gods—but the grain it casts aside; it is designed to grind out the husk.

I do not say that we can do without examinations: nor do I object to all examinations, under any condition. My complaint is confined to the incessant frequency of examinations, the growth of the practice into a highly artificial system, the creation of a profession of examining, and its correlative the profession of cramming, the wholesale, mechanical, and hurried way in which the examinations are held, and the subjection of teaching to examining. In sum, I complain that the trick, the easily acquired and cheaply purchasable trick, of answering printed questions, should now so largely take the place of solid knowledge and be officially held out as the end of study. —*From "Comments on the Sacrifice of Education," by Frederic Harrison, in the Popular Science Monthly for February.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.

By Dr. HORATIO R. STORER, Newport, R. I., Member of American Public Health Association, etc.

X. *Epidemics.* Continued from page 251.*

IV. CHOLERA.

A. THE UNITED STATES.

DR. N. S. DAVIS, of Chicago. "How Far do the Facts Accompanying the Prevalence of Epidemic Cholera in Chicago During the Summer and Autumn of 1866 Throw Light on the Etiology of the Disease." Chicago, 1867, 8°.

The medal of the American Medical Association, commemorating Dr. Davis as its founder in 1846, was described under Section VIII., No. 377. He is also mentioned upon the larger medal of the International Medical Congress of 1887, No. 906 of the present series, and he will again be mentioned when speaking of typhus, surgical-fever, and diphtheria, and in Section XII., climate.

Dr. J. M. Toner, of Washington. "The Portability of Cholera, and Necessity of Quarantine." New York, 1866.

(With Professor C. A. Lee.) "Facts and Conclusions Bearing upon the Question of the Infectious Character and Portability of Asiatic Cholera." New York, 1876.

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* The previous portions of this paper will be found in THE SANITARIAN for May, July, August, October, 1887; February, April, July, August, November, 1888; February and March, 1889.

With reference to having mentioned the medals of St. Charles Borromeo when speaking of The Plague (SANITARIAN, November, 1888), I may state that since that portion of my paper appeared, I have received descriptions of three additional and hitherto unpublished medals of the Saint from Mr. A. de Witte of Brussels, the dies of which are preserved at the Royal Mint of that city. One of them, the following, definitely settles the claim of St. Charles to be commemorated in this connection.

865*a*. Obverse. Bust of the Saint, in biretta, to right. Beneath, R(oettiers) Legend: Ora Pro—Liberanda Peste.

Reverse plain. Oval. 23x25 mm.

This was unknown to Pfeiffer and Ruland.

Dr. Toner has been mentioned under Section I., repeatedly in the present Section, and will be again alluded to hereafter.

B. ENGLAND.

Dr. E. A. Parkes. "Pathology and Treatment of Asiatic Cholera." 8°.

This medal was briefly described under Section I., No. 57. I have as yet been unable to obtain full particulars of it. Dr. De Chaumont, his successor at the Netley Hospital, who had promised to procure them for me, has since then deceased.

C. HOLLAND.

Dr. J. L. H. Haerten, of Utrecht. "Dissertatio exhibens historiam Cholerae Asiaticae annis 1848–49." Utrecht, 1850, 8°.

992. Obverse. Within a beaded circle, bust to left, without inscription. Upon shoulder, J.P.M.Menger. F.

Reverse. J.L.H.Haerten | Medico. Doctissimo. | Hoc. Amicitiae. | Et. Grati. Animi. Pignus. | J.G.Putman | Archiepisco. Ultrai | A. Consil. Et. Decan. | Civit. Incidi. Curavit | A.R.S. MDCCCLXXIII. (Rosette.) Bronze. Rüppell, 1876, p. 14.

Gerard Jan Mulder, of Utrecht (1802–80). "De scheikundige middelen der Nederlandsche regering tegen de verspreiding der cholera." Rotterdam, 1866, 8°.

"De natuurkundige methode en de verspreiding der cholera." Rotterdam, 1866, 8°. (With F. Vander Paut.) "De Cholera in Rotterdam." Rotterdam, 1832, 8°.

993. Obverse. Bust, to left. Beneath, D.V.d.Kellen F. Inscription : Gerardus Johannes Mulder.

Reverse. Within a laurel wreath, Praeceptori | Carissimo | Grati | Discipuli MDCCCXL–MDCCCLXV. Bronze. Rüppell, 1876, p. 12. Unknown to Duisburg.

Dr. Bernhard Francis Suerman, of Utrecht. Distinguished for his services during the cholera of 1831–32.

994. In 1833 a gold medal was conferred upon Dr. Suerman for devotion during the preceding cholera epidemic. I have not yet seen its description. Volcker Cat., Amsterdam, 9–13 April, 1888, no. 1925.

995. Obverse. Bust to left, with military orders. Beneath, D. Van Der Kellen F. Legend : Laborantibus Praesidivm—Consvlentibvs Lvmen.

Reverse. Within heavy oak branches tied by ribbon : Bern. Franc. Suerman | Per X Lvstra | Medicinae Professori | Doctrina Arte Sapientia | De Academia Et De Patria | Optime Merito | Senatvs Academiae | Rheno Trajectinae | D. IX Octobris | MDCCCLIX. Bronze. 58 mm. Rüppell, 1877, p. 12. In my collection. Unknown to Duisburg.

D. Belgium.

Charles De Brouckere, of Brussels. While burgomaster, zealous to check two epidemics of cholera.

996. Obverse. Bust to right. Inscription : Charles De Brouckere Burgomastre De Bruxelles Braemt F.

Reverse. An angel in armor striking down a triple-headed monster, with a flaming sword. A spade and coffin, with skull and crossed femora upon the latter. The city in the background. Inscription : Au Magistrat Dévoué Les Habitans De La Capitale Reconnaissants. Souscription Ouverte Par Le Cercle Artistique Et Litteraire. Zele Infatigable Pendant L'Invasion Du Cholera 1849 & 1854. Silver, bronze. 54. Dugniolle Cat., 1885, Nos. 280 and 288. In the Lee collection. Unknown to Kluyskens, Duisburg, and P. and R.

Dr. Adolphe Pierre Buggraeve (1806–). "Le Choléra Indien." Ghent, 1855, 8°.

This medal has been described in Section I., and Dr. Buggraeve again referred to under Vaccination. He will also be mentioned in the present Section under Syphilis, and in Section XII., Climate. While preparing the present Section for the press, I have learned of a second medal to Burggraeve that has quite recently been struck. I take the description from advance sheets of a valuable work that has been sent to me by its author, Mr. A. de Witte, of Brussels.

997. Obverse. Bust, to left. Beneath shoulder, Ch. Wiener. Inscription : Dr. Burggraeve—Anno Aetatis LXXXII

Reverse. Branches of laurel tied by ribbon. Above their junction, a burning antique lamp. Within field : La | Medecine | Hippocratique | Restaurée | —Above, Medicine Dosimetrique. Below, 1872–1887. Edges pearled. Bronze.

Alvin, *Revue belge de numismatique*, 1888, p. 590; De Witte Medailles Historiques De Belgique, p. 194, No. 95, pl. LXXVII.

Dr. J. F. Kluyskens, of Ghent. "Quelques reflexions sur la nature et le traitement du choléra-morbus épidémique de l'Inde." 1833, 8°. Already described under Vaccination, in the present Section.

E. FRANCE.

Dr. Mathieu Maxence Audouard (1776–1856). "Histoire du choléra-morbus qui a regné dans l'armée française au nord de l'Afrique." Paris, 1836, 8°.

His medal, which was given conjointly to Mazet and three others, will be described hereafter, when considering those of Yellow-fever.

Dr. François Victor Bally (1775–1866). "Études sur la choladrée lymphatique ou choléra indien," etc. Paris, 1833–35, 8°. The medal to this physician is the same as that last mentioned, and will be described a little later on.

Dr. Jean Baptiste Bouillaud (1796- [this date not given in the Index of Cat. S. G. O.]). "Traité clinique et statistique du choléra." Paris, 1832, 8°.

998. Obverse. Within laurel branches tied by ribbon, Au | Professeur | J.Bouillaud | Ses Elèves | Reconnaissants | — Juin 1836. Outside, Hôpital De La Charité—Clinique Interne (rosette).

Reverse. Within laurel branches tied by a long ribbon, Fièvres | Encephalite | Philosophie Médicale | Rhumatisme Articul[e] | Maladies Du Coeur | &.&.&. Externally, Science (rosette) Progrès.

Duisburg has dots before and after Juin, omits the dash, and has a dot after Charité; and on reverse, has four dots after words in the field, and omits the three &'s. Duisburg, Supplement (I.), 1863, p. 4. Unknown to Kluyskens. It is in my collection.

999. Obverse. Head, to right. Beneath, Caqué F. Inscription: J.Bouillaud Né A—Gavat 16 Septembre 1796.

Reverse. A jointed circle. In field, Au Chef | De La Médecine | Exacte | — | Aôut 1838. Inscription: *Hommage Au Génie De L'Observation* | Clinique Interne De

La Charité. Bronze. 40 mm. Kluyskens, i., p. 146, fig. ; Duisburg, p. 74, cxciii.

Dr. J. B. Bousquet. "Lettre sur le Choléra-morbus." Paris, 1831, 8°. Already described in this Section, under Vaccination.

Dr. François Joseph Victor Broussais (1772–1838). "Le choléra-morbus épidémique." Paris, 1832, 8°. Two clinical lectures on d°. Translated by John S(tephen). Bartlett, N. Y., 1832, 8°.

1000. Obverse. Bust. Beneath, Michaud. Inscription : F.J.Victor Broussais.

Reverse. Médecine | Phisiologique. | 1814. Duisburg, Supplement II., 1868, p. 7. Unknown to Rudolphi and Kluyskens.

1001. Obverse. Naked bust. At base, an order with its ribbon and three medalets. Beneath, Michaud. Inscription : F.J.V.Broussais, Né A St.Malo Le 17 Decem. Année 1772.

Reverse. In fourteen lines : A L'Illustre Auteur De La Médecine Physiologique Et Du Cours De Phrenologie. Membre De L'Institut De France Officier De La Legion D'Honneur.Prof.De La. Facul. De Méd. De Paris. Médecin En Chef De L'Hopital Milit. Du Val De Grace, etc., Ses Disciples Reconnaissans 1836. Bronze. 32. Duisburg, p. 69, clxxvii. Unknown to Kluyskens. It is in the Lee collection.

Guillaume Dupuytren, of Paris (1778 [according to the medal ; 1777, Thomas, Biographical Dictionary]–1835). "Lettre sur le siége, etc., du Choléra-morbus." Paris, 1832, 8°.

1002. Obverse. Nude bust to right. Beneath, to left, Caunois F. Inscription : Guillaume—Dupuytren.

Reverse. Né A Pierre Buffière | Haute Vienne | Le 5 Octobre 1778 | — | Médailler. | Français Célèbres. | XIX Siècle.1821. Silver, bronze. 40 mm. Rudolphi has François. Rudolphi, 1829, p. 43, no. 170 ; Kluyskens, p. 269, No. 1 ; Duisburg, p. 68, clxxii., No. 1.

1003. Obverse as preceding.

Reverse also the same, save with addition of Mort A Paris | Le 8 Fevrier 1835., and with omission of the final 1821. Bronze, silvered do. 42 mm. Kluyskens, p. 269, No. 2, fig. ; Duisburg, p. 68, clxxii., No. 2. Unknown to Rudolphi.

Dr. Férat, of Bourbonne, will be mentioned a little later on, No. 1012.

Baron Dr. Jean Dominique de Larrey (1776–1842). "Notice sur l'épidémic du choléra-morbus indien," etc. Paris, 1835, 4°.

1004. Obverse. Head to right, with long hair. Beneath, Petit D'Après R.J.David. Inscription : J.D.Larrey Né A Beudeau (Htes Pyrenees) Le 8 Jt. 1766. Mort Le 22 Jt 1842*

Reverse. A group of four persons. In midst a figure with sword and cloak holds the hand of a kneeling woman, upon whose lap a dying child is lying, and extends the staff of Æsculapius toward a soldier with sword and shield. Exergue : MDCCCXXXXVII. Beneath, Petit Fecit. Bronze. Rüppell, 1876, p. 25. Unknown to Kluyskens and Duisburg.

Dr. J. A. A. Legay. Distinguished for personal services during the epidemic of 1849.

1005. Obverse. Bust of Liberty. Beneath, Borrel. Inscription : République Française.

Reverse. A Mr J.A.A.Legay Chirurn. Major Du 41e De Ligne. En Témoignage De Son Dévouement.—Cholera. 1849. On edge, Ministère De L'Agriculture Et Du Commerce. Bronze. Duisburg, p. 73, clxxxix. Unknown to Kluyskens and to P. and R.

F. Germany.

Christian Gottfried Ehrenberg, of Berlin (1795–1876). "Erfahrungen über die Pest in Orient," etc. Berlin, 1831, 8°.

1006. Obverse. Head to right. Beneath, J. Weigand Berlin.

Reverse. Christiano Godofredo | Ehrenberg | Medicinae Per L Annos Doctori | Naturae Investigatori | Sagacissimo | Latentium Indagatori | Admirabili | Die V Mens. | Nov. | MDCCCLXVIII. Bronze. Rüppell, 1875, p. 50. In the Lee collection.

Carl von Pfeuffer, of Munich (1806–69). For services in cholera epidemic of 1854.

1007. Obverse. Bust to right. Beneath, C.Voigt. Inscription : Doctori Carolo Pfeuffer.

Reverse. The staff of Æsculapius, between branches of laurel. Inscription : In Memoriam Anni 1854 Medici Bavariae.

Silver, bronze. 42 mm. Kluyskens has Pfeufer. Kluyskens, ii., p. 312; Duisburg, p. 172, cccclxiv. Unknown to P. and R.

1008. Obverse. Bust. Beneath, C. Voigt. Inscription: Carl V. Pfeuffer. Prof. D. Heilkunde.

Reverse plain. Bronze. Duisburg, Supplement (I.), 1863, p. 9. Unknown to Kluyskens.

G. ITALY.

Dr. Giuseppe Ferrario, of Milan. "Istruzione al popolo per curarsi del colera asiatico." Milan, 1854, 8°.

"Cenni storico-statistici sul pestilenziale colera-morbus asiatico negli anni 1836, 1849 e 1854." Milan, 1855, 8°. "*Ibid.* per l'anno 1855." Milan (1856), 8°.

"Avvertimento al popolo sui mezzi di distruggere, etc., del cholera-morbus." Milan, 1860, 8°. Already described in the present Section, under The Plague.

H. RUSSIA.

Dr. Ernst August Kupffer (1797–1867). Prominent in arresting the cholera of 1831.

1009. Obverse. Inscription: In Sommer 1831 Schwebte Ueber Goldingen Der (here, as device, a figure of Death with his sickle, flying, toward right). At left, Lange.

Reverse. Inscription: Dā | Gab Uns Gott | in RV (Raths-Verwandte) Schmidt | Und Dr. Kupffer Helfer | In Der Noth. | Das Erkennen Dankbare | Bürger. 35 mm. Duisburg has Med. Dr., and Kupfer. Koehne, *Zeitschrift*, vi., p. 26; Duisburg, p. 194, dxxii.; P. and R., p. 155, No. 442. Unknown to Kluyskens.

The other medals of cholera are the following:

A. CANADA.

In a series of papers that I am now publishing in the *American Journal of Numismatics* upon the medals, etc., illustrative of medicine, generally considered, I shall fully discuss the question whether there exist any medals struck in Canada with reference to cholera. The following seem to be of this character, although at the date of their issue the epidemic of 1832 had not yet occurred. A little later, when speaking of the similar tokens of Paris, I shall explain this seeming discrepancy.

1010. Obverse. The Blessed Virgin standing upon the globe, her hands irradiated. Inscription: O Marie Conçue Sans Péché Priez Pour Nous | Qui Avons Recours A Vous Exergue: 1830

Reverse. M surmounted by a cross (the monogram of Maria). Beneath, a heart pierced by a sword. Around, twelve stars. Exergue: Grothe. Oval. 20 x 25.

Upon this class of medals both the Sacred Hearts, of Jesus and Mary, are usually represented, instead of the former of them, as here. McLachlan, *American Journal of Numismatics*, July, 1881, p. 9, ccii.; *ibid.*, Canadian Numismatics, Montreal, 1886, p. 51.

Mr. McLachlan states that "Grothe, whose name appears on this medal, had at that time an extensive silversmith's establishment (in Montreal). The dies are said to have been engraved by Beaume. We may therefore class it as the earliest medal of purely Canadian workmanship.".

1011. Obverse. Device as in preceding. Inscription: Marie Conçue Sans — Péché Priez Pour Nous.

Reverse. The monogram as in preceding, but both the Sacred Hearts. The stars and name as above. Oval. 10x12.

Le Roux, le Medailleur Du Canada, 1888, No. 634, fig. . This is much smaller than the preceding, the date is absent, and the inscription upon the obverse is greatly abbreviated. McLachlan thinks that there exists only the former of the two, and that he possesses the only specimen. The latter of them is admitted here solely upon the authority of Dr. Le Roux. They are both unknown to P. and R.

B. Holland.

a. Amsterdam (1832, 1866?).

1012. Obverse. The Arms of Amsterdam; two lions, erect, upholding a crown. Inscription: Cholera-Commissie Te Amsterdam· Exergue: MDCCCXXXII. | I·P·Schonberg F

Reverse. Blijk Van Erkentenis· | Aan· followed by the name of the recipient. In P. and R.'s specimen this was Dr. J. B. Klonstrup, Jr.; in that of Durand, Dr. G. J. Stork, and in that of Dr. Fisher, H. | Meijer Hz^{n} Durand, p. 194; P. and R., p. 158, No. 448. In the Fisher collection.

1013. There is another cholera medal of Amsterdam, of which I have only the following description:

"Eerepenning van wege de regeering voor onverplicht dienstbetoon aan cholera-lijders of hunne betrekkingen. In 18(66)." (Medal of honor conferred by the Government for voluntary attention to cholera patients and their surroundings.) Dies by J. Elion. Bronze. 58 mm. Bom and Son Cat., Amsterdam, 3 Nov., 1884, No. 4271. Unknown to P. and R.

b. Groningen.

1014. By D. VanderKellen. 60 mm. Conferred by the Town Council, for special official services during the cholera. Gold, silver, bronze. *Ibid.*, No. 4255. Unknown to P. and R. There were struck in all thirty of these medals; one in gold, twenty-seven in silver, and two in bronze.

c. Utrecht.

Reference has been previously made to the medal given to Dr. B. F. Suerman of this city, No. 994.

C. BELGIUM.

a. Brussels (1832, 1849, 1866).

1015. Obverse. Head to left, encircled with oak leaves. Inscription: Leopold Premier—Roi Des Belges. Beneath, Braemt F.

Reverse. Beneath a wreath, Reconnaissance Publique· Inscription: Services Rendus Pendant Le Choléra*1832* Gold; bronze. 37 mm. Guioth, p. 142, pl. 18, No. 151; Kluyskens, i., p. 297; P. and R., p. 158, No. 449.

1016. As preceding, but smaller. Silver. 16 mm. Guioth, p. 142, pl. 18, No. 152; Kluyskens, i., p. 297. In the Fisher collection. Unmentioned by P. and R.

1017. Obverse. Bust to left. Hart Fecit. Inscription: Leopold Premier Roi Des Belges.

Reverse. A female figure with couchant lion, distributing laurel wreaths to two sitting figures; one of whom, a male, represents Science, and the other, a female, clasps two infants in her arms. In background, figures bearing a patient. Legend: Recompense Nationale. Exergue: Cholera—1849. Hart. F. Silver. 37. In the Lee collection. Unknown to P. and R. I owe its description to Surgeon J. S. Billings, U.S.A.

Concerning the next in sequence I am as yet without exact information, but I insert it here at the suggestion of Dr. William Lee, of Washington.

1018. A female holding branch over another who kneels beside a stricken youth. In background, a statue of Hygieia —1849. Bronze. 36. Cogan sale March 16th–18th, 1883, No. 986. Unknown to P. and R.

The epidemic of 1849 and that of 1854 are also referred to upon No. 996, the medal of De Brouckere.

1019. Obverse. A female, with masonic emblems, a twig in her raised right hand and a wreath in her dependent left, stands near an altar, against which two oval shields are leaning. To left a B, a circle, etc. Two pediments: upon the left one the letter J, and beneath, a twig; upon the right, B. At their base a branch of roses. Inscription: R.·.□ Des Amis Philanthropes. Exergue: Or.·.De Bruxelles

Reverse. Beneath two branches bound by ribbon, La | □ .·.Au T.·.C.·.F.·. | Jules Anspach | Son Vén.·.M.·. | Pour Sa Conduite | Vraiment Maç.·. | Pendant L'Épidémic | De L'An De La | V.·.L.·. | 5866· (1866). Bronze. 48 mm. Marvin has Ven., and La for Sa. Marvin, Medals of the Masonic Fraternity, p. 88, No. CCX.; P. and R., p. 167, No. 477.

D. France.

a. Bourbonne (1832).

1020. Obverse. Inscription: Épidémic Du Choléra 1832.

Reverse. Within a crown of oak and laurel: Au Docteur Férat La Ville De Bourbonne Exergue: A. Caqué F. Silvered bronze. 31 mm. Duisburg inserts a dot before the date. Kluyskens, i., p. 297; Duisburg, p. 74, dxciv. Unknown to P. and R.

b. Chateauroux (1832).

1021. Obverse. Æsculapius (Hippocrates, Lee) warding death with his scythe from a sick woman. A corpse at left. Attendants with disinfectants, and grieving friends. At right, E. Rogat 1832. Exergue: Invasion Du Choléra | En 1832·

Reverse. Within oak wreath an old chateau with two lateral towers. Inscription: Ville De Chateauroux Reconnaissante 31 Mai An 15, 7ere· Bronze. 84 mm. 53.

This obverse is the same as that of No. 1021, which is figured by P. and R. In the Lee Collection. Unknown to P. and R.

c. Douai.

1022. La Ville De Douai Au Corps Médical A L'Occasion Du Cholera. Bronze. Minart Cat., Paris, 1880, No. 3767. Unknown to P. and R.

d. Paris (1832, 1848).

1023. Obverse as that of the last but one.

Reverse. A thick oak wreath. Field vacant for name of recipient. Bronze. 84 mm. Kluyskens, i., p. 297; P. and R., p. 159, No. 450, fig. of obverse.

Either this or No. 1021 is in the U. S. Mint Collection. Snowden mentions it in his "Miscellaneous Medals" (Medallic Memorials of Washington in the U. S. Mint, p. 128, No. 41), and calls Æsculapius "the Good Samaritan."

1024. Obverse. Æsculapius attending a patient with cholera, whom a female (the city of Paris) sustains. Above, the Genius of Pestilence. Legend: Génerosité—Dévouement Exergue: 1832 | J·Vatinelle Inv·Et F·

Reverse. Within an oak (P. and R.; laurel, Kluyskens) wreath: Louis—Philippe | Régnant | La Ville De Paris | À | F·Mouillet· | Le Ce· D'Argout Ministre | Le Ce· De Bondy | Préfet· Bronze. 69 mm.

Kluyskens's specimen was a proof, and instead of a recipient's name, it had Essai engraved. He also gave Cte· Kluyskens, i., p. 298; P. and R., p. 159, No. 451.

1025. Obverse. Bust, to right. Beneath, Gayrard·F· Inscription: Hyacintvs—Lvd· De Qvelen· Archiepiscopvs· Parisiensis·

Reverse. "St. Francis De Paula" (*St. Vincent* De Paul ?) seated, with nuns and children at his feet. Legend : Orphano· Tv—Eris—Adjvtor Exergue : Cholera·Morbo | Ingravescente | MDCCCXXXII· Mr. Frossard (Cat. of ninetieth sale, March 12th–13th, 1889, No. 801) calls the saint "the praying archbishop." Bronze. 37 mm. 24. *Ibid.*, p. 159, p. 452.

1026. Obverse. The saint, kneeling. Inscription : St Roch Priez—Pour Nous·

Reverse. *St Roch | Préservez | Nous | Du Cholera Oval. Bronze. 23 x 19 mm. *Ibid.*, p. 159, No. 453 ; Die deutschen Pestamulete, p. 492.

Mr. Edouard Frossard, of New York, in his eighty-ninth Sale Catalogue (Hart collection, December 26th–28th, 1888, No. 567), speaks of this medal as having been struck specially for the parish of St. Roque, Quebec. He is doubtless in error, and it is not mentioned as Canadian by either McLachlan or Le Roux.

1027. Obverse. The saint, kneeling. Inscription : St Roch Préservez Nous De La Peste.

Reverse. St. Hubert, kneeling before the miraculous stag. Inscription : St Hubert Priez Pour Nous Oval. Bronze. 18 x 14 mm. P. and R., p. 159, No. 454 ; Die deutschen Pestamulete, p. 492.

1028. As belonging to this same epidemic of 1832, P. and R. class the many French medals, sometimes styled "miraculous," consecrated to the Immaculate Virgin, with a serpent, here not merely the personification of original sin, but of pestilence, beneath her feet. Most of these bear upon the reverse the Sacred Hearts of Jesus and of Mary, with monogram and a cross, irradiated or not, and surrounded by stars. Of these I possess no less than nine varieties. There are others in my collection with the same obverse, but apparently unknown to P. and R., which have the following reverses : St. Louis De Gonzague, St. Ignace De Loyola Priez Pour Nous, Sta. Anne Mére De Marie with the same invocation, Souvenir Du Jubilé 1851, and Ecce Panis Angelorum ; the last but one of which shows how an old die is often misled with a more modern one.

Of a similar character, and probably issued for the same purpose, are medals bearing an English inscription, but whether struck in England, Canada, or the United States, or in all of these countries, I have not yet ascertained. The device of their obverse is as just described, and the legend, O Holy Mary Ever Virgin And Conceived Without Sin | Pray For Us Who Implore Thy Aid ; or, as in some of them, For Us Who Have Recourse To You. Of these, of the Sacred Hearts' type, irradiated and not, I have sixteen varieties, and six others with the same obverse and the following reverses : Ecce Panis Angelorum (a large and very beautiful medal of the Adoration of the Blessed Sacrament), St. Patrick Pray For Us, Congregation of the Children of Mary, D°. of the Holy Child Jesus, and Remembrance of The Holy Mission (from three sets of dies). To the German issues, of the same type, I shall subsequently refer.

Some of these medals bear the date of 1830, and would at first seem excluded from the cholera classification in point of time. As, however, the epidemic in question started from India in 1827, and reached Orenburg in 1829, and Astrakhan in 1830, although it did not arrive in Germany till 1831, and in France till 1832, it is probable that these medals were struck in the hope that prayers through the Divine Mother might arrest the threatening scourge.* Especially does this seem to be the case in view of the history of the following :

1029. Obverse. The Mother of God, upon the globe. In the field, stars ; above, sunbeams. Inscription : Medaille Anti Cholérique. Beneath, very small, 1848.

Reverse. Around a star, Anti | Cholérique Beneath, very small, Garnier A Paris. Inscription*: Métal Composé *Préservatif* Beneath, very small, Déposé. 18 mm. P. and R., p. 163, No. 464 ; Die deutschen Pestamulete, p. 492. Although this was issued in 1848, evidently in the endeavor to ward off the approaching epidemic, it was not till 1849 that the cholera reached Calais and Dunkirk, and then Paris. The medal was followed by that next described.

1030. Obverse. The Phrygian cap between two skulls and cross-bones. Above, Republique ; beneath, Française.

Reverse. *Medaille* | *Anticholérique.* Beneath, 1849 between

* The religious medal of St. Martial, with the date of 1830, I have mentioned under Small Pox, with the intimation that it may have been struck at Limoges during the prevalence of that disease, although it may prove upon further investigation to have been another cholera medal, like those above.

a cross and an anchor. Legend : Saint Roch Priez Pour Nous Octagonal. Tin. 34 x 45 mm. P. and R., Die deutschen Pestamulete, p. 492.

e. Marseilles (1835, 1849, 1854).

1031. Obverse. The arms of the city.

Reverse. Within an oak wreath : Choléra | 1835 | Marseille Reconnaissante· 56 mm. P. and R., p. 160, No. 455.

1032. Obverse. The arms of the city.

Reverse. Within an oak wreath : Marseille | Reconnaissante | Choléra | 1849· Beneath, small, Robineau. Silver. 28 mm. *Ibid.*, p. 163, No. 465.

1033. Obverse as preceding.

Reverse as in the last but one, save 1854. 56 mm. *Ibid.*, p. 163, No. 466.

f. Toulon (1865).

1034. Obverse. The City Arms. Inscription : Epidémie De 1865—La Ville De Toulon Reconnaissante.

Reverse. A laurel wreath, with space for name of recipient. *Ibid.*, p. 167, No. 476.

D. GERMANY.

a. Berlin (1831–32).

1035. Obverse. Within a circle, the angel of pestilence with flaming sword and cup of poison threatens a seated and shrinking female wearing a mural crown, who leans upon a shield bearing the arms of the city. To right, C.Pfeuffer F. Inscription : Demüthiget Euch Nun Unter Die Gewaltige Hand Gottes* Exergue : Berlin Von Der Asiat· | Cholera Erreicht | D·31 Aug·1831·

Reverse. A similarly crowned female kneels in thanksgiving before an armorial shield resting against a tree. Beneath, to left, G·Loos D· Inscription : Bei Dem Herrn Ist Gnade Und Viel Erlösung* Exergue : Von Der Plage Erlöset | D·30 Januar | 1832. Silver, bronze. 37 mm. Kluyskens has De Müthiget, and P. and R. in their edition of 1880 have Peuffer. Kluyskens, i., p. 298 ; P. and R., p. 155, No. 443, obv. figured. In the Fisher collection and my own.

b. Breslau (1831–32).

1036. Both obverse and reverse as in preceding, save that the shield bears the arms of Breslau, and that the dates in the two exergues are different. In that of the obverse, there is 29 Sept., and in that of reverse 4 Januar.

1037. Obverse. The epidemic as a female, flying before Hygieia. In background, the city. Inscription : Ist Den Die Hand Des Herrn Verkürzt? 4 Mos· 11, 23. Exergue : Anfang D Choler· | D·29, T·Sept· | 1831

Reverse. A person rendering thanks at an altar. Beneath, small, Less(e)r Inscription : Der Herr Giebt Mich—Dem Tode Nicht Psal· 118, 18 Exergue : Dankfest Nach D· | Cholera, Bresl· | D 22·Jan 1832 Silver. 32 mm. P. and R., p. 157, No. 446.

c. Hamburg (1831–32).

1038. Both obverse and reverse as in No. 1030, save that on obverse the date is 8 Oct., and on reverse 22 Januar. *Ibid.*, p. 158, No. 447.

d. Munich (1836, 1854–55).

1039. Obverse. The Arms of Munich ; a monk upon a heart-shaped shield. At the sides, in Gothic letters, S(uppen) A(nstalt)

Reverse plain. Both oval and four-cornered. White metal.

Neumann, No. 6, 872 ; *Num· Zeitung*, 1851, s. 99 ; P. and R., p. 162, No. 460.

Soup ticket, during the epidemic of 1836.

1040. Obverse. Inscription : TALISMAN | Gegen Die | CHOLERA

Reverse. Diese MEDAILLE Wird In Der | MAGENGEGEND | Auf Dem | BLOSENLEIBE | Getragen· Copper. 32 mm.

In their "Pestilentia in nummis," 1882, P. and R. have Gegfn. P. and R., p. 162, No. 462 ; Die deutschen Pestamulete, p. 491. Worn during the cholera of 1836.

1041. P. and R., following Von Eyb (Münzen und Medaillen der Stadt München, No. 220), here include the heart-shaped medalet, with the Immaculate Virgin, within an oval, upon obverse, and the Sacred Hearts upon reverse, similar to those already mentioned. The inscription is : O Maria Ohne

Sünde Empfangen | Du Unsre Zuflucht Bitt Für Uns. P. and R., p. 162, No. 461; Die deutschen Pestamulete, p. 491; Walter, Medallic Amulets and Talismans, *Proceedings of American Numismatic and Archæological Society of New York*, 1886, p. 39.

1042. Obverse. Head, to right. Inscription: Maximilian II—Koenig V·Bayern Beneath, C·Voigt·

Reverse. The Blessed Virgin standing upon a pillar, the crescent beneath her feet. Inscription: Patro | na—Bava | riae·Zur Erinnerung An—Die Wiederherstellung | | Der Mariensäule—In München 1855· Upon rim, Zwey Gulden. Silver. 36 mm. 23. P. and R., p. 165, No. 472. In the collection of Mr. Robert Shiells, of Neenah, Wis.

1043. Obverse. The Blessed Virgin, with The Child, a crescent under her feet. Beneath, T—B. At the sides: Heilige | Maria—Mutter | Gottes Exergue: Bitt Für | Uns (Pray for us).

Reverse. Gedenke | Der | Gottes | Gnade, | Mariens | Fürbitte Und | Schutzes· (Believe in the mercy of God, and Mary's intercession and protection) | Anno | 1854–55· P. and R. in their "Pestamulete" have Füebitte. Rhomboid in shape. Brass. 36x24 mm. *Ibid.*, p. 166, No. 475; Die deutschen Pestamulete, p. 492.

1044. As the last, save that the die-cutter's initials are absent. *Ibid.*, p. 492.

1045–47. P. and R. also give three medals of the Blessed Virgin, two of which are heart-shaped and the other oval, as struck during this epidemic, which are without date and closely resemble those already mentioned of 1830. They are P. and R., pp. 165–66, Nos. 473–74; Die deutschen Pestamulete, pp. 491–92.

Of interest in connection with the cholera of 1854–55, is the medal conferred upon Dr. Pfeuffer, of Munich, by the physicians of Bavaria. This I have already described, No. 1004.

E. Austria.

a. Vienna (1831–32).

1048. Obverse. The city of Vienna, over which hovers an angel with sword and cup of poison. To the left a weeping woman, with mural crown, who leans against a pedestal. Upon this: Wien | Von Der | Cholera | Erreicht | D:4:Sep: | 1831· |][Legend: Herr Dein Wille Geschehe

Reverse. A woman, erect, with thankful mien, before a flaming altar, upon which: Erlöst | D·1·April | 1832· At left, over a hill, the rising sun, and at right, in background, the city of Vienna. Legend: Bei Dem Herrn Ist Gnade· Exergue: Wien Bey F·Machts· Silver. 44 mm. P. and R., p. 156, No. 444.

F. Italy.

a. Brescia (1836).

1049. Obverse. The genius of Religion with a large cross supports a sinking female, behind whom is an armorial trophy with shield. In background, to right, a distant city. Inscription: Deo·Praestiti·—Sospitatori Exergue: Zapparelli.

Reverse. A two-barred cross, beneath which: MDCCCXXXVI· Inscription: Brixia Cholera Morbo Tentata Pristinae Reddita Sanitati* Bronze. 52 mm. *Ibid.*, p. 161, No. 458, fig. of obverse.

1050. Obverse. Inscription: Sacro Presidio Di Brescia* Within field: Nel | Cholera | Del | 1836.

Reverse. A two-barred cross upon a pedestal. Inscription: Voto—Publico. Copper. 21 mm. *Ibid.*, p. 161, No. 459.

b. Chiavari, near Genoa (1837).

1051. Obverse. The Madonna and Child, before a curtain. Legend: Hortus Conclusus Maria Patrona Incomparabilis.

Reverse. The façade of a church. Inscription: Clavarenses A Diro Cholera Servati Vivebant. Exergue: H. Lorenz F. Anno Domini 1837. Bronze. 31. In the Lee Collection. Unknown to P. and R.

c. Leghorn (1835).

1052. Obverse. Inscription: La Ven·A·C·Della Misericordia Di Livorno Within olive and cypress branches, tied by ribbon: Ai | Capiguardia | Flagellante | Il | Cholera | 1835 Beneath, small, G(iorgio)·N(esti)·

Reverse. Iddio | All' Opera Procellosa | Sortilli | Per Fare

Prodigio | Di' Misericordia | Salvandoli. Bronze. 52 mm. P. and R., p. 161, No. 457.

d. Parma (1855).

1053. Obverse. The busts of the Grand Duke and Duchess, to left. Inscription: Roberto I·D·Di Parma Ecc-Luisa M·Di·Borb·Regg· Upon neck: Bentelli.

Reverse. Within a wreath of oak and laurel: Alla | Carita | Coraggiosa | 1855. Copper. 24 mm. *Ibid.*, p. 165, No. 471.

e. Turin (1835–36).

1054. Obverse. The Madonna upon a pedestal. To the left, a female with mural crown and a child bearing a shield, upon which is a rampant bull, are making a votive offering. To the right, a man is supporting a sick woman who tries to touch the Virgin's mantle. Beneath, to left, Galazzi F. Exergue: MDCCCXXXVI

Reverse. Matri·A·Consolatione | Ob·Aerumnam·Morbi·Asiatici | Mire·Lenitam·Mox·Svblatam | Tantae·Sospitatricis·Ope | Ordo·Dec·Pro·Popvlo | Votvm·Solvens·Qvod·Vovit | An·M·DCCC·XXXV· Bronze. 54 mm. 35. *Ibid.*, p. 160, No. 456, fig. of obverse. In the Lee Collection.

As to the following I am somewhat doubtful.

1055. Obverse. A Suor Cristina Pasquier Per Viril Lenno Per Carita Intelligente Operosa Instancabile Angelica In XXX Anni Di Governo E Nelle Piu Tremende Epidemie Segnallatissime (To the Reverend Sister C. P., etc.).

Reverse. La Direzione Del Manicomio Di Torino Interprete Della Publica Riconoscenza MDCCCLX (The Directors of the Lunatic Hospital at Turin acting as interpreters of the public gratitude). Bronze. 32 mm. In the Lee Collection. I have not seen this medal and owe its description to Dr. Lee. Whether or no the "tremendous epidemics" that it chronicles were of cholera, I am still uncertain. Unmentioned by P. and R.

G. THE STATES OF THE CHURCH.

a. Rome (1854).

1056. Obverse. Bust of the Pope, to right. Inscription: Pivs IX·Pontifex-Maximvs Anno X· Beneath, P·Girometti F·

Reverse. The Holy Father, attended by two priests and an officer, blesses a sick person upon a bed. At its side, a third priest, kneeling. Exergue: Ad Sancti Spiritvs Lve Laborantes | Invisit XI Kal·Sept· | A·MDCCCLIV.— 44 mm. *Ibid.*, p. 164, No. 467, fig. of obverse.

1057. Obverse. Within a heavy wreath of oak and laurel, the bust of the Pope, to left. Inscription: Pivs IX·—Pont· Max· Beneath, Nic·Cerbara F.

Reverse. Pivs IX·Pont·Max· | Pater Indvlgentissimvs | Senatori Et Conservatoribvs Vrbis | Anno·Rep·Sal·MDCCCLIIII | Lve Asiana In Vrbem Grassante | De Civium Incolvmitate | Praeclare Meritis | (here follow the names of the nine officials who are honored). Bronze. 82 mm. *Ibid.*, p. 164, No. 468.

1058. Obverse. The Madonna. Legend: Prima Vrbis Et Orbis Tvtela.

Reverse. Maria Labis Nescia Qvod Pio IX P·M·Vbertatem Vrbi Impetravit Lvem Asiaticam Lenivit·A·Chr·MDCCCLIV· 37 mm. *Ibid.*, p. 164, No. 469.

There is a medal of Pope Leo XII. blessing a sick person in bed, with the legend Infirmus Eram Et Visitatis Me, which is known as a hospital piece, and is often mentioned as commemorating cholera. This is undoubtedly, however, an error, as the pestilence was not then in Europe, and upon the other hand, the pontiff in question was noted for his great fidelity in personally visiting and investigating the condition of all the public institutions within the domains of the Church.

H. Spain.

a. Barcelona (1854).

1059. Obverse. The arms of Catalonia. Beneath, Carrasco. Inscription: A·D·Pascual Madoz Los Catalanes Residentes En Madrid·

Reverse. Colera Morbo, Agitacion Politica, Crisis Industrial Afligieron A Barcelona Durante El Mando De Madoz. Desde 10 Agosto A 20 Octobre De 1854. Su Abnegazion Y Civismo Amenguaron La Intensidad De Estas Calamidades. Bronze. 59 mm. *Ibid.*, p. 165, No. 470.

I. POLAND.

a. Warsaw (1831).

1060. Obverse. An old man, with bat-like wings, holding a vase before him, flies toward the right, where there is a withered tree. Beneath, St.

Reverse. Pierwsze | Ziawienie Sie | Cholery | W Warszawie (The First Appearance of Cholera in Warsaw) | 1831. Silver. 23 mm. *Ibid.*, p. 154, No. 441.

J. RUSSIA.

a. Goldingen (1831).

This medal has already been described, No. 1006, when speaking of Dr. E. A. Kupffer.

b. Odessa (1837).

1061. Obverse. The monogram of the Czar Nicholas I. beneath a crown.

Reverse. In four lines of Russian (For the arrest of the pestilence in Odessa). 1837. Bronze. 28 mm. *Ibid.*, p. 162, No. 463.

1062. In addition to the above there appears to exist a large oval "anti-cholera copper plaque" of 1831. If such is the case, it was unknown to P. and R., unless there be an error in the date, in which it may prove one of those of Munich in 1836.

Frossard sixty-fifth sale, February 19th, 1887, No. 175.

(*To be continued.*)

TO YOUNG PHYSICIANS.—There is said to be a barber's sign near the Palais Royal, Paris, bearing the following legend in the vernacular: "Callileucocapillaire water which colors the hair white. For the use of young physicians and magistrates."

SITKA.*

By Passed Assistant Surgeon C. W. Rush, U. S. Navy.

THE inhabitants of Sitka are chiefly Russians and Indians, there being but few Americans. The number of Indians varies with the season, as during the summer most of them are absent hunting or fishing for their winter supply of food. They return to Sitka usually about November 1st, but the increasing attractions of Juneau, with its dance-houses and theatre, have materially reduced the population of the ranch. At present there are about five hundred, while during the last winter there were between twelve and fifteen hundred. Phthisis and the various forms of scrofula are rapidly diminishing their number. In spite of the influences of civilization they adhere so strongly to their old customs that any attempts at medical treatment from the whites, if not refused, are submitted to with reluctance, and as a result, particularly in the case of children, the mortality is very high.

During the past winter erysipelas has prevailed to an alarming extent throughout the ranch, and many deaths have occurred from its cause.

Bronchitis and catarrhal pneumonia among the children are common, and in many cases are fatal because of neglect and the lack of proper treatment. Rheumatism in a subacute or chronic form is common among the males, and the peculiar deformities resulting therefrom are especially noticeable among the Sitka tribe. While on the summer cruise all Indians who applied for treatment were furnished with medicines by permission of the commanding officer. At Chilcat and a small village at the head of Taiya Inlet many cases of purulent ophthalmia in children were presented for treatment. Those who came regularly and followed directions faithfully were soon relieved, but the majority made but one visit to the ship. This disease I believe to be a prominent cause of blindness,

* From Report of the Chief of the Bureau of Medicine and Surgery, U. S. Navy, 1888.

which is by no means uncommon among the Indians, both adult and children. As a rule the Indians from the northward and the interior are far superior physically to those of Sitka. They are taller, more robust and muscular, and present fewer evidences of chronic disease, but syphilis is everywhere present.

When we consider the exposure to which they are subjected, and the primitive attempts at either relief or cure of disease, it is not surprising that the mortality among these Indians is so great. The primary results of civilization among such a people are never encouraging. The white man's vices are far more attractive to the Siwash than his virtues, and time alone can bring about the avoidance of the former and the adoption of the latter. When we think of the Siwash "doctor," with his hideous masks and his doleful incantations, it is not strange that impressions such as they must have produced are not easily removed; and we can hardly expect the average Indian to have much faith in the white man's treatment. The position of "medicine man" was so lucrative, and at the same time commanded so much respect from the Indians, that attempts to abolish his practices have met with great opposition, both by the "doctor" himself and those of the tribe who were impressed with his wonderful abilities. But the prompt arrest and punishment of the offenders has made the distinction an undesirable one, and it is only in places that are rarely visited by the whites that a "Siwash doctor" can now be found.

Their treatment of young girls is, perhaps, as fair an illustration as can be found of their brutality and cruelty. Upon the appearance of the menses the girl was taken and confined at some distance from the camp, in a small hut or tent, only large enough to admit her in the most cramped position. Here she was kept, for a period varying from a few months to a year, entirely shut off from every one, her food being passed into the hut, and she was regarded by all the tribe as unclean and unfit to associate with them. While on the cruise several of these unfortunates were discovered and released by the commanding officer, and speedy punishment promised for a repetition of the offence.

Southeastern Alaska is noted for its mineral springs, and there is scarcely an island but has one or more. On Baranoff

Island there are four, the most important of which is situated on the western shore, about eighteen miles south from Sitka. These springs, both hot and cold, are strongly impregnated with sulphur, iron, or magnesia, and some contain various proportions of each. During the Russian occupation of the country a hospital under the charge of the army was located at this place, and not only were soldiers treated there, but citizens were allowed free use of the waters. The medical officer stationed at Sitka made semi-weekly trips to the springs, and it is said that in most cases no medicine other than the waters was used. People from all parts of the Territory went there for treatment, and wonderful cures are related by men whose word is beyond question. The place is still resorted to by patients afflicted with rheumatism and venereal disease, and, from my own observation, I am forced to believe that benefit results from the use of these waters.

An enterprising trader has erected several houses at the place and charges visitors at the rate of $1 per day for the use of bath-tubs which he has built. During the summer there are always from six to a dozen patients there, and in the majority of cases they return greatly improved if not wholly cured.

It would be interesting to know whether or not cases originating under my own observation would be equally benefited, and if the permission of the department to send patients there could be obtained sufficient data might be accumulated to form an opinion as to their curative value.

THE MICROBE OF MALARIA.—At a recent meeting of the Academy of Sciences, Professor Bouchard presented, in the name of Professor Laveran, of Val de Grâce, a memoir on the parasite of impaludism. The parasite brought to notice by the author in 1879 is considered as being incontestably that which produces intermittent-fever. Everywhere where cases of fever were examined the same organism was found, and that not only in France, but also in Germany, in Italy, in Russia, in Algiers, in Madagascar, etc. M. Bouchard, therefore, considers it as demonstrated that intermittent-fever is due to the parasite discovered by Dr. Laveran.—*The Lancet.*

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

Subscribers will please conform to conditions of detachable order on advertising page.

THE DISINFECTION WITH STEAM ADVISED FOR THE "BOSTON."—We regret that a strong impression created by conversation with one of the members of the Board of Medical Officers of the Navy, who recommended the use of steam at a temperature of 220° F. for the disinfection of the "Boston," and negligence to refer to the report in our January number, when we recalled the subject editorially in February, led us into a misrepresentation of the intent of the board. It did not recommend the application for two hours—did not designate the time at all! But we are now informed that the board never contemplated more than ten minutes' exposure at that temperature; and in a subsequent explanatory note (when it was found that the Bureau of Construction objected to the use of steam on account of its injury to the lining woodwork), reported that two hours' exposure to steam of 150° F. would probably accomplish the same result.

THE HAPPIEST OF NATIONS—FRANCE?—It has been said that the happiest nation is that in which the proportion of men and women is most nearly equal, in which the number of illegitimate births is least, which contains the greatest number of healthy adults, in which the average life is longest, and in which the proportion of people beyond sixty years of age is the highest. According to the Paris *Temps*, France is the country in which all these conditions are most fully met. While in Great Britain there are 750,000, and in Germany 1,000,000 more women than men, in France the excess is only 92,000. Between the years 1825 and 1867 the illegitimate births varied in the different countries of the Continent from 8.2 to 25 per cent, but in France they were only 7.2 per cent. The mortality in England is 31, in Germany 38, and in France 23.8. The proportion of inhabitants between fifteen and sixty years of age is greater in France than in any other country, and the same favorable showing is made for the average duration of life and for the number of vigorous old people.

Investigations by M. Chervin, published in a recent number of the *Gazette Hebdomedaire des Sciences Medicales de Bordeaux*, show that, of 10,425,321 families in France, 2,073,205, or twenty per cent, are childless; 2,546,611, or twenty-four per cent, have but one child each; 2,265,317, or twenty-two per cent, have two children each; 1,512,054, or fifteen per cent, have three children each; 936,853, or nine per cent, have four children each; 549,633, or five per cent, have five children each; 313,400, or three per cent, have six children each; and 232,188, or two per cent, have seven children each.

Excluding the 2,073,205 families that have no children, there are only 8,352,116 that contribute to the increase of the population. This gives an average of 259 children for every 100 families, but if those having no children are included the average will be but 207 for each 100 families, or a little more than two children in each household. Those having no children, the families being unrepresented, drop entirely out of existence in time. Of those having only one child there is only one representative for father and mother, and such families, unless by alliances with others, would disappear.

Families having two children would barely be represented if sickness, wars, epidemics, and other causes did not reduce the number thus left. Only 3,544,188 families, representing thirty-four per cent, contribute to maintain the population; while 6,881,133, or sixty-six per cent, contribute nothing. This small increase explains the almost imperceptible increase of the population in France.

The departments having the least increase are those in the northeast, the northwest, the southeast and the southwest. In these the average number of children for 100 families is from 200 to 228.

The departments having the greatest increase are Brittany and Poitou on one side and Savoy, Auvergne, etc. In the north, Flanders and Loire scattered, which give an average of 285 to 340 children in the household.

The interest of the State in the conservation of infantile health and life may be appreciated by reference to the illustrated article under the head of "Charity Institutions of Paris," on preceding pages.

The *Journal Officiel*, recently issued, reports the vital statistics for the last year as follows: 278,056 marriages, 899,333 births, and 842,797 deaths, showing an increase in the population of 56,536 individuals, or 3920 more than during the preceding year. In spite of the increase, however slight, it is noteworthy that there is a steady decrease (12,808 annually) in the births during the last seven years. Of the total number of births registered during the year, 73,854 were illegitimate, giving a proportion of over 8 per cent of the whole. In the department of the Seine (Paris) the percentage reached the high figure of 25, while in that of Finisterre it sank to 2. The average number of deaths per 1000 for the year was 22.

The total number of *suicides* was 7572. Of these, one fifth were in and around Paris. Poverty appears to have caused only 483 suicides throughout France, and this number includes a morbid fear of impending misery without actual privation. To mental aberration 1975 cases were traced, and 1228 to physical suffering. Among the moral causes domestic trouble comes first, and alcoholism next. Disappointed love and jealousy caused respectively 200 and 27 cases; dislike of military service, 25. The suicidal month of the year is July, and it is noteworthy that since the establishment of the *fête* on the 14th, suicides have increased.

THE MEDICAL SOCIETY OF THE STATE OF NEW YORK held its eighty-third annual session in Albany, February 5th–7th inclusive. The number of papers on the programme was so large—and for the most part excellent—as to require a division of the society into sections for their proper disposal.

The opening address of the President, Dr. Samuel B. Ward, of Albany, besides citing some of the prominent evidences of professional advancement during the year since the society last met, and stating the necessity for division into sections, invited special attention to a recent judicial decision on *What Constitutes Insanity?* "Within the past year, two of our professional brethren, here in Albany, have been placed in a somewhat novel and disagreeable position, as the result of examining a man whose actions had been such as to raise a doubt concerning his mental soundness. It is a matter of no little importance to us all, for any two of us might easily have found ourselves in the same unpleasant predicament. Examination, cautiously and properly conducted, showed the man to be the subject of the delusion that his wife and daughter were conspiring to poison him—a perfectly unfounded suspicion. The usual papers were made out, signed and sworn to, and he was transferred from the jail to the insane asylum. He brought suit through his attorneys to recover his liberty, and the case came before Judge Learned, of the Supreme Court, who virtually decided that no man could be judged insane and sent to an asylum on the certificate of two physicians, in the way usually followed, unless he had shown that he was dangerous to himself or others. Before this court and jury the man was judged sane, though it was shown that he was laboring under delusions. He then commenced action against the Recorder and the two physicians to recover several thousand dollars damages. The defendants put in a demurrer, on the ground that even if all the facts were as stated there was no cause for action, and the demurrer was sustained by Justice Mayham. Appeal being taken to the General Term, a decision handed down last December sustained the demurrer as to the Recorder, on the ground that he was a public official, but overruled it as to the two physicians. It appears, then, that in accordance with the latest decision of the Supreme Court of this State any two of us who express the opinion that a man is insane, on any other ground than that he is dangerous to himself or others, become thereby liable to the annoyance of a suit for damages."

Medical Expert Testimony, the subject of Dr. Ward's anniversary address, we purpose to give entire hereafter.

Of other papers, viewed from THE SANITARIAN'S standpoint, the most notable was by Dr. George M. Sternberg, U. S. Army, on "The Etiology of Croupous Pneumonia," conclusively demonstrating its microbic origin and the particular microbe causing it that which was discovered by the author of the paper in 1880, which he named after Pasteur.

Dr. Charles Storer, of Amsterdam, read a paper on "The Municipal Control of Diphtheria," in which he described the excellent results of active sanitary measures against impure water, surface filth, and foul ground air.

Dr. Stephen S. Burt, of New York, read a paper on "The Prevention and Treatment of Typhoid-fever," attributing its prevalence in New York and other places to foul water, and urging more attention to general cleanliness and drainage; and where these measures are not accomplished, to the importance of boiling the drinking water as the most effectual means for rendering it harmless.

"Purulent Conjunctivitis of Infants, and Blindness in the State of New York," and "The Report of the Committee on Blindness," by Dr. Lucian Howe, of Buffalo, were replete with statistics and other information on the prevalence of eye diseases, contagious and otherwise, and suggestions for prevention and treatment. Blindness in the State was shown to be rapidly on the increase; chiefly from neglect of purulent conjunctivitis in infancy, largely spread by immigrants, especially the lower order of the Irish.

The "Report of the Committee on Quarantine Control" was in favor of "home rule" as against the Marine Hospital Service.

The "Report of the Committee on Hygiene" is given in full on other pages.

Officers elected for the ensuing year: President, Daniel Lewis, of New York; Vice-President, Alfred Mercer, of Syracuse; Secretary, F. C. Curtis, of Albany; Treasurer, C. H. Porter, of Albany.

HOW DO GERMS INDUCE DISEASE?—Professor Victor C. Vaughan, M.D., of Ann Arbor, in the American *Lancet*, believes that the symptoms of disease are due to chemical poisons. This admits of three explanations: 1. Are the germs poisonous? No, for they may be injected in large quantity, and death will occur no more quickly than if a small quantity be injected, and chemical analysis has shown they contain no poisonous element. 2. Do the germs produce a chemical ferment? No, for it has been proven that the fluid in which they resided will cause no disease if the germ be filtered out. 3. Is it by splitting up the proteids producing ptomaines? This theory thus far seems tenable, and we have evidence that every characteristic germ is capable of producing its own characteristic ptomaine.

Hence, we may formulate a definition for an infectious disease. An infectious disease arises when a specific pathogenic micro-organism, having gained admission to the body, and having found conditions suitable for its development, grows and develops, and in so doing produces a poison, which, being absorbed, causes the characteristic disturbances.

We will take note that the germ must be specific, must possess the same characteristics at all times. The germ of one specific disease cannot cause another disease. And it must find a suitable soil for development, or it will not develop. Koch found that the cholera bacillus would not develop in a normally acid gastric juice, but when sodium carbonate was added the germ developed. Typhoid-fever develops a ptomaine that if isolated and injected into a healthy being will produce the fever. So also of anthrax, cholera, tetanus, etc.

A ptomaine is a substance, basic in character, produced by the action of germ proteids.

Of what practical value is all this is often asked.

1. If it be the truth all truth is worth knowing.

2. Knowing the truth must always be of service to us, sooner or later.

HOT-AIR INHALATION AS A CURE FOR PHTHISIS.—At the meeting of the Section in Theory and Practice of Medicine of the New York Academy, February 19th, 1889, Dr. A. L. Stearne exhibited and described the apparatus recently devised by Weigert for heating air for inhalation, and gave an account of the results which followed the use of air so heated by consumptives. The apparatus consists of a stand supporting a double cylinder covered with asbestos. The interior of the inner cylinder is heated by means of a Bunsen burner, so that air drawn in between the two cylinders is heated while it is at the same time disinfected—if it contains any impurities—by heat. At the outset of treatment by this means the patients were made to inhale air at a temperature of 212° F. for thirty minutes. Gradually the sitting was prolonged to two hours, both morning and evening, and the temperature of the air was slowly increased to the highest point each patient could endure without discomfort; the maximum reached in any case had been 482°.

The chief results were the following: 1. The pulse, at first faster, became slower as the inspirations continued, and the respirations became deeper. 2. The body temperature rose at first one or two degrees, but in the course of an hour sank to normal, the exhaled air having a minimum temperature of 113° F. 3. While the general health remained undisturbed, the difficulty in breathing was at once removed; there was lessening and finally cessation of cough, fever, and night-sweats, and the appetite and strength improved. The disease in time came to an end in fact, the hemorrhages, catarrhal lesions, infiltrations, and the dilatations of the bronchi all being put a stop to; cavities underwent cicatrization; the weight increased rapidly, especially where emaciation had been extreme; and the bacilli slowly disappeared from the sputa, sometimes in as short a time as fourteen months.

PHTHISIS FROM HOUSE SWEEPINGS.—The *Münchener Medicinsche Wochenschrift*, No. 308, reports that Carnet has experimented with the dust obtained from the walls and floors of various dwellings in which tuberculous patients have been, inoculating guinea pigs with it, and carefully excluding all possibility of infection from outside sources. In this way, twenty-one rooms of seven Berlin hospitals were examined, and bacilli found to have been present in the dust from most of them. Positive results were also obtained with the dust from insane asylums and penitentiaries.

The dwellings of fifty-three tubercular patients were investigated in the same way, and the dust in the neighborhood of twenty patients found to be virulent. It was the case, with absolute regularity, that the dust was always virulent when the patient had been in the habit of spitting on the floor, or in a handkerchief, while it was never so when a spit-cup had been employed.

A "CREMATOR" CREMATED.—By the New York press telegraphic reports of March 27th, 1889, we learn that the cremator erected by Chicago for the burning of the city's garbage was burned to the ground by an incendiary fire the day before; and that citizens in the neighborhood have been indignantly remonstrating against its use for some time, alleging that it created an unbearable stench.

This is understood to be the "Distillery Crematory"—the *Mann* patent—which was so enthusiastically urged by its patrons at the Milwaukee meeting of the American Public Health Association in November last. As at that time in operation in Buffalo, it was said that the entire running expenses could be defrayed by the lubricating oils extracted from, and the residual manure of, the garbage "cremated;" and that the process was entirely free from offensive odors. The one at Buffalo has since been reported a nuisance, and that at Chicago as above. It is to be hoped that *rendering* apparatus, such as this appears to be, will not detract from or prove to be an obstacle in the way of the growing interest in garbage *cremation*, and the adoption of such cremators as will effect the purpose without nuisance.

DRIED POTATOES.—In the *Voenno-Sanitarnoie Delo*, Dr. Jakov M. Shmulevitch emphatically draws attention to dried potato as an important food article, possessing some very valuable advantages in comparison with the vegetable in fresh state. The advantages claimed for the article are these: (1) While fresh potatoes easily rot, blacken, and sprout, dried potatoes, when kept duly protected from moisture, remain in the best condition for a very long time; and (2), being by far lighter and less bulky than fresh potatoes, are by far more convenient for preservation and transportation, which point has a great practical importance, especially in time of war. To be fit for culinary use, the article requires a preliminary maceration in water for ten or twelve hours.

AGED 109 YEARS.—The longevity of CHESLEY HEAL, a resident of Searsmont, Me., who died in October last, at the advanced age of one hundred and nine years, ten months and twenty days, is ascribable to his simple life, which was that of an agriculturist, unbroken by worry or excitement of any kind. He retired and rose with the sun; had a good appetite and freely indulged it, meat being an important part of his diet; and he was a tobacco chewer from boyhood. His education, or rather his lack of it—for he could neither read nor write, and consequently the excitement of the daily papers was unknown to him, and he had never put foot on car or steamboat—was a bar to the most harassing incidents of progressive civilization. His perverse fondness of meat and tobacco were apparently the only elements which should have militated against his longevity; but they did not, unless we assume that he might have been still living if he had been more abstemious.

INTOXICATION.—The *Medical Register* says that it is claimed that half a teaspoonful of chloride of ammonium in a goblet of water will almost immediately restore his faculties and powers of locomotion to a man who is helplessly intoxicated.

THE NUMBER OF IMMIGRANTS landed at Castle Garden during the year 1888, reported by the Commissioners of Emigration, was 370,822, of whom 237,856 were males, and 132,966 females. The nationalities chiefly represented were: Irish, 44,300; English, 38,355; German, 78,145; Russian, 33,052; Swedish, 37,934; Italian, 43,927.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000: Reports 61 deaths during February, of which 12 were under five years of age. Annual death-rate, 18.3 per 1000. From zymotic diseases, 2, and from consumption, 12.

CALIFORNIA.—For the month of February, 1889, the Secretary's abstract of the reports received from 67 cities and towns, with an aggregate population of 665,700, the number of deaths was 859. Annual rate, 15.48. Deaths from consumption during the month, 165—19.20 per cent. From zymotic diseases: Diphtheria and croup, 43; typhoid-fever, 21; typho-malarial-fever, 1; remittent-fever, 1; cerebro-spinal-fever, 14; diarrhœal diseases, 9; whooping-cough, 1; scarlatina, 1; small-pox, 1.

San Francisco.—During the month of February, 1889, the number of deaths was 484. From zymotic diseases, 53. From consumption, 93.

Los Angeles, 80,000: 54; from zymotic disease, 9; consumption, 10.

Oakland, 55,000: 74; from zymotic diseases, 9; consumption, 10.

San Diego, 32,000: 19; from zymotic diseases, 1; consumption, 6.

Sacramento, 35,000: 26; from zymotic diseases, 3; consumption, 4.

CONNECTICUT.—The Secretary of the State Board of Health reports for February, 1889, 922 deaths from 165 towns, comprising a population of 731,851, representing an annual death-rate of 15.0. Deaths under five years of age, 215. Deaths from zymotic diseases, 136. From consumption, 125.

FLORIDA.—*Pensacola*, 15,000: Reports 14 deaths in four weeks ending February 28th, 1889, of which 6 were under five years of age. Annual death-rate, 12.06 per 1000. From zymotic disease there were 2 deaths, and from consumption, 2.

IOWA.—The State Board Bulletin for February reports since previous issue:

Small-pox, two cases, at Ainsworth.

Diphtheria at Alden, Sabula, Delta, Lake City, Clear Lake township, Cambridge, Marne, Center Grove, Audubon, Douglas and Leroy townships, Mechanicsville, Orange City, Plainfield, and Thor.

Scarlet-fever at Story City, Solon, Tama, Lake City, Paullina, Toledo, Marne, Shelby, Anita, Lohrville, Parnell, Sanborn, Decorah, Kingsley, Lucas, Webster township, Polk County, Woodward, New Sharon, Lone Tree, and Hedrick.

ILLINOIS.—*Chicago*, 830,000: Reports 1072 deaths during February, of which 524 were under five years of age. Annual death-rate, 15.50 per 1000. From zymotic diseases, 197, and from consumption, 112.

LOUISIANA.—*New Orleans*, 248,000: Reports for four weeks ending February 23d, 425 deaths, of which 97 were under five years of age. Annual death-rate per 1000 among whites, 18.04; among colored, 32.84. From zymotic diseases there were 35 deaths, and from consumption, 68.

MARYLAND.—*Baltimore*, 500,343: Reports 632 deaths during the four weeks ending February 23d, of which 216 were under five years of age. Annual death-rate, 16.43 per 1000. From consumption, 95.

MASSACHUSETTS.—*Boston*, 415,000: Reports 750 deaths during February, of which 233 were under five years of age. There were 106 deaths from zymotic diseases, and 118 from consumption. Annual death-rate, 21.68 per 1000.

MICHIGAN.—The Secretary reports that for the month of February, 1889, compared with the preceding month, the returns indicate a marked increase in the prevalence of pneumonia.

Compared with the average for the month of February in the three years 1886–88, measles, intermittent-fever, consumption of lungs, diarrhœa, bronchitis, and inflammation of bowels were less prevalent in February, 1889.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of February, 1889, at thirty-one places, scarlet-fever at fifty-two places, typhoid-fever at eleven places, measles at seven places, and small-pox at ten places.

Detroit, 230,000: Reports 259 deaths for February, of which 71 were under five years of age. Annual death-rate, 14.67 per 1000. From zymotic causes, 42, and from consumption, 20.

MINNESOTA.—Official report of infectious diseases for the month of January, 1889: Diphtheria, 143 cases, 45 deaths; scarlatina, 73 cases, 1 death. *Small-pox*, a case of varioloid in a woman, was reported in Minneapolis by Dr. Kilvington, under date of January 14th. "She had been in the city three months. January 7th, went to a Scandinavian hotel on Thirteenth Avenue. Got sick there, and on the 27th went to a friend's house. She was placed in bed with two children, in a small unventilated room, and in same room with the father and mother of the children, there being no space between the bed and the wall. Eleven other persons were exposed in this house, beside one who had gone out of the city. She was sent for and the whole number isolated and vaccinated. Sixteen boarders and thirteen visitors at the hotel were vaccinated and quarantined. One from the hotel was in the lockup. He was released, vaccinated, and returned to the hotel, and fifty-seven tramps in lockup vaccinated." It is by such vigorous treatment that small-pox and other infectious diseases, as well, may usually be stamped out.

Diseases of animals: Cases of glanders remaining isolated or not accounted for, 15; reported during the month, 14; killed, 9; released, 9; isolated, 8. Remaining February 1st, isolated or not accounted for, 11.

Saint Paul.—Henry F. Hoyt, M.D., Commissioner of Health, reports for the year 1888: Population, 175,000; deaths, 2078; death-rate, 11.80—1171, or 56.34 per cent of the deaths were of children under five years; 549, or 26.4 per cent of all, were caused by zymotic diseases. There were 358 cases of diphtheria, 281 of scarlet-fever, and 7 of small-pox.

The especially remarkable feature of these statistics is the large ratios of infantile mortality, and from zymotic diseases in conjunction with so low a death-rate in the aggregate.

Bad water, bad plumbing, and bad surface drainage are urged as the chief conditions promotive of zymotic diseases, and requiring municipal attention. During the month of February, 1889, there were 141 deaths, of which 73 were under five years of age. Annual death-rate, 9.40 per 1000. From zymotic diseases there were 30 deaths, and from consumption, 8.

MISSOURI.—*St. Louis*, 440,000: Reports for February 671 deaths, of which 288 were under five years of age. Annual death-rate, 18.3 per 1000. From zymotic diseases there were 158 deaths, and from consumption, 52.

NEW HAMPSHIRE.—Official organ of the State Board reports for the month of February: Diphtheria in Somersworth, Wolfeborough, Stratham, Dover, East Kingston, Manchester, Lancaster, Moultonborough, Canaan, Rochester, Pittsfield, Conway, Campton, and Henniker. The largest number reported from one place was four at Stratham. No epidemic of diphtheria exists in the State.

Scarlet-fever in Keene, Dover, Rye, Laconia, Manchester, Claremont, Rochester, Pittsfield, Jaffrey, Wakefield, and Goffstown. Dover reported the largest number, 13 cases; Wakefield, 7, and Claremont, 5 cases.

Typhoid-fever was reported from Nashua, Manchester, Rochester, and Weare.

NEW JERSEY.—*Hudson County*, 282,254: Reports 514 deaths for February, of which 244 were under five years of age. Annual death-rate, 21.8 per 1000. From zymotic diseases there were 117 deaths, and from consumption, 51.

Paterson, 80,000: Reports 135 deaths during February, of which 43 were under five years of age. Annual death-rate, 20.0 per 1000. There were 10 deaths from zymotic diseases, and 21 from consumption.

Newark, 180,245: Reports 346 deaths during February, of which 127 were under five years of age. Annual death-rate, 23.06 per 1000. From zymotic diseases there were 55 deaths, and from consumption, 43.

NEW YORK.—The number of reported deaths during February is less than in January and less than in February, 1888; not only for the entire State but for each sanitary district. The proportion of deaths under five years of age is nearly the same as in January, but higher than of a year ago. The same is true of zymotic diseases, which for the last two months caused 170 deaths in each 1000 deaths, and but 154 in February, 1888. The increase is mainly in scarlet-fever, and this is limited to the Maritime and Hudson Valley districts, other parts of the State showing no increase. Measles and whooping-cough are also more prevalent than a year ago, as shown by their mortality. On the other hand, there is a considerable diminution in the mortality from diphtheria. There were nine deaths from small-pox, seven of them occurring in the Onondaga County Poor House, one in Lyons, and one in Canasseraga, Allegany County; cases are reported from Dansville and Hannibal. Consumption caused 11.57 per cent of all deaths, and 15.15 of deaths over five years of age.

New York, 1,571,558: Total deaths, 3327; under five years of age, 1441; annual rate, 27.50. Zymotic, 702; consumption, 430.

Brooklyn, 814,500: Total deaths, 1422; under five years of age, 614; annual rate, 22.75. Zymotic, 295; consumption, 153.

Buffalo, 230,000: Total deaths for four weeks ending February 23d, 320; under five years of age, 139; annual rate, 18.10. Zymotic, 40; consumption, 36.

Rochester, 110,000: Total deaths, 207; under five years of age, 49; annual rate, 22.58. Zymotic, 17; consumption, 29.

Albany, 103,000: Total deaths, 166; under five years of age, 44; annual rate, 19.34. Zymotic, 22; consumption, 20.

Syracuse, 80,000: Total deaths, 93; under five years of age, 27; annual rate, 13.95. Zymotic, 10; consumption, 18.

The five cities or towns reporting the highest rates of mortality are: Catskill, 34.67; Goshen, 30.00; Lyons, 30.00; Newtown, 27.60; New York, 27.50.

The five lowest mortalities are: Worcester, 4.00; Clayton, 5.60; Ilion, 5.75; Hoosick Falls, 6.00; Marbletown, 6.00.

NORTH CAROLINA.—In twenty-two towns in the State, representing a population of 68,828 whites, 56,328 colored, total, 120,156. There were 5 deaths from malarial-fever; 1 from whooping-cough; 1 from measles; 15 from pneumonia; 24 from consumption; 8 from brain diseases; 3 from neurotic diseases; 5 from heart diseases; 6 from diarrhœal diseases; 33 from all other diseases; 5 from accident and violence, and 7 were still births. Total number of deaths among the whites, 46; temporary annual death-rate, 7.2; the total number of deaths among the colored was 67, temporary annual death-rate, 13.2; total number of deaths, both races, 113; temporary annual death-rate, 9.6.

OHIO.—Official *Monthly Record* of the Secretary reports 1317 deaths during the month of February, representing an annual death-rate per 1000 population of 53 cities and towns of 13.84. Deaths under five years of age, 496. From zymotic diseases, 224; croup and diphtheria, 78; typhoid-fever, 41; scarlatina, 11; whooping-cough, 10; cerebro-spinal meningitis, 15. Deaths from consumption, 194.

Cincinnati, 325,000: Total deaths, 420; under five years of age, 232; annual rate, 15.50. Zymotic, 58; consumption, 56.

Cleveland, 235,000: Total deaths, 302; under five years of age, 115; annual rate, 15.42. Zymotic, 68; consumption, 28.

Columbus, 101,000: Total deaths, 99; under five years of age, 23; annual rate, 10.77. Zymotic, 18; consumption, 19.

Toledo, 80,000: Total deaths, 80; under five years of age, 26; annual rate, 12.00. Zymotic, 9; consumption, 13.

Dayton, 60,000: Total deaths, 51; under five years of age, 17; annual rate, 10.20. Zymotic, 7; consumption, 9.

PENNSYLVANIA.—*Philadelphia*, 1,040,245: Reports for four weeks ending February 23d, 1871 deaths, of which 496 were under five years of age. Annual death-rate, 23.3 per 1000. From zymotic diseases there were 188 deaths, and from consumption, 195.

RHODE ISLAND.—The number of deaths recorded in the different towns and cities, from which returns have been received, was 474, in an estimated population of 281,053.

The *annual* death-rate upon the estimate given is 16.6 in every thousand of the population. The death-rate is somewhat smaller than for the previous month. The general sickness throughout the State, although reported as large during February, as in the month of January, was less fatal.

TENNESSEE.—The State Board Bulletin for March reports the principal diseases named in the order of their greater prevalence, in the State for February were pneumonia, bronchitis, catarrhs, tonsilitis, consumption, and rheumatism.

Typhoid-fever is reported in the counties of Bledsoe, Campbell, Cannon, Davidson, Franklin, Grundy, Hamilton, Hancock, Hawkins, Knox, Lincoln, Maury, Rhea, Shelby, and Sumner. Measles in Cannon, Franklin, Gibson, Grundy, Henderson, Humphreys, Lawrence, Lincoln, and Maury. Mumps in Bledsoe, Campbell, Gibson, Lawrence, Montgomery, Moore, Overton, and Robertson. Whooping-cough in Cumberland, Gibson, Hamilton, Houston, Humphreys, and Maury. Scarlet-fever in Dyer, Gibson, Montgomery, Robertson, and Shelby. Croup in Davidson, Maury, Robertson, and Sullivan. Varicella in Bledsoe, Grundy, and Rutherford. Diphtheria in Hamilton and Shelby. Roseola in Gibson and Smith. Erysipelas in Gibson and Robertson. Cerebro-spinal-fever in Hancock. Meningitis in Overton.

In the chief cities the respective annual death-rates for the month per 1000 of population are reported as follows:

Chattanooga,	white,	6.66;	colored,	24.00 :	12.30
Clarksville,	"	9.60;	"	36.00 :	19.50
Columbia,	"	12.00;	"	6.00 :	9.60
Knoxville,	"	8.47;	"	32.95 :	13.47
Memphis,	"	19.05;	"	26.59 :	22.48
Nashville,	"	12.32;	"	21.09 :	15.46

WISCONSIN.—*Milwaukee*, 210,000: Reports for the month of February 255 deaths, of which 80 were under five years of age. Annual death-rate per 1000, 14.6. From zymotic diseases there were 44 deaths, and from consumption, 20.

CUBA.—*Havana*, 200,000: Deaths reported for the month of February, 411; under five years of age, 117. From consumption, 92—22.11 per cent of total mortality. From *yellow-fever*, 4; other fevers, 17; small-pox, 1; diphtheria, 6. Death-rate, 26.66.

Small-pox, according to the most recent reports from abroad, continues prevalent in Ostend, Milan, Bologne, Madrid, Barcelona, Prague, Marseilles, Amiens, Rouen, Lyons, and Paris.

Yellow-fever, by report of United States Consul, Weekly Abstract of Sanitary Reports, February 13th, 1889, is more prevalent in Rio de Janeiro than ever before known at the same season. The number of deaths during the month of January was 1713, and was so large up to February 10th as to indicate about one-third more for that than for the preceding month.

LITERARY NOTICES.

THE INSANE IN FOREIGN COUNTRIES. By WILLIAM P. LETCHWORTH, President of the New York State Board of Charities. 8vo, pp. 386. Adequately illustrated. New York and London : G. P. Putnam's Sons.

No work hitherto published, to our knowledge, gives such a full and clear account of the oversight of the insane abroad, past and present, as this. The author of it is so extensively and favorably known for his many years' devotion to the duties of his office, it appears but a natural trend of his mind and intensification of his thoughts to contemplate especially the most pitiful and the most needful of all the subjects of his care—the insane poor.

To all devoted students the magnitude and importance of the object in pursuit increases, *pari passu*, with a knowledge of it ; and it would be difficult to find a better illustration of this general truth than in the author of the work before us. Painfully familiar with all the relations of his subject in the United States, but still realizing a lack of practical knowledge for ameliorating the deplorable condition of the insane poor, he pursued the subject abroad ; and for the purpose of securing fulness of detail as well as accuracy, his work comprises stenographic notes of visitations and interviews with many distinguished specialists in this field of inquiry ; his aim throughout being to ascertain, from a practical point of view, what are the most advanced, the most humane, and the most economical methods of caring for the insane.

The work opens with an introductory and retrospective chapter on the insane in foreign countries, and a sketch of the initial treatment of them in this country. Next follows the history of the treatment of the insane in England, Scotland, and Ireland, and in Continental countries from a little more than three centuries ago to the present time. It would be difficult to furnish a better illustration of the triumph of scientific knowledge over superstition, though slowly acquired, than the recognition of insanity as a disease and its treatment accordingly, so admirably sketched in these chapters—a triumph in which physicians may take reasonable pride, notwithstanding the unjust reproach of infidelity because of their belief in brains diseased instead of "devil-possessed."

The most approved methods of treatment are presented in the descriptions of the colonies of Gheel, Fitz-James, Alt-Scherbitz, and other institutions, with illustrations of the buildings and grounds in detail. And the whole is summed up under a general *résumé* of the subject and such practical deductions as no one whose duty it is to provide for the insane can well afford to do without. We heartily commend the work to all such not only, but to all physicians and other persons interested—and who is not?—in the treatment of the insane.

ATLAS OF VENEREAL AND SKIN DISEASES. By PRINCE A. MORROW, A.M., M.D., Clinical Professor of Venereal Diseases, formerly Clinical Lecturer on Dermatology, in the University of the City of New York; Surgeon to Charity Hospital, etc. Imperial folio atlas to consist of fifteen parts, containing seventy-five chromo-lithographic plates, containing several hundred figures, many of them of life-size, in flesh tints and colors, together with descriptive text for each plate, and from sixteen to twenty folio pages of a practical treatise upon venereal and skin diseases, the whole to form one volume. In the composition of the work, besides Professor Morrow, many of the most distinguished authorities on the subjects treated of have been secured as contributors: M. Kaposi and I. Neumann, of Vienna; Hutchinson, Fournier, and Hardy, of London; Ricord, Cullerrier, Besnier, and Vidal, of Paris; Leloir, of Lille; Keyes, Otis, and Henry G. Piffard, of New York; Hyde, of Chicago, and others. Fasciculi X., XI., and XII. of this superb work are now before us, and fully maintain the high standard of those which have preceded and have been before reviewed. The plates are (F. X.): Eczema of Palm, Psoriasis of Palm, Eczema rubrum; Eczema seborrhoicum, dry, scaly, and moist forms; Impetigo Figurata, Contagiosa; Dermatitis Exfoliativa, Pityriasis rubra; Dermatitis medicamentosa, Eruptions from Iodide and Bromide of Potassium. (F. XI.): Herpes Zoster, Ferbrilis, Progenitalis; Herpes Zoster; Dermatitis herpetiformis; Pemphigus Vulgaris, foliaceus; Purpura simplex, thrombotica. (F. XII.): Psoriasis of body, hand, and arm; Lichen planus; Lichen ruber, ruber moniliformis; Acne vulgaris, rosacea; Moluscum epitheliale, Veruca Senilis.

The descriptive text of these several subjects—etiology, pathology, and treatment—is full in all respects.

THE PSYCHIC LIFE OF MICRO-ORGANISMS: A STUDY IN EXPERIMENTAL PSYCHOLOGY. By ALFRED BINET. Translated from the French by THOMAS McCORMACK, with a preface by the author written especially for the American edition. Chicago, 1889: The Open Court Publishing Company. Cloth, 75 cents; paper, 50 cents.

The subject of this book is little known, as the data of this department of natural science lie scattered for the most part in isolated reports and publications, and this is the first attempt made to collate and present them in a systematized form.

Especial use has been made of the investigations of Balbiani, Claparède and Lachmann, Maupas, Ribot, Engelmann, Pouchet, Weber, Pfeffer, Kent, Dujardin, Gruber, Nussbaum, Bütschli, Lieberkühn. The cuts, eighteen in number, are illustrative of the movements, nutrition, digestion, nuclear phenomena and fecundation of proto-organisms. The researches and conclusions of the author show "that psychological phenomena begin among the very lowest classes of beings; they are met with in every form of life from the simplest cell to the most complicated organism."

MERCK'S INDEX OF PINE CHEMICALS AND DRUGS FOR THE MATERIA MEDICA AND THE ARTS. E. MERCK: New York, London, and Darmstadt. An evidently useful catalogue to chemists, druggists, and apothecaries, for whom it is intended; embracing upward of 4000 different articles, with their trade prices. The make-up of the book is neat and substantial. Price, $1.

ALDEN'S MANIFOLD CYCLOPÆDIA, Vol. IV., Baptism to Bilberry, 637 pages, is at hand, distinguished by the excellent characteristics which have already been pointed out in our notice of preceding volumes. Handsome cloth binding, 50 cents ; half morocco, 65 cents. This is truly bringing knowledge within reach of millions. John B. Alden, Publisher, 393 Pearl Street, New York.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS FOR MARCH contains Neurasthenia and its Treatment, Dr. H. Von Ziemssen ; Antipyresis and Antipyretic Methods of Treatment, *ibid ;* The Tongue as an Indicator of Disease, Dr. W. H. Dickinson ; Treatment of Cystic Goitre, T. M. Hovel, F.R.C.S. ; New Remedies, 1878 to 1888, Dr. C. Canquil. Ten dollars a year ; $1 a number. New York : William Wood & Co.

REPORT OF THE COMMISSIONER OF EDUCATION FOR 1886–87, NATHANIEL H. R. DAWSON. Pp. 1170. Washington : Government Printing Office. It is the misfortune of this office to be so inadequately equipped as to forfeit much of the interest that would otherwise attach to the publication of its reports by reason of their tardy appearance. The Commissioner fully recognizes this misfortune, and has done a good deal in his effort to overcome it, though as yet the desired result is not manifest. The volume before us contains a large amount of useful information to all who take interest in the status of education and the means for sustaining it throughout the country, but its want of freshness relegates it to the book-case instead of the table.

The Commissioner states that the Bureau has undertaken to investigate the history of American education from its earliest beginnings : good encyclopædic work and entertaining to the student ; but considering the restricted force of the Bureau—the reasons for, the how and the means of infusing more educational spirit among the people of the present generation, appear to us to be the objects which should animate the Bureau before and above all things else. If these objects can be spurred into greater activity by the excellent monographs and "Contributions to American Educational History" as now seem to be given the foremost place, it is well, and they should be pushed to the fullest extent, but otherwise not. Monographs of William and Mary College and the University of Virginia, with sketches of other Virginian colleges, have been prepared, and others are in progress, comprehending all sections of the country, to be treated of in State groups.

The volume is replete with information on the status of public education throughout the country, at the time of its going to press, and contains an index and list of the publications of the Bureau from 1868 to 1887.

CONTRIBUTIONS TO AMERICAN EDUCATIONAL HISTORY, edited by HENRY B. ADAMS. Bureau of Education, Circular of Information, No. 2, 1888: *The History of Education in North Carolina.* By CHARLES LEE SMITH, Fellow in History and Politics, Johns Hopkins University.

This is an adequately illustrated pamphlet of 180 pages, comprehending the pioneer work of education in colonial times and all the way up to the present educational outlook, which was never before so complete and encouraging. "Since the revival of the University in 1875 there has been manifest progress in every department of education. The public schools have been made more efficient; the graded school system has been introduced in the principal towns; the endowments of several of the denominational colleges have been largely increased, their curricula made more thorough, and their standard of graduation raised; normal schools and teachers' institutes are conducted at convenient points, the State and counties making provision for their maintenance; and at the last session of the Legislature (1886–87) provision was made for the immediate establishment of a college of agriculture and the mechanic arts, to which the State, besides granting the interest from the land-scrip fund, amounting to $7500 per annum, guarantees a liberal income from certain specified taxes. All the young men of the State who can successfully pass the entrance examination will receive free tuition. This college has been established at Raleigh, and it is expected that the work of instruction will begin in the fall of 1889. The interest now so manifest in all that pertains to the intellectual advancement of the Old North State promises grand results for the future."

INDUSTRIAL EDUCATION IN THE SOUTH. By Rev. A. D. MAYO. Circular of Information, No. 5, 1888. Bureau of Education, Washington, D. C. A pamphlet of 86 pages, composed by one who has been for the past eight years engaged in the ministry of education through all the Southern States. It consists of a plain statement of the reasons for the growing interest in industrial education in the country generally, and the special needs of this type of education in the Southern States in particular, together with a brief account of the principal institutions that have already undertaken this work in that section. It contains a large amount of useful and practical information, well calculated to correct erroneous opinions entertained for the want of knowledge, and should be extensively circulated.

PROCEEDINGS OF THE DEPARTMENT OF SUPERINTENDENCE OF THE NATIONAL EDUCATIONAL ASSOCIATION, Washington, February 14th–16th, 1888. Circular of Information, No. 6, 1888. Bureau of Education, Washington, D. C.

A pamphlet of 165 pages, containing essays on Manual Training, County Institutes, Elocution, Qualifications of Teachers, Normal Schools, Moral Training, Can School Programmes be Shortened and Enriched? Alaska, Superintendents and Teachers, National Aid to Education, and the discussions thereon, by a number of the most accomplished school officers and educators in the country.

THE CENTURY for April is largely devoted to celebrating the Centennial of the Inauguration of Washington in New York, April 30th, 1789. The contents of the number include: "The Inauguration of Washington," by Clarence W. Bowen, illustrated with views of New York in 1789, the reception at Trenton, portraits, etc.; "Washington at Mt. Vernon after the Revolution," by Mrs. Burton N. Harrison, with a number of interesting illustrations, and "Washington in New York in 1789," by the same author; "Original Portraits of Washington," by Charles Henry Hart, and "A Century of Constitutional Interpretation," by Professor John Bach McMaster. Mrs. Harrison's articles are devoted to the social aspect of the subject and describe New York society at the time of the first President. Profusely illustrated.

HOW TO BE SUCCESSFUL ON THE ROAD AS A COMMERCIAL TRAVELLER. By an OLD DRUMMER. 96 pp., paper, price 20 cents. New York: Fowler & Wells Co., 775 Broadway. Is a condensation of the experience and observation of an old and successful commercial traveller. He puts a deal of common sense into his advice, and shows how a good knowledge of human nature is the potent instrumentality in dealing with business men and the road to success. In this connection he naturally dwells upon the influence of personal appearance, dress, language, manners, and tact generally.

An appendix is bound in with the book containing about 250 places and hotels arranged in the most approved manner.

SELECTION OF LIVES FOR INSURANCE, by EDGAR HOLDEN, M.D., Ph.D., is an instructive pamphlet of thirty-one pages, showing the indications of diatheses, parental longevity, occupation, physical condition, and habits as illustrated by the statistics of life insurance companies.

PAMPHLET REPRINTS, REPORTS, ETC.

"Partial Syllabic Lists of the Chemical Morphologies of the Blood, Sputum, Fæces, Skin, Urine, Vomitus, Foods, Including Potable Waters, Ice and the Air, and the Clothing." By Ephraim Cutter, M.D., A.M., LL.D., F.R.S., etc. New York: The Author.

"Transactions of the American Association of Obstetricians and Gynæcologists," Washington, September, 1888.

"Primary and Secondary Action of Drugs." By Boardman Reed, M.D., Atlantic City, N. J.

"History of Abdominal Section in Albany, with a Report of Seventy-five Cases." By Albert Van der Veer, M.D., Professor of Surgery in the Albany Medical College, etc., Albany.

"Prophylactic and Therapeutic Resources of Mankind." By Henry G. Hanchett, M.D., Member of New York Academy of Anthropology, etc., New York.

"Cocaine Doses and Cocaine Addiction." By J. B. Mattison, M.D., Brooklyn.

"Intestinal Surgery, with Special Reference to the Treatment of Intestinal Obstruction." By Nicholas Senn, M.D., Ph.D., Milwaukee.

"Electrolytic Treatment of Stricture." By G. C. H. Meier, M.D. New York: E. P. Coby & Co.

"Gaseous Enemata—Experimental Demonstrations," etc. By R. Harvey Reed, M.D., Mansfield, O.

"Treatment of Peritonitis by Abdominal Section." By L. S. McMurtry, A.M., M.D., Danville, Ky.

"Hydrophobia, Report on." By Charles W. Dulles, M.D., Philadelphia.

"Recent Advances in State Medicine." By Henry B. Baker, M.D., Secretary of State Board of Health of Michigan, Lansing.

"The Human Nature Library—The Servant Question." By H. S. Drayton. New York: Fowler & Wells Co.

"Effects of Food Preservatives on the Action of Diastase, Pancreatic Extract and Pepsin." By Henry Leffman, M.D., and William Beam, M.A. Philadelphia: William F. Fell & Co.

"Medical Expert Testimony." By F. H. Darby, M.D., Morrow, O.

"Pleurisy as a Predisposing Cause of Phthisis Pulmonalis." By B. F. Westbrook, M.D., Brooklyn, N. Y.

"The Ischiatic Crutch." By A. B. Judson, M.D., New York.

"Orthopedic Treatment of Paralysis of the Anterior Muscles of the Thigh." By A. B. Judson, M.D., New York.

"Uses of Adhesive Plaster in Orthopedic Surgery." By A. B. Judson, M.D., New York.

"Vegetable Parasitic Diseases of the Skin—New Method of Treatment." By Henry J. Reynolds, M.D., Chicago, Ill.

"Rectal Insufflation of Hydrogen Gas—An Infallible Test in the Diagnosis of Visceral Injury of the Gastro-Intestinal Canal in Penetrating Wounds of the Abdomen." By N. Senn, M.D., Ph.D., Milwaukee.

"Uterine Myoma—Two Cases of Removal of." By Mary A. Dixon Jones, M.D., Surgeon of the Woman's Hospital, Brooklyn, N. Y.

"Suggestions Regarding the Shortcomings and Misconceptions in Medical Education—Inaugural Address." By C. B. Kinyon, M.D., President of Illinois State Homœopathic Medical Society, Rock Island, Ill.

"Heredity." By James Thomas Searcy, Tuscaloosa, Ala.

"Some of the Advantages of the Union of Medical School and University." By William H. Welch, M.D., Professor of Pathology in Johns Hopkins University, Baltimore, Md.

Cornell University College of Agriculture:

1. "Insectory of Cornell University."

2. "Preventing the Ravages of Wire Worms."

3. "Destruction of the Peum Curculio by Poisons." Cornell University, Ithaca, N. Y.

"Writing-Machines for Doctors." By John Aulde, M.D. Philadelphia: Records, McMullen & Co.

"Success and Failure of Electrolysis in Urethral Strictures, Especially Dr. Keys's Method Reviewed." By Robert Newman, M.D., Surgeon to the Northwestern Dispensary, New York.

"Aseptic Climates without Altitude." By W. H. Geddings, M.D., Aiken, S. C.

"Gynæcology: Presidential Address to the American Gynæcological Society." By Robert Battey, M.D., Rome, Ga.

"Manual Training in Elementary Schools for Boys." By A. Sluys, Director of Normal School, Brussels, Belgium. New York: Industrial Education Association.

"Suggestions Regarding the Management of Phthisical Patients at Health Resorts." By Isaac Hull Platt, M.D., Lakewood, N. J.

"Diseases of the Nose and Pharynx and their Treatment." By W. Cheatham, M.D., Lecturer on Diseases of the Eye, Ear, Throat, and Nose in the University of Louisville, Ky.

"The Means of Effecting the Unity of the Medical Profession, being the Anniversary Discourse Delivered before the New York Academy of Medicine, November 15th, 1888." By D. B. St. John Roosa, M.D., LL.D., New York.

"Treatment of Epithelioma with Mild Caustics." By Daniel Lewis, M.D., Surgeon to New York Skin and Cancer Hospital, New York.

"Pulmonary Consumption Considered as a Neurosis." By Thomas J. Mays, M.D., Professor of Diseases of the Chest in the Philadelphia Polyclinic, Philadelphia.

"Plumbing—Sewer-Gas—Disease." By James A. Campbell, M.D., St. Louis, Mo.

"How Far Can Legislation Aid in Maintaining a Proper

Standard of Medical Education?" By W. A. Purrington, Counsel of the Medical Society of the county of New York. New York.

"Relation of Menstruation to the Sexual Functions." By William M. McLaury, M.D., New York.

"The Social Evil: Its Cause and Cure." By Charles H. Kitchell, Esq., New York.

"The Pneumatic Cabinet in Lung Disease." By Sidney Allan Fox, M.D., Brooklyn, N. Y.

"Extent and Distribution of Consumption in New Hampshire." By Irving A. Watson, M.D., Secretary of New Hampshire State Board of Health, Concord, N. H.

"Inflation of the Stomach with Hydrogen Gas in the Diagnosis of Wounds and Perforations of this Organ." By E. Senn, M.D., Attending Surgeon to the Milwaukee Hospital, Professor of the Principles and Practice of Surgery and Surgical Pathology in the Rush Medical College, Chicago, Ill.; Milwaukee, Wis.

"Gun-shot Wounds of the Abdomen Illustrating the Use of Rectal Insufflation with Hydrogen Gas, as a Diagnostic Measure." By N. Senn, M.D., Milwaukee, Wis.

The Seguin Physiological School for Feeble-Minded Children, 260 West Fifty-fourth Street, New York.

"Placental Development." By Henry O. Marcy, A.M., M.D., LL.D., Boston, Mass.

"History and Surgical Treatment of Uterine Myoma." By Henry O. Marcy, A.M., M.D., LL.D., Boston, Mass.

"The Climate of the Southern Appalachians." By Henry O. Marcy, A.M., M.D., LL.D., Boston, Mass.

Seventy-first Annual Report on the State of the Asylum for the Relief of Persons Deprived of the Use of their Reason, Philadelphia.

"Pott's Disease of the Spine." By A. B. Judson, M.D., New York. Pamphlet reprint from New York *Med. Journal.*

"Angina and Pneumonia Before 1857 and Since, with the Pathology of Diphtheria in its Various Phases." By William Henry Thayer, M.D., Brooklyn, N. Y. New York *Medical Journal*, January 26th, 1889.

MEDICAL EXCERPT.

. TOBACCO AMBLYOPIA.—Dr. St. Clair Buxton finds the following formula uniformly successful in curing tobacco amblyopia : Liq. hydrarg. perchlor. (B. P.), half a drachm ; potassii iod., twelve grains ; aquæ destil, one ounce.

To the above he adds for simultaneous administration the following pill : Ext. nucis vomic., half a grain ; ext. hyoscyami, one grain ; ft. pil. no. i. The pill of this strength is given three times a day, and with the solution.—*Lancet.*

THE NAIL-BRUSH AS A SOURCE OF INFECTION.—The *British Medical Journal* has made quite a savage and wanton attack upon the nail-brush. This esteemed article of the toilet is thought by the *Journal* to be a dangerous and dirty thing. Such condemnation applies, of course, only to common and strange nail-brushes used in the hospitals. These may, it is thought, be carriers of infection. The question could be easily settled by inoculating pure cultures with tainted nail-brushes or washings from the same. It is but reasonable to assume at any rate that it would be safer if each surgeon should have his own nail-brush.

THE DISINFECTION AND TEMPERING OF RUBBER DRAINS. —The proper disinfection of rubber drain-tubes is of great importance ; the more so, as its accomplishment is attended with considerable difficulty. Javaro shows that tubes are usually so affected by the usual processes of preparation as to be very much injured, and then fail to realize their intended purpose. To avoid softening (more especially of the red varieties), he advises that for five minutes they be immersed in concentrated sulphurous acid. He urges that the red variety should always be used in preference to the white kinds, as being more suited to withstand injury during his process. In the acid, the tubes assume a dark chestnut color, and become hardened. Then they are to be washed in alcohol, seventy-five per cent, and finally to be laid away in antiseptic preserving fluid—either five per cent carbolic acid solution or 1–200 bichloride solution. Tubes so prepared will not collapse under even very considerable pressure. If they have become too hard, by working them between the fingers they can be much softened. After being treated in the acid, they are unaltered in any way further by preservation in antiseptic fluids. These tubes have now for a long time in his hands entirely replaced all other kinds, and he utilizes them for every possible purpose. They maintain their lumen even when placed between the ribs, and will not readily kink or become obstructed, yet are not so resistant as to exert dangerous pressure (Centralblatt für Chir., August 18th, 1888).—*The Satellite.*

WEIL'S DISEASE.—E. Lanphear (*Kansas City Medical Index*, November, 1888) describes a febrile disorder now prevailing at Kansas City, which he is inclined to believe may be identical with Weil's disease. He has seen seven cases of it, one of which ended fatally. The disease begins suddenly, usually with a severe chill; there is a sudden and alarming rise of temperature, persistent headache, moist and clean tongue, and a decided tendency to vomiting without much nausea. There are tenderness and some enlargement of the liver, and some jaundice is apt to be present. The urine is dark, strongly ammoniacal, and contains, in some cases, a slight amount of albumen. Herpes and purpuric spots occasionally appear. The characteristic feature of the disease is the severe and distressing pain which may develop in any of the muscles, but is most frequently confined to those of the back and calves. The fever is peculiar in that it begins with 104° to 106° F., and gradually diminishes in intensity without much remission; while the pulse keeps but 80 or 90, soft, and compressible, like the pulse of shock, and indicating a profound disturbance of the vasomotor centres.

The author considers the disease infectious. An autopsy on one of his cases revealed nothing characteristic. He discusses its diagnosis, showing that it has little in common with either typhoïd or malarial-fever, and is readily to be distinguished from cerebro-spinal meningitis. He obtained the best results therapeutically with aconite or gelsemium for the fever, or with salicylate of sodium, or with injections of sulphate of codeia into the body of the muscle to relieve the pain. —*American Journal of Medical Sciences.*

COMMON SALT IN NERVOUS AFFECTIONS OF THE STOMACH. —Dr. Batrom has lately employed common cooking salt in the treatment of migraine, and Dr. Nothnagel has recommended the same in the treatment of epilepsy. Dr. Cerné attributes his success in the treatment of the first affection with this remedy, to an increase of the hydro-chloric acid of the gastric juice. In a case of gastralgia and migraine, in which the treatment simply consisted in augmenting the quantity of salt in the food, he noticed that the dyspeptic symptoms and stomachal pains disappeared entirely.—*La Normandie médicale. Revue Thérapeutique, December 15th*, 1888.

THE TREATMENT OF RICKETS should be by food rather than by drugs. Raw meat is of more value than iron, and cream or fresh milk than cod-liver oil. The diet must be carefully examined to see that it contains a due proportion of fat, proteids, and salts. A sufficiently close estimate is easily made, since the composition of milk and of all foods used for children is accurately known. The amount of animal fat in a rickety child's food must equal at least one fourth of the total solids taken ; proteids and carbo-hydrates about one third, and salts about one tenth. Such a diet will cure rickets without drugs. Iron is often a useful adjunct. The salts of lime may be added in the form of lactophosphate. Potent aids are sunlight, fresh air, and warm clothing.—*Lancet.*

INCOMPATIBLE ANTISEPTICS.—The *Journal de Médecine* directs attention to the following incompatibilities : Corrosive sublimate and iodine ; corrosive sublimate and soap ; soap and iodine ; carbolic acid and iodine ; carbolic acid and permanganate of potassium ; salicylic acid and soap ; salicylic acid and permanganate of potassium ; permanganate of potassium and oils, soap, or glycerine.

SURGERY RUN WILD.—Professor Von Nussbaum has been instructing and perhaps regaling the young generation of German surgeons by a brave pamphlet on "Surgical Mishaps."

Among the instances is the following case of a peasant who many years ago was taken to the clinics of a great medical centre in order to be treated for multiple ulcers of both legs. On being examined on the operating-table, the right leg was pronounced to be curable, while the left was declared to be incurable and to require amputation. The amputation had scarcely been performed when the surgeons found, to their great horror, that they had amputated the wrong leg! Their chagrin was still increased when the right leg, which by accident had been saved, healed in a short time spontaneously.—*Boston Medical and Surgical Journal.*

FORCEPS AND IDIOCY.—In a recent paper in the London *Lancet*, Drs. Winkler and Ballaan contend that instrumental delivery of the child is in a few cases the direct cause of idiocy. Dr. Langdon Down points out the fallacy of the above conclusion. In his experience of idiocy, he found that in only three per cent were the forceps employed. In only a small fractional percentage could he arrive at the conclusion that the use of the forceps was the principal cause of the calamity. In every case of idiocy where they had been employed, the friends of the child believed that the use of instruments alone was the cause of the disaster, while in the great majority of the cases he was able to find in the family history a sufficient cause.

TREATMENT OF ANAL FISTULA WITHOUT OPERATION.—Fistulæ which do not cause pain should not be operated upon. The clothing should be soft and smooth, and extreme cleanliness should be observed, the general condition of the patient should be attended to, and of systemic remedies a mixture of the bromides and iron is especially valuable. The following is an excellent remedy: Bromide of potash, 10 grams; citrate of iron, ammoniated, $\frac{1}{2}$ gram; syrup of bitter orange peel, 190 grams. Tablespoonful should be taken morning and evening.

Topical appliances should be made after each stóol. Here is a good formula for suppositories: Iodoform, $\frac{1}{10}$ gram; extract of belladonna, $\frac{1}{50}$ gram; cocoa butter, q.s. This should be applied after each defecation and on going to bed.—*Professor Guyot, Journal de Médecine.*

MILK JELLY.—As a variation in milk diet, the following is recommended by Professor Liebreich :

Heat one quart of milk with one pound of sugar, and when the sugar is dissolved continue the heat, at a boiling temperature, for about ten minutes. Now cool it well, and then add —*slowly* stirring—a solution of one ounce of gelatin in a cupful of water. Next add the juice of three or four lemons and three wineglassfuls of wine, brandy, or other liquor. Set the glasses containing the mixture in a cold place, so that the contents may gelatinize. It is necessary to have the milk quite cold before the other ingredients are added, as it would otherwise curdle.—*Medical Science.*

COCAINE AND LANOLIN FOR BURNS.—Dr. Wende recommends a preparation made of these substances. It excludes the air and quiets the pain. The cocaine should be pure and the mixture freshly prepared.—*J. de Méd. de Paris.*

CALOMEL AS A DIURETIC.—R. Stintzing, in a paper entitled "Clinical Observations upon Calomel as a Diuretic and Hydragogue" (*Deutsch. Arch. f. klin. Med.*, xliii., Abstr. in *Fortsch. d. Med.*, 1888, No. 24), arrives at the following conclusions : 1. Calomel is a diuretic of more powerful action than any other known drug. Its diuretic property may be seen to a slight extent in the non-dropsical, and in a great degree in certain forms of dropsy when it is combined with an anthydropic action. 2. Its diuretic action is best seen in cardiac dropsy, whether secondary to valvular or to muscular disease. It does not act, or but imperfectly, when the cardiac inability is extreme, but then other remedies are also inoperative. 3. Dropsy from other causes is less amenable to calomel treatment. This is the case with perial obstruction, but especially with renal dropsy. 4. In combined renal and cardiac disease, calomel acts in proportion as the latter predominates. 5. In diminishing cardiac dropsy, the drug acts not only by exciting diuresis, but also by increasing the flux from the intestines ; the best results being obtained when diuresis predominates. If the reverse holds good, there may be loss of weight, but not much general improvement. 6. When calomel acts as a prompt hydragogue, it acts favorably on the general condition

—on appetite, sleep, and strength. 7. In exudative processes (as pleurisy and pericarditis) calomel has no action, or only an insufficient one. 8. Mercurialism does not occur in cases where polyuria is established; but if there be no diuresis, then mercurialism is apt to arise. 9. Although a more powerful diuretic than digitalis, it is not a cardiac tonic. The combination of the two drugs in cardiac dropsy is most useful. Calomel probably acts directly on the secreting structure of the kidney.—*The Lancet.*

TINCTURE OF MUSTARD.—It is now recognized that the emetic qualities of ground mustard seeds are dependent for their exciting cause upon the minute particles enveloping, or having adherent to them, particles of the acrid and volatile principles of mustard, which act, mechanically, as local irritants to the mucous membrane of the stomach, and thus cause a revulsive action, and that it is not due to any centric influence.

Believing, then, that mustard in the form of a tincture would possess valuable stimulating properties, the writer prepared, over a year ago, an alcoholic preparation of this drug and urged its medicinal employment, especially in those conditions which are graphically expressed by the term "drunk-cases." It was found to answer admirably. Possessing the aromatic qualities of ginger and the sharply stimulating properties of capsicum, it combined in one the excellencies of both, without the local irritant feature so characteristic of capsicum. It was found to be stronger than tincture of ginger and less active than tincture of capsicum; standing, apparently, midway in medicinal activity between the two.

In the preparation of the tincture, the ground commercial black mustard seed which has had the larger portion of its 20–25 per cent fixed oil removed by pressure, has been used. The formula is as follows:

Take of

Ground black mustard..............	8 troy ounces.
Water..............................	2 fluid ounces.
Alcohol............................	q. s. ad 1 qt.

Moisten the mustard with the water, added in small quantities at a time, in a porcelain evaporating dish or other non-metallic receptacle, and admix thoroughly. Cover well and leave stand for twenty-four hours. Remove and pack in a glass funnel or percolator ; add one pint of alcohol and macerate for forty-eight hours. Then allow percolation to proceed, keep adding alcohol until the percolate measures one quart.

The finished liquid is a clear, transparent, yellow fluid, having a strong characteristic odor and a warm pungent taste. Mixed with water it becomes slightly opalescent or milky from the precipitation of a small quantity of fixed oil. Its dose is from $\frac{1}{4}$–$\frac{1}{2}$–1 teaspoonful well diluted with water.—*Joseph W. England, Ph. G., American Journal of Pharmacy*, vol. 19, No. 3.

LISTERINE is recommended by Dr. I. N. Love, of St. Louis, as a gargle and spray in diphtheria and scarlet-fever. He also has his scarlatinal patients sponged with it daily. By this procedure, he says, the question of contagion is almost eliminated during the desquamation.—*Southern California Practitioner.*

NOTICES.

AMERICAN MEDICAL ASSOCIATION—NOTICE TO EXHIBITORS.

Exhibits at the next meeting of the American Medical Association, at Newport, R. I., June 25th–28th, 1889, will be provided for as follows :

1. Medical books and stationery, charts and diagrams, busts, portraits, engravings, photographs, etc.
2. Hospital and ambulance plans and models.
3. Surgical instruments and supplies, general and special (gynæcic, obstetric, orthopedic, laryngeal, otic, ophthalmic, dental, etc.).
4. Microscopes, analysis outfits, and electro-galvanic apparatus.
5. Pharmaceutic products.
6. Rubber goods applicable to medicine and surgery.
7. Invalid furniture.
8. Invalid foods.

9. Sanitary appliances, as ventilators, filters, water-closet basins, traps, and similar necessities, and disinfectants.

Applicants should state the character of their proposed exhibits, that they may be assigned to their respective groups.

As a large attendance is probable, while the space available for exhibits is comparatively limited, the advantage of early application will be perceived.

Choice of space will be given in accordance with the date of application.

Intending exhibitors should address Dr. Charles A. Brackett, Chairman Sub-Committee upon Exhibits, American Medical Association, Newport, R. I.

THE AMERICAN INTERNATIONAL CONGRESS OF MEDICAL JURISPRUDENCE, to which we called attention in September last, will convene in New York on *the first Tuesday in June*, 1889.

Persons who propose to contribute papers are requested to forward their names and the titles of their papers for proper placement on the programme as early as possible, to the president, Clark Bell, Esq., 57 Broadway, New York.

THE CONVENTION FOR THE REVISION AND PUBLICATION OF THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA will assemble in Washington, D. C., at noon of May 7th, 1890, for the purpose of providing for a revision and publication of the pharmacopœia of the United States of America; and all incorporated medical or pharmacal colleges, associations, or societies desiring to be represented in the convention are requested to send to ROBERT AMORY, President, their corporative titles and lists of officers for engrossment and publication, addressed to the care of

Dr. EDWIN H. BRIGHAM, Assistant Librarian of the Boston Medical Library, 19 Boylston Place, Boston, Mass.

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SIR EDWIN CHADWICK, K.C.B.,

AND THE

PRESENT CONDITION OF SANITARY SCIENCE.

THE sixth annual dinner of the Association of Public Sanitary Inspectors of Great Britain was celebrated at the First Avenue Hotel, Holborn, on March 2d, 1889. The event was further intended to mark the attainment of his ninetieth year by their President, Sir Edwin Chadwick, K.C.B.; and, by a happy coincidence, on the previous day Her Majesty was graciously pleased to gazette the President, hitherto C.B., to the higher honor. There was not room for all those who had expressed a desire to be present on the occasion. Dr. B. W. Richardson, F.R.S., presided, and among the company present were the Earl of Aberdeen, Earl Fortescue, the Hon. D. F. Fortescue, Sir Lyon Playfair, M.P., Sir Richard Owen, Sir Robert Rawlinson, Sir Spencer Wells, Sir Douglas Galton, Dr. Cameron, M.P., Dr. Farquharson, M.P., the Mayor of Hastings, the Mayor of Chelmsford, Dr. Alfred Carpenter, Professor Corfield, Dr. Buchanan (Chief of the Medical Department of the Local Government Board), Colonel Tulloch, R.E. (Chief Engineer of the Local Government Board), Osbert Chadwick, Esq., C.M.G., Dr. Marshall, Dr. Dudfield, Major-General Graham, Wyke Baylis, Esq., H. Alexander, Esq. (Chairman of the Council of the Association), etc.

Letters excusing absence, and cordially congratulating Sir Edwin Chadwick, were read from the Duke of Westminster, the Duke of Bedford, the Earl of Meath, Lord Chelmsford, Sir James Paget, General Sir L. Simmons, Dr. Adler (Chief Rabbi), and Mr. J. B. Firth. The Duke of Westminster wrote as follows:

GROSVENOR HOUSE, February 25.

"I regret exceedingly that a previous engagement prevents me from attending to do honor to one to whom it is pre-eminently due. If better health, greater happiness of life and length of days are objects to be desired for and by a nation, and if our country has been able to secure a larger measure of these, then gratitude and recognition are largely owing to Mr. Chadwick, who has happily lived to see some tangible results of his long-continued endeavors in the direction of sanitary reform for the good of our countrymen. The debt we owe him is a heavy one! That every good wish may be realized for him in the evening of his days is the prayer of

"WESTMINSTER."

The following address was presented to Sir Edwin Chadwick, K.C.B.:

"We, whose names are appended to this simple but earnest Memorial, beg, on behalf of the members of the Association of Public Sanitary Inspectors of Great Britain, over whom you have so generously and ably presided since the foundation of the society in 1883, and of your many friends and fellow-workers in sanitary science at home and abroad, to tender to you our sincerest congratulations upon your entry into the ninetieth year of your life, and the seventieth of your active public career.

"We should consider it an event historical in character for any one of our friends and contemporaries to have distinguished himself during so long a period in the promotion of any work of public utility; but when we recall the labors which you have performed, and the objects of those labors—namely, the health of this nation and of other nations, and therewith the happiness, prosperity, and advancing civilization of peoples everywhere, for all future generations—our pleasure is the greater, not only that one so gifted as yourself should have labored toward the accomplishment of such extensive and lasting goodness, but that we who have witnessed your efforts should have had the opportunity of testifying to the industry, courage, and enthusiasm, continued to the present hour, by which your efforts have been characterized, and which, from opponents as well as from friends and allies, have long commanded the respect and admiration which are ever accorded to those in whom genius for original observation and suggestion is combined with earnestness of purpose and consistency of action.

"We consider that on your early labors in sanitation, especially your report on the sanitary condition of the laboring classes, and your introduction of the half-time system of education, the present advanced state of sanitation largely rests. And in thanking you for all you have done in the past for the health and happiness of mankind, we pray that your own health, hitherto so conspicuous an example of good sanitation, in its fullest strength and activity, may still long be preserved with every happiness that should to the last attend so honorable, honored, and useful a life."

The address was signed by a large number of noblemen and gentlemen, to the number of ninety or a hundred in all.

At the request of the Chairman, Lord Fortescue read a part of Sir Edwin's Address, of which the following is a complete copy:

Sir Edwin Chadwick's reply was as follows:

"MY DEAR CHAIRMAN, MY LORDS AND GENTLEMEN, MEMBERS OF THE ASSOCIATION OF SANITARY INSPECTORS OF GREAT BRITAIN: I presume that I may accept the great kindness bestowed on me on the present occasion, partly as having regard to the unusually advanced age of the body, and partly as to the extent of the occupation of the mind, for the promotion of our science during that unusually long period. On the bodily account, it is due to those here, who are practically engaged in sanitary work to state that it will be found on examination that the risks of death and wounds, especially in withstanding epidemics, are fully as great as those sustained by officers of the naval and in the military service. I have myself participated in those common risks, and although I probably owe the duration of such working ability as may yet remain to me, to exceptional hereditariness—for my father died at the age of eighty-four, my grandfather at ninety-five, and my two great-great-grandfathers as centenarians—these facts do not interfere with the point I have named, that men who have to fight for sanitation have sometimes to fight for life also.

"Turning from this topic, let me now briefly state the chief present conditions to which we have advanced in the practical applications of our science, which are as yet very imperfectly known. I beg to premise that I state nothing upon hypothesis —nothing but well-examined experiences.

"It has been objected that if it were possible to amend communities by Utopias, Utopias would long since have been introduced. Our proceedings—assumed to be Utopian—which I have to recite, are not, however, based upon Utopian ideals, but on 'experiences' carefully and separately examined—separately examined as to their assumed and strict application to common conditions. It is no Utopia that death-rates in towns under the separate system of drainage have been reduced by one half through the work of the sanitary engineer alone. It is no Utopia that the death-rate at Rugby, for example, which was one of the towns first treated by our first General Board of Health, was then 24 in a 1000, and is now only 12. It is no Utopia that at Salisbury the old death-rate, which at the beginning of the century was as high as 40 in a 1000, is now about 16; or that at Croydon and a number of other places, death-rates of 24 in a 1000 now average 15. These reductions have been effected by the system of 'circulation *versus* stagnation,' which is yet to be made generally understood, to be by constant and direct supplies of water, by the removal of the fouled water through self-cleansing house-drains and self-cleansing sewers, and by the removal of the refuse—fresh and undecomposed, and unwasted—on to the land.

"On the examination of incipient experiences, and on long and careful examination, the application of this system was proposed for the metropolis, but it was opposed by what is called 'Vestralization,' and by strong interests in expensive works, in the House of Commons, by which the Government, at a morning sitting, were put in a minority. An opposite system was adopted, which has since been examined and condemned by Lord Bramwell's Commission as 'a disgrace to the metropolis and to civilization.' Our measure was carefully examined by German sanitary engineers, who proposed it for application to Berlin. It has been applied there, though not yet so completely as I consider it might be, and it has recently been re-examined by a deputation from the French Government, and it is now adopted on that examination for the relief of the sanitary condition of Paris. I greatly lament the loss, by death, of M. Durand Claye, the *ingénieur-en-chef* of Paris, a firm sanitary disciple of mine, but I hope that loss may not imperil the economical execution of the work.

"Various experiences in this country, by these factors alone, have established with such certainty that a contractor may contract with safety for the attainment of sanitary results, and by them the general death-rate may yet be reduced by 10 in a 1000. Beyond the reduction of the annual death-rate from the work of the sanitary engineer, nothing is yet commonly expected or sought for. I had, however, early anticipated that the reduction of the annual death-rate would be accompanied by an advance of the life-rate, and I have recently obtained from the Registrar-General examples of what that advance may be.

"I find that at Rugby the life-rate has been extended to all living there, of every class, by eight years, or from thirty-three to forty-one years. At Hastings the duration of life has been advanced for males an average of five years and five months, but for females of eight years and one month; at Leek it has been extended by ten years; at Croydon and Salisbury, and other places, the extension has been from six to seven years, females, as a rule, obtaining, by our science, the greatest share —that is to say, some eight years more of life-rate, more of painless life, more of health, and strength, and beauty. These extensions of the life-rates, as yet little known and regarded, belong, however, to all classes, both to the well-to-do and to the lowest. Of the wage classes, whose life-rate is largely the lowest, the extension will be found to be the greatest. To them the greatest gain developed is by the house alone, the 'model dwelling,' the work of the sanitary architect, giving ten years more of life and working ability, a result cheap to pay for by extra rents, and which would be still further improvable by the removal of surrounding deteriorating conditions, especially bad schools and ill-conditioned places of work.

"As against extant evils, there is yet to be provided the due exercise of the functions of medical officers of health and the aid of the sanitary inspectors in the inspection of workshops and schools, and chiefly the half-time schools. As Commissioners of inquiry into the labor of young persons in factories in 1833, it was the recommendation of myself and my colleagues that the factory inspector should be essentially a sanitary inspector. Under our first General Board of Health we made an effort to extend these functions in our regulation of the duties of the local officer of health to a weekly inspection conducted at the places of work. On the detection of the premonitory symptoms of disease—chiefly the eruptive diseases—the health officer would, to prevent them spreading, intrust the removal of the patient to the sanitary inspector, who would be ordered to see to the fitness of the habitation for recovery or else to provide a proper place. It is a mark of our progress that such official sanitary qualifications as now abound, which qualifications it is economical to pay for, did not then exist, or were to be obtained in a few instances only, such as that of Dr. Neil Arnott, at such salaries as we could induce a Chancellor of the Exchequer to pay for them.

"The greatest and the grandest advance in the power of sanitation made in my time is, it appears to me, that for the extinction of the chief children's diseases, measles, scarlatina, typhus, and diphtheria—an advance carefully and efficiently tested and ascertained in the chief district half-time schools, where the death-rate, among the children who come into those institutions with no developed disease upon them, is reduced to less than 3 in a 1000, or less than one third of the death-rate prevalent among the general population. Such reduction is coincident with the reduction of the death-rates in the prisons, the former seats of epidemics, where among the persons who enter without developed disease upon them, the epidemics are entirely expelled, and the death-rates reduced below 3 in a 1000, or to less than a third of the death-rates prevalent among the unprotected population outside.

"Physicians are beginning to declare that a large amount of the crime for which punishment is inflicted is due to insanity, and that insanity is due to low physical condition, which sanitation by early physical training would remove. There are experiences to show that this is the fact. Dr. Ashe and others conversant with the lunatic asylum declare that, as a class, lunatics are of low physical condition, and that that low condition is reducible by sanitation and early physical training; an important matter, for eighty thousand lunatics are now burdening the rates. Of thirty thousand blind persons, the late Dr. Rolph declared that two thirds might have been saved by early sanitation. There are experiences, too long to particularize on this occasion, which sustain these several conclusions.

"These experiences are also of vital importance in their application to prison life. But there is another part of our national life and strength which yields the same results. I refer to the latest manifestation of the power of our science for the maintenance of the force of our army. At the Congress of Social Science, held at Liverpool in October, 1858, I proposed that the science which had saved the second army of the Crimea should be applied to the protection of our excessively death-rated army in India, and after much persistent labor of representation, a Commission of Army Sanitary Inquiry was appointed at the instance of Lord Stanley, now the Earl of Derby, in May, 1859, and the change which has since taken place is surprising, even to stolid minds. The old death-rate in the Indian army was 67 in a 1000. In the last decade it has been reduced to 20 in a 1000. The saving of life in India in that decade was in men, 28,130; in sickness, 25,000. This was affirmed, on examination, by Sir Louis Mallet, on a claim for due recognitions, when he was secretary to the India Board. The services of the Army Sanitary Commission, which comprised those of Dr. John Sutherland, and of Sir Robert Rawlinson—the remaining officers of the Crimean Sanitary Commission—were extended over the whole army, and the aggregate saving of life, as returned by the late lamented Professor de Chaumont, of the Army Statistical Department of Netley, has been 4058 men per annum, and for the decade, 40,500 men; or in money, at £100 per man, £40,053; and in sickness, £41,680, an equivalent sum of £100 per man. The saving in life by sanitation is immensely greater than the losses of life by war.

"At this time a further reduction has been made from the 26 per 1000 of the last decade to about 14 per 1000, and further advances may yet be made in the sanitation of the Indian army. A strong party has been formed in India to obtain the application of the experiences of the successful sanitation in the army to the relief of the civil population of India, and, moreover, to apply those experiences to large tracts of unoccupied but fertile land, capable of permanent military settlement, or of the civil settlements of a population much greater than the present population of all India. My aid by exposition of sanitary and administrative principle has been besought for this movement.

"So much for our own empire; but a still greater advance in army sanitation has been made in the German army, where the death-rate has been reduced to 6, and even to 5, in a 1000, with an increased value of 30 per cent for civil work after three years of military service. We have not yet attained to that increased value of labor, although I have been informed of the value of the labor of the volunteers being increased by five shillings a week by the aptitude imparted by the drill. The foremost sanitation of the German army is largely advanced by a factor which is new to us, but which is extensively available for the civil as well as the military population. Mr. David Grove, the eminent sanitary engineer of Berlin, applied a means of washing constantly half a million of soldiers, with tepid water, at the cost of a shilling for every two hundred men. But I find that we now improve upon that sanitation, and can effect it better for ninepence per two hundred men. Now, also, in our schools and district institutions about ten children can be washed with tepid water for about a penny, soap and towel included, at a rate of time of three minutes per head—much more cheaply and effectually than they can be washed at home. Trained nurses devoted to the care of patients with the most infectious diseases, have long protected themselves by a double washing, head to foot, daily, with tepid water and a change of clothes, and experienced sanitary officers use the same precautions on the occurrence of extraordinary visitations of epidemics. Populations may now be trained to do the same.

"Let me state one large gain in sanitation, which I now believe to be attainable for the satisfactory ventilation of public buildings, and of large schools and workshops.

"I have for a long time collected observations of the height of attacks of epidemics on the population of tall buildings, and have found the attacks to be generally confined to the cellar dwellings or the lower floors, while the occupants of the upper floors have been distinctly exempted from them, that is to say, the occupants of dwellings above the range of the visible fogs, made up of the heavier, low-lying, and visible fogs. Mr. Glaisher, the experienced aeronaut, gives me his testimony that the visible fogs are low and close lying to the land. From the height at Highgate or Hampstead, fogs are seen covering London like a level white blanket, out of which the upper and bright portion of the dome of St. Paul's Cathedral is seen bright and clear above it. By tubular arrangements (largely economical in result) intakes may now be opened into the purest superior strata of air, and it may be pumped down and delivered, at a rate required, into public edifices, into the larger schools and workshops, warmed in cold weather, and cooled in hot weather. Had this new means of sanitation been understood at the time of the erection of the new public offices, two sets of officers might have been enabled to work well, where one now works ill, and not with comfort, above half a day, in the large, ill-ventilated rooms, which are reservoirs of impurity, from which Ministers of State have declared that they have been driven to work at home. From India I have collected experiences where the fog just covered the infantry, but where the cavalry were seated above it; and another experience also where a foot messenger could not pass, but where a messenger on an elephant might. In such places, by shorter tubular arrangements, the fresher air may be reached at an expense less than that of the punkha, and healthy rest obtained free from the torment of mosquitoes.

"Experiments may be required to determine the height for a tubular intake (which may be of copper sheathing) to be raised above the clock tower, to avoid the discharges of the high chimneys of bone boilers and others (which themselves require correction), and to insure for the Houses of Parliament and the new public offices air of complete purity for their ventilation.

"Let me do justice to the intellectual by referring to some of the experiences of the working of the half-time school principle. At the half-time District School of Anerley, and of others of them, excluding absolute idiots, full 90 per cent are got 'to the good'—that is to say, to wages when they leave of 8*s.*, 10*s.*, and 12*s.* per week, or nearly the former wages of adults. When I last visited the half-time school of Manchester, at Swinton, the head-mistress there asked what need they had of emigration when they had three applications for every girl as soon as she was fitted for a place. When the Dowager Empress of Germany visited the half-time school of Norwood, the head-mistress declared that she had the greatest difficulty in meeting the pressing applications for girls for good places. And there can be no doubt that many will be carried from them who would have been left with the helpless insane. The late distinguished inspector of schools in Ireland, Sir John Lentaigne, declared that the system, if duly applied, would beneficially change the character of a nation. Lord Shaftesbury has put it on record that the mothers of the factory children in Lancashire had declared to him that the half-time system of school and work had made their children as of another race to them. And this, too, is practicable at a reduced charge from often using the same school buildings for double sets the same day to accommodate industry, as they are finding out they may do in the colonies. And this may be done for £1 10*s*. per head, with a superior physical training, as against £2 5*s*. per head, the charge of the long time board schooling. School teachers have declared that if they were left to their own devices as to classification, they would save three years of school life to every child, and that with a superior physical training which can be got at no time afterward. This will effect the abolition of the 'snail's pace,' and will make the school the happy assemblage of the millions of children during the first days of their life.

"What may be further attained, by a combination of more effective work of the sanitary architect, with better sanitary inspection of schools and places of work, by the local health officer, with the aid of the sanitary inspector, would, it appears to me, be ascertained by what I have called a close clinical examination, carried out by a competent specialist, as was done with great advantage for Brighton.

"The selection of emigrants is now a subject of much consideration, but it may be submitted that one great object would be to ascertain the sanitary fitness of the locality to which it is proposed to send the emigrant, as, for example, that it is not one where the chances of death from phthisis are doubled, or one where, of the children born, more than half will be in their graves before their fifth year—common conditions in some places to which emigrants and their families are now sent.

"The orphan children in the district half-time schools are, in a large proportion, the children of hereditary vagrants, mendicants, and delinquents. Our experiences now display a considerable reduction from them of juvenile delinquency, and enable us to declare that if the children of these classes were given to us from very infancy they need be vagrants and delinquents no longer, but honest and productive citizens.

"To those who are unacquainted with the subject in detail in principle—the popular test of central legislation and of local administration, of either political party, may be deemed extravagant; yet on due examination it will be found that the wastefulness of ignorance, of bad central legislation, and of bad local administration, causing sickness and premature mortality, may actually be tested by the nose—now by the odors of stagnation and of putrefaction, now by the gases of stagnation, by putrefaction in rooms, defective supplies of water, by stagnant cisternage which absorbs foul gases, by the odors of putrefaction from sewers of deposit, by the odors of putrefaction from ill-formed and ill-cleansed streets, and by the eye indeed, as well as the nose, in unwashed children and unwashed workpeople in the byways and the highways.

"In a sentence, low sanitary conditions of populations are everywhere the sources of irritations, of despair, of disorder; while high sanitary conditions are the sources of satisfaction, of political security, prosperity, order, and peace.

"Mr. Chairman, lords and gentlemen, I thank you most sincerely for the consolation and happy assurance of the great future which your testimonial conveys to me. Looking further back than perhaps any one here present can look, I do see, I confess, in the progress of the past, an augury for the future which fills me with all the delight that can fill with the brightness of hope a human heart that has beat so long as mine. I see in the happier, because healthier children that are being nurtured, what may fitly be called the new birth of health that is in promise for the world. My satisfaction may not be equal to my thankfulness, but it is sufficient in this respect, that it is a richer satisfaction than has fallen to the lot of most men who have devoted all their energies to the work of national reform, in matters that lie nearest to the most vital of all that is national, the vitality of the nation and its power for strength and endurance in the career of nations."

THE SANITARY CONDITION OF INDIA AND ITS TEACHINGS.*

By Dr. J. A. S. GRANT-BEY, of Cairo, Egypt.

IN our last article we gave an account of an eye-witness of the sanitary *normal* state of a native hamlet in the suburbs of Calcutta while no epidemic was raging.

We now purpose to lay before our readers an account of a visit in December, 1887, to a native cholera-stricken village, also in the suburbs of Calcutta, in order that we may profit by the lessons taught us by the sad narrative.

The epidemic here described is only part of that cholera epidemic which has been spreading over the length and breadth of India since last year, and which is now raging in all its intensity in the Punjab. As all our readers know, India is the hot-bed of cholera, where it is always present in its endemic form, and where every three or four years it assumes the epidemic character, when it threatens to spread not only over India, but to every port having communication with that country.

"The destroying angel passing over the land of the Pharaohs and smiting the first-born in every Egyptian household cannot have produced a more heartrending scene than the one now presented on a smaller scale at Hathibagan, a suburban village not more than a quarter of a mile from the centre of Calcutta. There, within an area of small compass, more than twenty families are each bewailing the death of some member or members of their family. The sound of the dirge and lament is heard at nearly every door, for within the last few days cholera has visited house after house, carrying with it sorrow and ruin and panic. People are hurrying their dead to the burial and burning-grounds, while others are fleeing for safety from the place.

* Copy of paper written for the Arabic medical journal. *Al Shifa*, September, 1888.

"Among the refugees there are not a few who have fled too late, only to be struck down on the roadside.

"Custom and apathy have so ordered that no pitying eye takes note of these things—no helping hand stretches forth succor to the suffering people in their affliction.

"Hopelessly left to shift for themselves, they die in all the horrors and pangs of a cholera death.

"But this is not all. The moral insensibility which distinguishes the authorities in their attitude toward the sufferings of the inhabitants is only surpassed by their supineness in permitting the causes of the pestilence to remain unremoved.

"The sanitary condition of the village has, out of India, no parallel in the civilized world.

"There are tanks supplying the inhabitants with drinking-water, and at the same time receiving the contents of their latrines; ditches full of the blackest and most putrid of mire; the soil soaked with the foulest and most noxious of filth, while the air is laden with impurities and redolent with stinks. Literally, the place is a vast cesspool—air, water, soil are all alike poisoned. Here the external and most potent causes of disease are in full play, and grim and ghastly indeed are the effects.

"Cholera, the child of filth, revels in its home, gaining in strength and vitality, until conditions arise that will give it an opportunity of leaving its native soil and visiting other places and countries congenial to its tastes.

"Doubtless the authorities will declare that the endemic or epidemic is due to seasonal influences, and that the deaths are not more than usual.

"This apology has ever and at all seasons been a convenient cloak for inaction; but how long is the truth to be suppressed for the ease of the authorities? Seasonal causes are myths of a bygone day, and must give way to the irresistibly large accumulation of facts which evidence that polluted soil, polluted air, and polluted water are alone the means of nurturing this fell disease, and that the removal of this pollution is alone the remedy. How long are the inhabitants to be deprived of a pure water-supply, of drainage, and of measures of cleansing which are among the ordinary necessaries of healthy aggregate life? It is idle to speak of the filthy habits of the people, when the ordinary means whereby they can be clean are not placed within their reach.

"If municipal commissioners will not supply these three wants to their constituents, no amount of education or lecturing will ever effect a change. The change must come from those who are in municipal power—that is, from those who are in authority.

"At the present time the unsanitary condition of the suburbs of Calcutta is an outrage on humanity, a satire on civilization, and a disgrace to all concerned." *

The closing words of the above report are even more trenchant than we dare use toward our authorities, however much tempted to do so.

Now what can we Egyptians learn from this picture of the unsanitary condition of our neighbors?

What about the air we breathe? What about the state of the soil on which our habitations are built? What about our drinking-water supply?

True, we have not cholera to deal with unless when it is imported, but we have other death-producing diseases always present that are equally dependent for their existence and propagation on what feeds cholera and other contagious diseases. Is it not true that the air in and about the majority of our dwellings is pestilential? And have we not evidence enough that the soil is saturated with filth and is becoming more and more so every day?

As to our drinking-water, if we have no means of storing the high Nile water, then, for about three months in the year, we have to drink what may be truthfully designated sewage-water, while during the other months of the year the river is only comparatively pure by reason of the abundance of water, which helps to nullify the bad effects of the organic matter thoughtlessly thrown into it by the natives; for there is no sacredness attached now to old Father Nilus to force the natives to keep the river undefiled.

The wisdom of the ancient Egyptians is proverbial, but, unfortunately for us, wisdom is not hereditary; besides the acquiring of it is by far too laborious and irksome for a race

* *Journal of the Health Society for Calcutta and its Suburbs*, vol. iv., Pt. I., 1888.

whose nerve-power is concentrated elsewhere than in the brain.

We have heard a great deal lately about the excessive death-rate throughout Egypt, but more especially in Cairo, and it may well attract our attention and draw out our concern.

What are the best means for lowering it, and are they being used?

In other departments of the government we hear of great projects proposed and attempted at a great cost to the State, but the Public Health Department is in many respects like that of India—left almost out of count, although disease and death threaten the very existence of such a small nation as this is. India, with its population of 300,000,000, can afford to be well purged of its extra population from time to time by keeping up its unsanitary condition, but this is not the case with Egypt, which is at this moment suffering from scarcity of tillers of the soil. There is no lack of immigrants pouring into Egypt, but none of them can replace the *fellaheen.* The cultivation of laborers ought then, one would think, to demand the serious study of our political economists as much, if not more so, than the cultivation of cotton and sugar-cane.

We question very much whether this is the case, but the shoe will pinch more tightly erelong if intelligent and well-digested sanitary methods are not speedily adopted and faithfully carried out. There is a remarkable similarity between Egypt and India in their unsanitary conditions and in the apathy of the authorities as to sanitary questions that involve the health and stability of the native population.

One has only to walk through our cities and villages to be sensibly assured of the pollution of the air and soil; and in nine cases out of ten that pollution is far more intense inside the dens and houses of the natives than it is in the open streets. Even the European houses are not exempt from unsanitary stinks that might easily, by proper ventilation, be carried off and disinfected in the open air instead of being allowed to permeate through the rooms, thereby destroying the health and stamina of the inmates. We read of the filthy water-supply in India and of its deleterious effects on those who are obliged to drink it, and we are not astonished to find that an impure water-supply in Egypt is accompanied by a high death-rate. Just look at those green, stagnant pools at low Nile, which surround the Egyptian villages and receive the filth and washings of the people, while at the same time they serve as a water-supply for man and beast.

Can it be wondered at that the native population is dying out by a slow process of blood-poisoning? Here in Egypt there is no lack of polluted air, polluted soil, polluted water-supply; these, combined with the excessive heat of summer, ignorance, and crime, make our demographic statistics simply deplorable. The present unsanitary condition of India has been designated an outrage on humanity. This may equally be said of the unsanitary state of Egypt. Surely things are not going to remain as they are.

It becomes more and more evident every day that a Minister of Public Health is urgently needed in the Council of Ministers. There is no lack of sanitary measures to be passed; but as they are not well understood by a non-professional and non-scientific ministry, and as they are not immediately remunerative, they are pigeon-holed, and thus remain a dead letter.

We have raised our feeble voice in the cause of sanitary reform, and we have pointed out some of the ways by which the health of the people might be improved, and we are glad to find that sometimes our suggestions occupy the serious attention of the Sanitary Department; but as this department is discredited at the Ministry, its proposed sanitary measures are generally sent back for further study, as they are considered both ill-digested and impracticable. As far as the climate of Egypt is concerned, little need be said further than that it is excellent.

The heat of summer is, no doubt, sometimes excessive, and children suffer from the effect it has upon their milk-food, and many of them die from summer diarrhœa. This could be controlled somewhat if the people were less ignorant and knew more about the proper preparation of food for the delicate stomachs of their offspring.

The cold of winter does not last long, so that chest disease is not common among the natives; but we have seen many cases that would have better health if they had more clothing. We are sure that a little more education would enable the natives to intelligently combat the evils arising from the climate.

We consider that it is the duty of the government to take the advice of the Sanitary Department as to the laying out of towns and villages, and as to the construction of individual houses, so as to secure a pure air for the people to breathe.

Many of the wild beasts have better dens to live in than the Egyptians have houses.

The honeycomb principle on which the houses of the villages are built is entirely wrong in a sanitary point of view. This could easily be rectified, as they are but crude brick huts at best. The government is certainly responsible for a pure water-supply for man and beast all the year round, and it would be wise in fulfilling this duty to make arrangements beforehand for carrying off the waste. This has been effectually frustrated at Cairo by the destruction of all the sewers.

Cairo is now supplied with an abundance of water, and occasionally during the winter there is a considerable downfall of rain; but without a single sewer this must inevitably lead to flooded streets, if to nothing worse.

The Public Instruction and Sanitary Departments could not have a better field than Egypt for distinguishing themselves in, there is so much that needs to be done.

We are, therefore, very anxious to see both these departments in a more flourishing condition.

SEWAGE IRRIGATION AND SALUBRITY.

THE Paris correspondent of the *Lancet*, December 26th, 1888, writes that,

Concerning the disposal of the sewage of Paris, the first reading of the report of Dr. Cornil has been favorably received at the Senate. In concluding his report, Dr. Cornil made the following statement: "Our hospitals are the great centres where are accumulated patients affected with contagious or microbian affections. The dangerous matters, such as the sputa of phthisical subjects, the dejections of patients affected with intestinal ulcerations or simply of general maladies, the linen of dressings, everything which proceeds from wounds or suppurations, etc., should be disinfected on the spot, before leaving the hospital, by chemical procedures or by well-known heating measures." In connection with this subject I may here give the substance of a very remarkable article published a short time ago in the *Temps*, in which Dr. Cornil relates two conversations which he had with Professor Koch, of Berlin, when on a visit to that city. In the first Professor Koch declared that it was not correct to say that the use of the waters of the drains by the inhabitants of the city was interdicted. Everybody, he said, drinks this water, and finds it good. The municipal functionaries who occupy domains in the city, have drunk this water for several years without experiencing the least inconvenience. The contamination of small streams by the effluent waters of the drains is not admitted by M. Koch. This water, he says, does not contain organic matters non-nitrified ; the inhabitants of the villages situated on their banks contaminate these streams a great deal more than the drains which open below them. He recognizes, moreover, that the soil of the domains where Paris proposes to practice irrigation with sewage water, is much more favorable than that of Berlin, as it is very permeable. Moreover, at Paris there are two hundred and fifty litres of water per inhabitant, instead of sixty or seventy as at Berlin. To the question as to whether there would be any fear of a progressive saturation of the soil, M. Koch replied that there was none. If the periodical quantity is properly regulated, as is done in Berlin, one can obtain the complete transformation of the organic matters without any modification whatever of the soil. The facts observed, he added, at Breslau, Dantzic, and Berlin, are altogether conclusive, and he considers it as demonstrated and certain that the irrigation may be continued indefinitely. At the second interview the eminent professor of hygiene at Berlin recalled that the bacteriological researches have demonstrated that in the sewers the air is extremely poor in microbes. The confirmatory results of the analysis of the air of the sewers of London and of those of Paris by M. Marie-Davy were foreseen ; for, firstly, the air is always but little charged with microbes ; and, secondly, humidity fixes them. M. Maze, who was present at the interview, asked whether purification was best effected with absolutely pure sand, or with sand a little argillaceous. M. Koch replied that the second mode appeared to him preferable, as the filtration is then much slower, and consequently better. The soil is, moreover, a perfect purifier; it is thus that at Berlin the sheet of water does not contain any germs. In conclusion, to an observation made by M. Maze as to the disagreeableness which would result to the localities of the neighborhood of the irrigation, M. Koch replied that in his office of physician he interested himself a great deal more in the salubrity of Paris than in the agreeableness of the localities of its outskirts. Great cities, so much exposed to diseases, should be salubrious in order that the environs might be also. As to the proposal to convey the sewage by means of a canal to the sea, M. Koch considers this impracticable, whereas the purification of the waters by the soil should succeed even better than at Berlin.

THE WEIGHT OF THE SMOKE CLOUD which daily hangs over London has been estimated by Professor Chandler Roberts, says the *Engineering Times*, to amount to about 50 tons of solid carbon and 250 tons of carbon in the form of hydrocarbon and carbonic-oxide gases. Calculated from the actual result of tests made by the Smoke Abatement Committee, the value of coal wasted in smoke from domestic grates amounts, upon the annual consumption of 5,000,000 of people, to £2,256,500. The cost of cartage on this wasted coal is calculated to be £268,750, while the unnecessary passage of about 1,500,000 horses through the streets in drawing it, adds seriously to the cost of street cleaning and repairing. Then there is the cost of taking away the extra ashes, £43,000 per year. Summing it all up, the direct and indirect cost of waste coal may be set down at £2,600,000, plus the additional loss from the damage done to property caused by the smoky atmosphere, estimated by Mr. Chadwick at £2,000,000, the whole aggregating, £4,600,000.

"HELLO, MOSES! Wot's the matter wid ye?" "Indigestion." "How's dat?" "Hain't had nothing to digest lately."

WATER ANALYSIS.*

By CHARLES SMART, M.D., Surgeon U. S. Army.

A NUMBER of experiments on the decomposition of urea showed that while the amount of the ammonia collected in the later measures of the distillate might be made to vary by raising or lowering the gas-flame, and so altering the time occupied in the distillation of the measure, it was a constant quantity where the rate of ebullition did not vary, and under similar conditions the quantity given by the alkaline permanganate was always as large again as that obtained by simple distillation. Dilutions of fresh and decomposing urine in tap-water gave similar results. This peculiarity in the behavior of urea is of importance, as by it not only may the presence of this substance in the water be diagnosticated, but an approximate estimate may be made of its quantity. Laboratory notes giving the details of the evolution of ammonia from organic chemicals and composite organic solutions, the waste-products of manufactories, etc., were examined, but not one was found presenting reactions by which it could be confounded with urea. Thus, while some gave a persistent and equable evolution of albuminoid ammonia, no free ammonia was liberated. Among those acting in this way were potassium cyanide, potassium and silver cyanide, sodium nitroprusside, alloxan, and some of the alkaloids. In several instances factory-drainings gave a persisting evolution of both free and albuminoid ammonia, but not in the ratio 1 : 2, as furnished by the decomposition of urea. The details of the analysis of a large number of waters were examined with reference to this point, and in all cases where the evolution had occurred in the manner stated urea was known to have been present, or its presence was probable in view of the known origin of the sample. The writer is therefore of the opinion that where this peculiarity is found in treating a water-sample by the Wanklyn process, the presence of liquid sewage amounts to more than a probability.

* Continued from page 305.

It is true, in some of the analytical notes examined, the evolution was not recorded as having taken place in this peculiar manner, although sewage was probably, or, indeed, known to be, present; but as in these instances many days had elapsed between the collection of the sample and its analysis, urea might have disappeared in the meantime by the natural fermentative process.

Moreover, the process is approximatively quantitative; for since 1 milligram of urea in 500 c.c. of water gives a persisting and equable evolution of .01 milligram of ammonia when distilled alone or with sodium carbonate, and an evolution of .02 milligram when subsequently treated with the alkaline permanganate, a water-sample which gives such results must have contained urine equivalent to at least 1 milligram of urea in each half-litre. The urea in urine is, of course, a variable quantity; but experiments on a number of samples of fresh urine, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and 1 c.c. in the half-litre, gave an average evolution of .01 milligram of free ammonia in the third and fourth measures of the distillate, and of .02 milligram of albuminoid ammonia when the water contained 1 part of urine in 15,000 parts of water. For example, one half cubic centimetre of urine in 500 c.c. of water, equalling 1 part in 1000, gave .47, .25, .15, and .15 of free ammonia, respectively, in the four measures of 50 c.c. each, and .54, .34, .32, and .32 of albuminoid ammonia in the four measures distilled from the alkaline permanganate.

This method of detecting the presence of sewage in water was put to practical use in an examination of the wells and cisterns of Nahant. One of these, known to the writer only by its number in a series, showed black rings and islets, with sooty fumes and foul odors on ignition, and gave .19 part of free and .53 part of albuminoid ammonia per million. This of necessity condemned it as an organically foul water, but as the ammonias were evolved in the manner indicated as peculiar to urea, and as, moreover, the water, known from its general characters to be a cistern-water, contained a larger proportion of chlorine than is normal to cistern-waters, the writer had no hesitation in reporting it as contaminated with a certain proportion of urinous admixture. One month later another of the Nahant series of waters, known to the analyst only by its number, was reported on analysis as a satisfactory cistern-water. Thereupon the following history was communicated : Typhoid-fever had appeared in a cottage built by a gentleman as a summer residence on the sea-shore. The water was suspected as having to do with the causation, and a sample analyzed by Professor E. S. Wood, of Harvard, was pronounced unfit for use. The proprietor, dissatisfied with this report, sent a specimen to another chemist, who returned a similar verdict. A physician inspected the premises and suggested that sewer-gases might have been condensed on the roof from the ventilating pipe of the water-closet. Thereupon means were adopted to remedy the evil ; and the cistern was pumped out, cleaned, relined with cement, and put in what was conceived to be perfect condition. When filled, the sample was collected which on examination was reported as polluted with urine. This naturally shocked the proprietor, after all his efforts to obtain a pure rain-water, and he felt more inclined to deny credit to water-analysis than to pronounce his cistern guilty. But Mr. Bowditch, of Boston, who was conducting the sanitary survey of Nahant, conceived that further investigation was imperatively demanded. There was a possibility of leakage into the cistern from certain drains which carried off kitchen-waste, but this would not account for the urea unless the servants were in the habit of putting this system to an unauthorized use, and the proprietor, though willing to concede that some servants might act in this manner, would not allow that his could be guilty of such a practice. However, it appears that the drains had no connection with the cistern. But Mr. Bowditch, in his examination, discovered that there were three apertures into the cistern while only two conductors from the roof entered it. It was then remembered that two years before, in adding a wing to the building, a conductor had been disused, but what had been done with it was not known. The old conductor was then uncovered by Mr. Bowditch, and its distal end was found open under the surface near the piazza where grew some vines which were sometimes nourished with chamber-slops. It was further found to be the custom of the house to collect all such slops in pails, which were emptied through a water-closet on the first floor and then placed on the roof of the piazza to air. The old conductor was removed and its cistern-aperture sealed, and the connection was cut between the cistern and the roof of the piazza, the roof of the house thus becoming the only contributing surface. When the cistern was again filled after these changes the analysis authorized a favorable opinion on the contained water. This appears to be a satisfactory illustration of the value of attending to the manner in which the ammonias come over during the distillations of the Wanklyn process.

The information which may be gathered concerning the character of a water by a comparison of the results of the Wanklyn and Kubel processes may be formulated as follows:

A water yielding up the nitrogen of its organic constituents slowly as albuminoid ammonia contains *recent organic matter;*

Of *animal* derivation, if a small quantity of oxygen be required to oxidize it by the Kubel or Tidy process;

Of *vegetable* derivation, if a large quantity of oxygen be required.

A water yielding up the nitrogen of its organic constituents more rapidly contains *decomposing organic matter;*

Of *animal* derivation, if a small quantity of oxygen be required to oxidize it, and if there be no interference with the development of the true ammonia-coloration during Nesslerization;

Of *vegetable* derivation, if a large quantity of oxygen be required, and if a yellow coloration be developed in the water on the addition of sodium carbonate and a greenish color interfere with the estimation, particularly of the free ammonia, by Nessler's method.

The *nitrates* in a water are of much importance, as being the inorganic or skeletal remains of formerly existing nitrogenous organic matter. In themselves they are harmless; but the water which contains them must at one time have been contaminated with organic substances.

Wanklyn says that the nitrates offer no data of any value in judging of the organic quality of a water. But as the nitrates are always derived from organic matter, and very generally from recent matter, Frankland gives greater weight to their presence, and makes them, with the nitrites and ammonia, the basis of a calculation showing what he calls the previous sewage-contamination of the water. Ekin goes further, and claims, from an experience which has found nitrates in waters which had undoubtedly caused typhoid-fever and yet were free from any unusual amount of recent organic matter, that nitrates in excess of 0.5 or 0.6 part in 100,000 point significantly to dangerous pollution. This is an extreme view. A water which contains the nitrified remains of organic matter should have its surroundings minutely inspected, and if there is a possibility that the nitrates are derived from any neighboring polluting source liable to infection with typhoid excreta, suspicion as to the wholesomeness of the water may be entertained, for some change in the circulation of the percolating current may at any time bring unoxidized organic matter into the water, and, moreover, there is great probability that the specific fever-poison may persist notwithstanding a filtration which destroys ordinary or non-specific sewage.

Nitrates are conveniently detected by means of Sprengel's solution, which consists of one part of carbolic acid dissolved in four parts of sulphuric acid, and subsequently diluted with two parts of water. It forms a faintly reddish solution when seen in mass, but is almost colorless when dropped on a white porcelain surface. The water to be tested is evaporated to dryness in a porcelain capsule. A few drops of the test-liquid are permitted to fall on the residue and are trailed over its surface by tilting the capsule. If nitrates are present in notable quantity a dark blood-red color is developed on the trail of the test-drops. If traces only are present the color is fainter—so faint, perhaps, that it may be difficult to decide if the original color of the drops has been really deepened. Besides this, the darkening produced in some organic residues by the acid of the test obscures the reaction with minute traces of nitrates, but, nevertheless, the test is of value.

Frankland has called the nitrates the skeleton of sewage; but these salts may have their origin in the nitrogen of vegetable organic matter as well as in that of animal matter. If any one salt is especially characteristic of animal life it is *sodium chloride*. It is an essential component of the animal tissues, and is therefore present in the excretions. Chlorine in a water associates the sample with a pre-existing animal matter. If ammonia is present in unusual quantity the proximity of the polluting source whence the chlorine was derived may be considered certain. If nitrates, and especially nitrites, are present, the chlorine may also be referred to a recent pollution. These various substances, found on analysis, support each other's testimony and give greater value to the analytical results. Rain-water contains minute traces of chlorine, especially in showers falling near the sea-coast. Cistern-waters collected from foul roofs may contain a fraction of a part per million. River-waters usually contain up to five parts per million, and well and spring-waters more than this. The more extensive the contact with the soil the greater usually is the amount of chlorides present.

Chlorine is detected by the action of silver nitrate on its solutions. This test should be applied to a few cubic centimetres of a water under examination, not to manifest the presence of the chlorine, for that may be taken for granted, but to give a rough estimate of its quantity, that the analyst may know what volume of water will be convenient or necessary for the exact determination of quantity. When a dense cloud or curdy precipitate appears in this preliminary experiment, the chlorine may be estimated in the unconcentrated water ; but when the silver salt gives only a faint haze, it will be advisable to evaporate 100 c.c. to a small bulk for the quantitative experiment ; and if the silver gives little or no reaction, as much as 400 c.c. may be required.

The estimation of the chlorine concludes the organic analysis of clear waters, but it is always advisable to supplement the chemical methods by *microscopic examination* and bacterioscopic investigations, as they may furnish points of information bearing on the character of the organic matter. Although the sediment to the unaided eye may appear as *nil*, or as the merest film upon the bottom of the containing vessel, the microscope may reveal in it an infinite variety of vitalized forms, few of which, however, have been associated with injurious qualities of the water. Thus the symmetrical forms of the desmids and diatoms are found in the sediment of almost every natural water. Their presence is therefore deprived of any special sanitary value, except where it constitutes the characteristic of the microscopic field, as in cases of pure well or spring-waters. Impurity in the water develops other forms of life which withdraw the attention of the observer from the occasional diatoms. The filamentous oscillatoriaceæ and nostocs, with their transverse markings and constrictions, and the other confervoid genera in which the colored endochrome becomes converted into motile zoöspores, as in zygnema, spirogyra, zygogonium, conferva, œdogonium, and chœtophora, are so generally found in water that it is only when they become prominent as a sediment that excess of organic impurity may be suspected. Of the animals, rotifer and hydatina among the rotifers, cypris, cyclops, and daphnia among the entomostraca, and macrobiotus and hydrachna among the arachnids, occur frequently in waters which analysis has shown to be pure, and experience to be destitute of any unwholesome qualities ; while the tentacled infusoria, such as euglena and peranema, and the ciliated acomia, enchelys, and alyscum are also to be found in waters which give good results chemically. Pure waters have generally but little sediment. Impure waters, although frequently depositing a sediment which swarms with vital forms, may give a microscopical field which is as devoid of living forms as that furnished by a pure spring-water. This result may be obtained after water has been thoroughly sedimented in the well or cistern whence it has been withdrawn for examination. But if the sedimentation has been less perfect, so that some particles of vegetable *débris* are left floating in the water, these particles will be seen to swarm with living forms if the water is impure ; while, if it is pure, any vegetable *débris* thus accidentally present will not be found to be the centre of a vital settlement. In some instances an organically impure water has presented a perfectly dead field when the amount of saline matter in solution was large.

The discovery of the comma bacillus by Koch, with the expectation of further developments from his methods of biological research, has for some time past made the sanitary analysts feel as if there would speedily be no more use for their chemical knowledge and experience of the constitution of water-supplies. The medical profession, and even the general public, became fascinated with the views and possibilities opened up by the German method of growing invisible germs on solid gelatine plates until the colonies of each reached a magnitude that brought them within the ken even of the naked eye. The original germinal spots could be counted, to demonstrate the number of individuals that had existed in the water under examination. Differences could be observed in the appearance of the various colonies. Transplantation could be effected and pure cultivations of each could be obtained for further microscopic and biologic study. It seemed as if the end had been reached, and that the question of the wholesomeness or unwholesomeness of a water was at last susceptible of solution by laboratory methods. But the progress of experimental work is slow. The anticipations of the enthusiasts, onlookers chiefly, may be reached ultimately ; but in the meantime it may be safely asserted that the new method has only succeeded in developing the difficulties by which it is surrounded and in casting doubt on its own results as a gauge of the quality of a water-supply.

In Koch's method a given quantity of the water is mixed with a sterile peptonized meat-jelly, which is then distributed evenly on a glass plate, where it solidifies. The plate is placed in a moist and properly protected apparatus and kept at a temperature of about 20° C., which is that most favorable to germination and growth. After a few days the colonies appear. They vary in size and shape, some minute, some larger and spreading, some round or oval, smooth, fibrillated or tuberculated, and some liquefying the jelly which is their nidus.

Among the first of the facts demonstrated by this new method of study was the universality of bacterial germs in water. It was difficult to find a water which would not yield a few colonies ; even distilled water from the laboratory of the chemist was sometimes charged with them. The question arose, Does the number of colonies developed from a water have any bearing on wholesomeness irrespective of the character of the individual colonies ? To this Bischof (" Trans. Soc. Medical Officers of Health," 1885–86, p. 110) has given a decided reply. It was recognized that a water which, when freshly drawn, gave rise to but few colonies, would yield very different results after storage for a few days, on account of the rapid multiplication of germs in the stored water, and it was also recognized that this multiplication depended less on the number of bacteria originally present or the organic pabulum at their disposal than on such accidents as temperature and exposure to, or deprivation of, light, oxygen, etc. But notwithstanding the development of these germs a wholesome water does not become unwholesome, as is well authenticated by the use of such stored waters. A sample of New River water, concerning the purity of which there could be no question, as it yielded only fifty-three colonies per cubic centimetre, was found after a storage of six days to yield no less than seven hundred and seventy thousand colonies, a number seventeen times in excess of that derived from the Thames water at London Bridge; yet there was not the slightest evidence to show that the water in which this immense number had been developed was not a wholesome water. A water might be as free from bacteria as that of Loch Katrine, or it might contain as many as this stored sample of New River water, without aspersion on its wholesomeness. Of what value, then, the intermediate hundreds or thousands—particularly as these numbers may be obtained from the same water on one day or another? If seven hundred and seventy thousand be consistent with wholesomeness, where is the line to be drawn? We know by experience that sewage or animal excretions constitute a dangerous element in water-supplies, but the number of colonies throws no light upon this element, for Bischof added sewage to a sample of the New River water, and after storing it for six days, as in the parallel experiment with the pure water from the river, he found that the bacteria in the latter exceeded those in the tainted sample almost twenty times.

But supposing the number of the colonies to be an indication of value, several important objections are urged against the accuracy of the results yielded by the gelatine method. Zoöglœa masses and chains are not broken up by the agitation in the tube, so that a mass may give origin merely to a simple colony. From analogy, as well as direct experiment, we know that different kinds of bacteria require different kinds of food. The addition of a little phosphate of soda to an ordinary water will greatly increase the colonies in the gelatine. Some organisms that do not flourish on the meat-jelly will do so on potatoes, Iceland moss, bread-paste, and other vegetable nutrient substances. The water-supply of Antwerp, which was stated by a commission of experts to be completely sterile to Koch's test, gave evidence of abundant life when potato was used as the field of cultivation. Remembering these defects in the gelatine process, and recalling the fact that number means nothing, what remains to be done? To study the colonies—to transfer to gelatine, blood-serum, potatoes, etc., in order to obtain pure cultivations. To examine these microscopically and study their characters, which are simple enough, yet complex in their simplicity. The bacteria are thick or thin, straight or curved, oval, round, or square-cut at their ends, long and filamentous, or so short as to merge into the torula or coccus, the cocci presenting every form of aggregation from single to zoöglœa, and the whole, perhaps, mixed with mycelial threads, shreds of mucor, spores, etc. Every water has a variety of forms, though in some the cocci, in others the bacteria may predominate. Which are harmless? Which are harmful? Nobody knows. In fact, the difficulties of the microscopic field are so great that few observers have attempted to state the number of different kinds of organisms present, and fewer still to isolate by pure cultures and investigate by subsequent experimentation.

The gelatine culture-test is valuable only for its promise of the future. At present it gives little information, and that little is assailed on all sides by interrogation points. Chemical analysis gives a definite statement of the quantity of the organic matter present and throws light upon its character, but the results of the culture-field vary for the same water according as it is examined on one day or another.

But to return from these culture-tests to the ordinary course of sanitary analysis. If the water is turbid the substances causing the turbidity may require to be investigated by both chemical and microscopical methods. The total amount of the *sediment* may be determined by evaporating a given quantity of the water after it has thoroughly sedimented, drying the residue and weighing, when its weight deducted from that obtained by a similar experiment performed on the unsedimented water gives that of the sediment present. If the experiments already described in this article as performed on the natural or unsedimented water are repeated on the thoroughly filtered or sedimented specimen, a comparison of the results will manifestly discover the special inorganic or organic characters of the sediment. But a formal examination of this kind is seldom necessary, as the microscope usually suffices to determine the quality of the sedimented matters. The microscopic appearances are extremely complex when examined in detail, but each sediment presents certain characteristics which may be seen at a glance with ordinary powers, and on which the quality of the water may frequently be predicated. The matters are mineral, organic, and vitalized.

The organic matters in suspension are various in character. They are easily discriminated when fresh, but in the progress of disintegration and decay their histological characteristics become lost, and their origin is of necessity obscured. Their organic derivation may, however, be generally determined by their difference from the usual forms of inorganic matter and by the activity of the organic life in their neighborhood. Those most frequently occurring are fragments of woody tissue from the roof in cistern-waters, and from the wood-work in well-waters—the pitted tissues showing their derivation from cypress or pine—straw, starch-cells, pollen grains, as also the cellular tissue, stomata, veinlets, etc., of broken up leaves. Dark-colored masses of woody tissue from the roots of trees, when present in a well-water, lead to the expectation of vegetable impurity in the water. Cotton fibres are often found in the cistern-waters and in many of the wells of the Southern States; but their prevalence in the atmosphere deprives their presence in the water of any sinister meaning. Wool and linen fibres may also be washed from the roof into cisterns, but when they are found in well-waters inflow from the surface may be suspected. Fragments of human hair and epidermic scales suggest a direct surface-leakage of a dangerous character, or an equally dangerous carelessness in protecting the water after it has been drawn. Insect remains, such as the legs, antennæ, abdominal shell, and wing-scales may be present in cisterns, indicating a corresponding degree of impurity in the water and affording evidence of inefficient filtration, or of insufficient protection in the case of well-water.

The germs of vitality are so generally diffused that, where there is food, development, growth, and reproduction will ensue under ordinary circumstances. Temperature retards or accelerates these changes; but the same temperature which promotes the growth of microscopic organisms induces, in devitalized substances, the development of the putrefactive changes which transform their albuminoids from wholesome to unwholesome, as regards their action on the human system. The growth of these microscopic organisms may therefore be considered, in many cases, as measuring the harmfulness of a water-supply. Bacteria, on the microscopic field, show a putrefactive tendency in the organic matter of waters. Of the tentacled infusoria, oxytricha, kerona, and euplotes are found in waters which do not give a satisfactory response to the chemical tests. The flat worms, the anguillula, and the regularly ciliated paramecia, of which that most commonly met is the oblong compressed paramecium, with its oblique fold, the elongated amphileptus, and the flask-shaped lacrymaria, with its long neck and ciliated mouth, coincide with waters which would be condemned on chemical grounds. Sluggish amœboids and the more active protoplasmic masses, such as monas, cyclidium, cercomonas, etc., and a profusion of vorticellæ in an active or encysted condition, are certainly characteristic of an impure water.

The question sometimes arises as to the presence of injurious quantities of certain metals in water. *Lead*, derived from service pipes or tanks, is usually the suspected metal, but it may be copper from boilers. These, when present, may be detected by the method recommended by Professor Wanklyn.

Rain-water is modified by the character of the roof which sheds it—that from a clean slate roof may not differ materially from the specimens collected in clean dishes; while rotting shingles, foul conductors, and equally foul cisterns may impress their characters upon the analytical results.

If the storage cistern is a wooden tank, the free and albuminoid ammonias may continue present in large quantities for a long time after the inflow of a fresh rainfall. These, with a large oxygen figure due to carbon washed from the roof, constitute analytical results which would condemn any water save that with this particular history. If the history of the water is unknown, the small amount of the solids and of the chlorine indicates with certainty that the water has not come in contact with mineral matters, and that it is probably a rain water from a wooden tank.

During the hot season putrefactive changes take place in the albuminoids of waters thus stored. The water may even become so tainted that the senses may take cognizance of its impurity. It is therefore especially desirable, when wooden tanks are used, that the impure portions of the rain-shower be rejected by a cut-off, and that the water used for drinking purposes be subjected to filtration.

If the rain-water is contained in a brick cistern, the carbonic acid which it holds in solution enables it to dissolve a small portion of lime from the lining of the cistern. The total solids are therefore increased in quantity to 10, 12, or even 16 parts per 100,000 of the water. The presence of the lime is readily demonstrated; and the absence of chlorine, save in quantities normal to rain-water, shows that the alkaline earth is not derived by sipage from the soil in which the cistern is built. In waters thus stored a remarkable change takes place in a very few hours. Although the rainfall on entering may have contained .050 free ammonia and .030 albuminoid ammonia, the former may disappear completely and the latter be reduced to less than .010 part, constituting, according to the opinion of most analysts, a record indicative of a pure and probably wholesome water. The purification which is experienced by rain-water when stored in an underground cistern, so notable in contrast with the continued impurity of that contained in wooden tanks, was at first attributed by the writer to conditions, as of exclusion from light and heat, pertaining to the underground position. But the speedy purification is now known to be owing to a process of nitrification, the earthy lining of the cistern appearing to furnish the germs of the organic ferment. This knowledge explains certain anomalous results which were puzzling to the writer when dealing with the tank-waters of New Orleans, La. Of two cisterns, one of which was new or newly cleaned, and the other many years old and perhaps never cleaned, the latter in most instances furnished the purer water. Many such cases may be found in his report in the "Annual Report of the National Board of Health" for 1880. Nitrification was effected in the old cisterns by germs in the sediment which had gradually accumulated as the result of roof-washing. But if the shedding surface was very foul and the sediment largely charged with organic matter, the water by prolonged digestion, especially at summer temperatures, became contaminated by the sediment rather than purified by the organisms which it contained. Hence the old and uncleaned cistern did not in every instance furnish a purer water than the new or recently cleaned cistern. The lesson taught by these facts is the introduction of the nitrification ferment by a cleaner and surer medium than the accumulated sediment. If a layer of sand or gravel be placed in the bottom of a clean wooden tank, nitrification will progress in its contained water as certainly as in that of the underground brick cistern. And if the sediment in a tank which yields a comparatively pure water be removed and replaced by sand or gravel, the purification of the water will be more rapidly and thoroughly effected.

Rain-water shed from the surface of the ground and collected in low-lying situations with an impervious subsoil layer constituting swamps, ditches, or ponds, gives an increase in the total solids over that proper to cistern-water, even when the lining of the cistern has been attacked. The chlorine is usually augmented to .5, 1.0. or more parts per 100,000 of the water. Such waters may become impure by passing over an unclean surface; but even if uncontaminated in their progress to the lower level, their subsequent stagnation in or on the highly organic surface soil affords opportunity for the solution of decaying vegetable matter, and they become impure, as their volume is small compared with the mass of organic matter which underlies them. The conditions in these instances appear similar to those in a cistern with a low water-level and a large and foul organic sediment. In fact, the analyst may be in some cases at a loss to determine whether he is dealing with a swamp-water or with a foul cistern-water. The influence of nitrification is lost in the continued absorption of ammonia and solution of albuminoids from decomposing tissues, so that the water yields to the Wanklyn process high figures of free and albuminoid ammonia; as much as .050 of the former and from .040 to .090 of the latter. The swamp-water of New Orleans yielded .050 free and .090 albuminoid ammonia, and its organic matter required as much as 1.345 part of oxygen from permanganate for its oxidation.

Foul pond-waters are sometimes used as public supplies, although they manifestly should not be so used. The water of

Easton's pond constitutes, for example, the city supply of Newport, R. I. It was repeatedly examined by the writer in connection with a sanitary survey of the city, and its organic constitution, as developed by the analysis, did not differ from that of swamp-water. On one occasion it yielded as much as .105 part of albuminoid ammonia per 100,000, and required .840 part of oxygen from permanganate. It might be supposed that, if the use of such a water was specially dangerous, the health reports of the city of Newport would bear testimony of the fact; but, as Bowditch says in his report on Summer Resorts: "It is questionable, however, whether the health of the city is known to any one; with the exception of a few of the citizens it is undoubtedly so, and it would be entirely safe to assert that neither the local board of health nor their officer know at any time the actual health of the community or anything approaching it, while the records show nothing." When necessity requires the use of these impure surface-waters, they should be purified by systematic filtration, for although the quantity or quality of the organic matter may not suffice to cause a notable endemic of diarrhœal disease, and although the germs of specific disease may not be present, the tendency to the former, and the probability of the presence of the latter, must be acknowledged to be greater in a supply which has much organic impurity than in one which has little or none. The microscopic characters of such waters are usually distinctive, consisting of bacteria in the zoöglea form, amœbæ and other sluggish protoplasmic masses, and a profusion of active and encysted vorticles.

Lake-waters, resting on bed-rock, and having their volume incomparably greater than the small marginal zone of organic decay, are usually pure. They are analogous in organic constitution to rain-water in a clean and sound underground cistern. After a heavy rainfall on the water-shed the free and albuminoid ammonia may be slightly increased for a few hours, but the active progress of nitrification soon effects a return to the normal constitution. Naturally, the total solids show a slight increase over those of cistern-water, and the chlorine participates in this increase. If the level of the lake is preserved less by direct outflow than by surface evaporation, the consequent concentration may give a marked increase to the various mineral matters, an exaggerated instance of which may be seen in the Great Salt Lake of Utah Territory.

The total solids in river-waters range from 10 to 25 or 30 parts in the 100,000. With a small amount of dissolved solids the water is usually soft; with a larger amount there may be a certain degree of hardness from lime-salts. Chlorine is present, but it is seldom in excess of 1 part in the 100,000. A trace of nitrites may be present; nitrates are also found as a result of the transformation of free ammonia and the albuminoids; but if they exceed 0.5 part, an unusual amount of organic matter has been washed into the stream. The free ammonia varies from .001 to .020, and the albuminoid ammonia from .010 to .025; while the oxygen from permanganate required to oxidize the organic matter ranges from .1 to .4 part. River-water is so liable to change in its quality from temporary disturbing causes, that its general character cannot be determined from a single examination. If a heavy rainfall has increased the volume of the stream just before the sample was collected, the free and albuminoid ammonias may be as high as the maximum quantities above mentioned. On the other hand, if no rain has fallen for some time before the collection of the specimen, the free ammonia and albuminoids may be present only in comparatively small quantities. Moreover, there are seasonal changes in the quality of river-water. Heavy rains and snow-meltings carry into the stream the sewage of the atmosphere. The former, especially, erode the surface-soil and diffuse its organic constituents in the running water, while the increased flow prevents the deposition of suspended matters and the consequent purification which occurs under other conditions. On account of these normal variations in quality, the water of one stream may not be compared in its analytical results with that of another. The mean annual quality of each must be known.

This varying constitution of a river-water renders it difficult to detect sewage in it by chemical means, unless the contamination is very gross indeed—in which case analysis will prove nothing that may not be determined by an inspection of the water-shed. Even when a large inflow of sewage is known to take place at a given point, the analysis of samples collected above this point, and a few miles below it, may not show any marked differences in organic quality. The presence of the sewage becomes marked only by a slight increase in the quantity of nitric acid, and a corresponding increase in the quantity of the chlorides.

The quantity of dissolved oxygen present in a water has been suggested as a measure of organic impurity. Professor Leeds says: "Pure natural water, such, for instance, as that of the Passaic in the upland hill country of New Jersey, contains in solution the maximum amount of oxygen which water can dissolve at natural temperatures and under ordinary atmospheric pressure. This amount is not far from 6.5 c.c. of oxygen in a litre. On coming into contact with decomposing organic matter, a portion of this dissolved oxygen is used up in processes of oxidation. The amount of oxygen held in solution becomes, therefore, an index of the degree to which the water is contaminated by decomposable organic substances." It is true that a large quantity of oxygen in a water is inconsistent with the presence of a large quantity of organic matter, since the latter, in its decomposition, forms transition products which are susceptible of oxidation by the dissolved oxygen; but as the oxidation of organic matter does not progress quickly, the presence of oxygen in a water may mean either that there is no accompanying organic matter, or that the two have not been associated long enough for the oxidation to be completed. If Professor Leeds's analyses are compared with some of those published by Professor Mallet in the "Annual Report of the National Board of Health" for 1882, it will be seen, for instance, that the stagnant water of the old Basin Canal at New Orleans, La., containing as it did 5.2 c.c. of dissolved oxygen, even after the many days which elapsed between its collection and analysis, does not differ much in this respect from the Passaic River supply; and yet it yielded 1.0 part of free, and .83 part of albuminoid ammonia per million, and no one would think of using it as a potable supply. In fact, as already explained, the self-purification of water is not dependent on a chemical oxidation, but on a vital process, some of the products of which are susceptible of oxidation.

The dissolved solids in well or spring-water may be so large as to cast doubt on the wholesomeness of the supply. But, even when these are not present in such excess as to interfere with potability by the saline character or hardness which they give to the water, they usually contain a much larger proportion of chlorides than the solid residues of pond or river-waters. Nevertheless, this increase in the quantity of the chlorides need not be viewed with suspicion, unless the water of the well under examination contains more than is found in the organically pure well-waters of the district. When the excess is due to local causes, the character of these and their bearing on the quality of the water must be studied. Similarly, in the case of nitrates, their presence in larger quantity than in the unquestionably pure waters of the same section calls for a demonstration of the absence of polluting sources from the area of drainage. Such sources are usually privies, sinks, cesspools, leaky house-drains, stables, pigsties, manured lands, grave-yards, and the contaminated condition of the soil which results from the accumulated filth of many years of occupation. The organic matters from these reach the well by inflow from the surface, by subterranean channels which may have been formed in the soil, or by a failure on the part of the soil to effect purification during the percolation of the water into the well, such failure occurring when the soil has become permeated by impurity. Subterranean communications between a well and a polluting source in its vicinity may sometimes be detected by pouring on or into the latter a solution of some chemical foreign to the constitution of the well-water, and testing at intervals for its appearance in the well. The communication which occasioned the typhoid poisoning of the Lausen Spring (see *infra*) was thus detected by means of common salt; and in the case published by Dr. Janeway, of New York (*infra*), chloride of lithium was employed to demonstrate the connection between the drain and the well-water. If the contaminating source is near, the nitrates may not be in excess, but the results of the distillations from alkaline permanganate will indicate its influence on the quality of the water. The organic matter may be of a harmless quality, but it is not so in all cases; and prudence dictates the disuse of the water which contains it. The danger arises from the fact that organic matter reaches the water by some channel; for, where harmless organic matter enters, harmful organic matter, if placed in the area of drainage, will also enter. If the polluting source is distant, and especially if the soil in the drainage area is not surcharged with organic matter, the absence of free and albuminoid ammonia may indicate a water organically pure. A water of this kind is generally wholesome, but it is not so always. Typhoid-fever may be disseminated by well-waters which contain only traces of free ammonia and the albuminoids, but in these instances the nitrates and chlorides are usually in excess.

If a well-water is contaminated by undecomposed sewage, its presence may be determined by the peculiar manner in which urea evolves its nitrogen as ammonia when treated by the Wanklyn process.

The well-waters of cities usually contain large quantities of nitrates and chlorides, and in many instances the coexistence of organic matter indicates that these salts are of recent formation, and the well correspondingly dangerous; not perhaps dangerous from the sewage or other foul matters which enter them, for ordinary or non-specific matter is not necessarily dangerous; but at all times threatening the consumers with an epidemic of typhoid-fever or cholera, should the sewage which enters the wells become infected with the poison of either of these diseases—for a well which contains nitrates may admit the specific poison in full potency, although other and ordinary organic matters have been destroyed in transit.

When the analyst has completed his work, he is able to state that the examined water does or does not contain a certain quantity of the elements of organic matter. He is able also to state whether the water at one time contained more than this quantity; and sometimes he may indicate that this increased quantity had a recent or remote existence. He may be able to say that the organic matter was of an animal or vegetable nature, and fresh or decomposing in condition. He may even determine the presence and the approximate quantity of sewage matters in the water. But the important question—Is the water wholesome or unwholesome?—cannot receive a positive answer from the records of the analysis. The nitrogen which enters into the composition of the albuminoid ammonia, distilled from a water which the analyst would characterize as foul, unfit for use, or dangerous, may come from an organic matter which is perfectly harmless, or from one which is a deadly poison.

The extensive investigations into the methods of water analysis undertaken by Professor Mallet for the National Board of Health, and published in the Report of that Board for the year 1882, had for one object the determination of the value of the processes, as furnishing indications of the wholesomeness or unwholesomeness of a water. From a careful study of the analytical reports on a number of samples, the full history of which was known to him, although unknown to the analysts who investigated their character by the various methods, Professor Mallet concluded that, "It is not possible to decide absolutely upon the wholesomeness or unwholesomeness of a drinking-water by the mere use of any of the processes examined for the estimation of organic matter or its constituents." But, as has been advanced in these pages as the result of an extensive experience in water analysis, and its bearing on the question of wholesomeness, a study of the analytical record, combined with a careful inquiry into the source and surroundings of the water, will frequently enable an opinion to be given which will have value as indicating the probability of dangerous qualities. In the future, culture experiments and the microscope may be used for the detection of the living particles which give a morbific quality to water, but until a greater advance has been made in this direction than at present, the chemical processes above outlined afford, in connection with a close inquiry into the natural history of the water, the only trustworthy data for the formation of an opinion as to the potable quality of any given sample.

(*To be continued.*)

THE RELATION OF DRINKING-WATER TO SOME INFECTIOUS DISEASES.

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In discussing problems of public health, the student of hygiene may have to face two classes of readers. One class consists of those who are timid and nervous about most questions concerning health, and who are easily alarmed by any disclosures which reveal possible dangers in their habits of life and environment. Another class, representing the other extreme, encouraged by the fact that nothing serious has happened thus far under prevailing conditions, display an assurance amounting to indifference and even gross negligence. The investigator is looked upon by such as an alarmist, who substitutes theory for experience, and who sounds the tocsin at the approach of spectres, the creatures of his own imagination. But the advances made and the means suggested for the protection of human life should not be looked at from either of these standpoints. They can, at best, proceed but slowly, and if they succeed in saving only a few lives each year from premature death, the compensation for labor and outlay is ample enough. It is from this middle point of view that the following remarks are made.

The immense but still infantile strides which have been made within the last eight or ten years in the field of infectious or communicable diseases have demonstrated that a considerable number of such maladies are directly due to the invasion of the body by specific bacteria. Quite naturally it became necessary to examine our surroundings in order to learn whether any of these micro-parasites may be found among the numberless harmless bacteria that live in the water and the soil, on the surface of the body, in the mouth and the digestive tract of man and animals. In general the results of numerous patient unbiassed observations have thus far proved negative. Disease germs do not exist in our environment in numbers sufficient to be detected by the methods of bacteriological research. The few that are constantly present in the soil, and which are presumably the agents producing certain forms of suppuration, septicæmia, and tetanus, are little to be feared, excepting by the surgeon during operations, judging from the comparative infrequency of these diseases. On the other hand, typhoid-fever germs have been found a number of times, within recent years, by carefully searching suspected drinking-water *during and immediately after epidemics*. Koch found during his researches in Calcutta, in 1884, cholera spirilla in the water of a tank which was, at that time, the centre of a localized cholera epidemic.

The scrupulous care which we exercise in the selection and preparation of our food contrasts strongly with the indifference which is exhibited with regard to the water we drink. Many of our large cities are supplied with river water which not only represents mere surface drainage, but also the diluted sewage of large communities and the refuse of manufactories. We do not hesitate to consume this in its rawest state, though we have learned to apply heat to most other foods, not merely as a preliminary aid to digestion, but also to destroy any deleterious matter which may be attached to or incorporated with them. It has now become generally accepted among authorities in hygiene, that water containing a large number of bacteria should not be used as a beverage unless previously boiled or filtered. The bacteria are evidence that the water represents surface drainage, or filters through a very porous soil more or less impregnated with organic matter and living bacteria. These, it is now known, live in the largest numbers near the surface of the soil. At a depth of from nine to twelve feet they are either entirely absent or present in very small numbers.

We must assume, then, that water which in its flow over or through the soil becomes loaded with a large number of organisms *may*, under certain circumstances, gather up disease germs and thus *act as a vehicle for a short time*, especially during epidemics. The disease germs may be widely distributed before they perish. The maladies which are now known to be chiefly transmitted in this way are Asiatic cholera, typhoid-fever, and dysenteric affections. The localization of these diseases in the digestive tract makes it extremely probable, even if bacteriological evidence were wanting, that the specific bacteria are introduced by way of the mouth with food and drink. In Asiatic cholera the spirilla, now generally accepted as the cause, are found in the intestines only. In typhoid-fever they are not only present in the intestines, but penetrate thence into the internal organs, notably the spleen. Dysenteric diseases have not yet been thoroughly studied, so that positive facts are not at hand, but they also are, without doubt, caused by micro-organisms introduced with the food and drink. Of these, cholera need not claim our attention, since it is to be hoped that it will not gain a foothold in our own country. Whatever shall be said in this article concerning the relation of drinking-water to disease, will apply with even greater force to this malady should it appear in our midst.

Typhoid-fever, being endemic over the greater part of the civilized world, has received considerable attention of late. The specific microbe (bacillus) was first distinctly recognized in 1882, and its peculiar characters and constant presence in the body during the disease confirmed by a host of observers since that date. It is transmitted very probably in the following way: The stools of patients, which contain the specific bacilli, are thrown upon the soil, whence the rain washes them into streams, which serve as sources of drinking-water for communities farther down, or they are thrown into vaults, whence they may contaminate wells, either by filtering through a very porous soil, or else by being carried through communicating fissures. The proximity of cesspools to wells and cisterns, and the ease with which surface water may find its way into the latter, are facts too frequently observed in small towns and villages to need any comment.

Numerous experiments have been made to determine the length of time during which typhoid bacilli may live in water. This is a very important problem, for we need to know how long these microbes may remain alive after the soil or water has been infected. Such experiments have shown that typhoid and cholera bacteria do not increase in number in drinking-water of average quality. Not only is the temperature too low, but the quantity of available organic matter present is below the minimum limit at which multiplication begins. Moreover, there is a gradual destruction going on which finally rids the water of its infectious elements. Experiments have shown that typhoid bacilli may remain alive a month, perhaps somewhat longer. Water may therefore become the means of transmitting typhoid bacilli from one person to another, but this capacity is limited, and future observations must be invoked to determine how long it may last, and whether the period assigned by laboratory experiments be correct.

In the actual examination of suspected water, two difficulties arise. (1) The bacilli resemble harmless bacteria present in water and other media very closely, and grow so much less rapidly than many saprophytes also present, that detection is rendered very difficult with methods now in use. (2) Water is rarely examined until some time after an epidemic has appeared—that is, not less than from four to six weeks after it has been contaminated. After what has been said of the rapid destruction of these bacteria in water, the chances of finding them are very poor. Still, they have been found recently in a number of epidemics.

But there are other lines of evidence that gradually lead up to the occasional conviction of drinking-water. I have dwelt upon the bacteriological evidence as, perhaps, the simplest and most direct. Other evidence, more complex, may be adduced from the mode of origin and distribution of epidemics. Perhaps one of the best illustrations is furnished by Mosny in the *Revue d'Hygiène* for January, 1888, in describing the water-supply of Vienna. This sketch deserves our attention, as the statistics have been carefully compiled. Before 1874, Vienna received nearly all its water from the Danube. Since that date, large reservoirs built in the mountains near the city have been in use to collect spring water, so that in 1886, about 88 per cent of all the city houses were provided with pure water. Dysentery has now become quite unknown, as the following figures show: In 1869, 1870, and 1871, there were about 100 fatal cases of this disease; in 1872, 38; in 1873, 53; in 1874 and 1875, 32; in 1877 and 1878, 17; in 1880, 11. Since that time none have occurred. Typhoid-fever has also well-nigh disappeared. Professor Nothnagel had occasion to say, recently, that when a case entered the hospital he quickly announced the fact by a bulletin, so that the students might see this malady which was dying out in the city. In the decade of 1850 to 1860, the mortality from this disease was about two for every 1000 inhabitants. In 1871 an epidemic appeared in which the mortality rose to 4.5. After 1874 it began to fall, until it has now reached the low figure of .11. In the winter of 1877 the reservoir of spring water had become frozen, and to supply the demand four districts of the city were provided with water from the Danube until February 10th. An epidemic of typhoid thereupon appeared in March, in which twenty-nine out of every 100,000 inhabitants succumbed; of every 100 sick, twenty-five died. The distribution of the disease showed that the number of deaths was in inverse ratio to the number of houses in each district provided with spring water. In those districts in which no Danube water had been distributed the mortality rose but slightly above the usual rate. Of every 100 houses, the disease invaded 25.2 provided with river water, 3.4 provided with well water, and 2.7 provided with spring water. To present the same facts in another form, out of every 10,000 inhabitants, 21.5 were attacked in the districts supplied with Danube water, 3.8 in those districts not receiving it. In the garrison, 15 per cent were attacked in the barracks receiving spring water, 2.69 per cent in those using river water. These statistics should be committed to memory in every municipality, especially by the authorities of those that are being supplied with unfiltered, filthy river water which receives and dilutes the offal of communities and again distributes them whence they came to make the rounds through the digestive tract of the inhabitants.

During the past two years several localized epidemics in France have been carefully studied and reported by the *comité consultatif d'hygiène publique.* I select the two following as of considerable interest. Of 24 persons who had come from Paris and Versailles to spend the summer of 1886 at Pierrefonds, 20 were attacked with typhoid. One of the three houses occupied by them had been a focus of this disease in the past, for it had appeared five times, usually in August and September, between the years 1874 and 1883. The investigation brought out the fact that a leaky cesspool, which also receives rain water from the roofs, is directly in the path of the ground water as it flows from the hills on its way to feed the well which supplies the houses with water, and farther on to join a small stream. The great porosity of the superficial layers of the soil may have permitted the microbes of typhoid-fever to be carried from the cesspool to the well 20 metres away. At any rate the specific bacilli were found in the well in October, the disease having appeared at the end of August and continuing during September. Another very formidable epidemic appeared in Clermont-Ferrand, from September to December, 1886. Over 250 persons were attacked. During the investigation the important fact was revealed that several families in the infected district, whose members drank either boiled or mineral water, remained well. A careful examination of the water-supply showed that there was every opportunity afforded for the contamination of the source at another village, which was located some distance up the stream furnishing the water. The public lavoir, or place for washing clothes, was a grotto only ten feet from the mouth of the conduit. This, which was defective in several places, passed the lavoir at a distance of only five feet. A few cases of typhoid had appeared in this village several weeks before the outbreak of the epidemic at Clermont. The chemical analysis of the water indicated fecal contamination. The specific bacilli are reported to have been found in the reservoir of one of the houses at Clermont invaded by the disease.

Epidemics like the foregoing have been frequently observed, and cases could be cited *ad libitum.* No doubt one or more recur to the mind of every experienced physician. The severe epidemic at Plymouth, Pa., which occurred several years ago, needs only to be mentioned here. It is true that in all such investigations there is still much to be desired to make the demonstration absolute. When evidence, however, is cumulative and invariably points in one direction, its warning should be heeded. In our own country all localized epidemics should be studied with reference to the topography and geology of the water-supply and other possible factors. Bacteriological examinations should be made in all cases and with the utmost care, for there is no branch of hygiene in which hasty conclusions, based on insufficient evidence or faulty methods and want of skill, are more likely to go utterly wrong than in bacteriology.

If the water we drink may become a prominent factor in the dissemination of typhoid-fever when contaminated with the bacteria of that disease, we must not overlook our ice supply. Dr. Prudden has shown that typhoid bacilli may resist continuous freezing for several months, and that, in general, bad water yields bad ice. An Italian observer states that 90 per cent of all bacteria in water are destroyed by freezing, the remainder live in the ice till summer. We must not forget that the milk we drink needs attention. The water used in cleansing the receptacles may at any moment become contaminated from cases of typhoid. When we bear in mind that typhoid bacilli multiply very rapidly in milk at a summer temperature, we will realize the importance of knowing whether the milk supply of our large cities is subject to any careful sanitary inspection or not.

Every summer there is a vast emigration from the densely-populated centres to the open country. Here there is apt to be much carelessness and indifference in sanitary matters. A vague notion seems to take hold of the traveller and the summer boarder that the country is safe, and that pure air is an antidote for all illness. Yet this migration very frequently carries the same diseases that threaten us in the crowded cities into the country where the general unsanitary conditions are often more favorable to their dissemination than in the city. In all cases it is best not to drink any water the source of which we do not know or have not inspected, unless boiled. Nor should we rely upon so-called filtered water, as most of the filters in the market are not to be trusted. The same rule applies in travelling. A recent collection of medical "don'ts" suggests that we should not forget our drinking-cups. Why not include what we drink as of more importance?

At the last International Congress of Hygiene and Demography held at Vienna in September of the past year, the relation which drinking-water bears to cholera and typhoid was quite thoroughly discussed. There was a general agreement as to the propagation of typhoid-fever by drinking-water, although there were not wanting voices who objected to too dogmatic assertions, since the proof was not yet absolute. The following proposition was adopted, by a large majority, as representing the position of the Congress: "The possibility of the propagation of infectious disease by contaminated drinking-water being proved, one of the most important prescriptions of public hygiene should be to supply communities with water absolutely pure." After an eloquent address made by Dr. Brouardel of the French *comité consultif d'hygiène publique* on this subject, he concluded with the following words:

"Experience has taught us that it is the large cities which perpetuate the epidemics of typhoid-fever and from which the transmissions of this disease radiate. It may be burdensome to obtain pure water and distribute it to a community, but it is possible. Has it not been said repeatedly that nothing costs so dearly as an epidemic? Is it not true that a malady which kills one or two thousand persons every year strikes, from an economic point of view, a population more cruelly than the taxes, which might have spared the lives of several thousand from 15 to 25 years old, cut down at an age at which they have cost so much and returned so little to their state? If we share these views, we should make an energetic effort in every country, proclaim the good fight, the preservation of human life. Our proofs are sufficient. The authorities need only to be convinced. They hesitate because they find dissidents among physicians. Is there one among you who dares maintain an adverse view, or who has opposing beliefs vigorous enough to say, 'No, the water into which the stools of typhoid-fever are poured does not produce typhoid?' Let him arise and assume before our successors the responsibility of the deaths which his resistance will have entailed."—*Albany Medical Annals.*

THE MEDICINAL VALUE OF COLOR.—At a time when fog is prevalent, any mention of the remedial value of color and brightness appears extremely tantalizing, although from personal experiences of the depressing influences of darkness and gloom it is probable that every one will rate the contrasts more highly than at any other time in the whole year. Color treatment has been suggested for various forms of mental derangement—bright crimson surroundings for melancholia, soft blue for maniacal excitement, and so on. The report which has reached us leaves much to be desired from a scientific standpoint; meanwhile there is very little room for doubt that a prolonged period of darkness largely influences the mental attitude, and, by hope deferred, favors a general feeling of misanthropy. Pessimism flourishes in the autumnal and winter seasons, optimism in spring and summer, even though the statistics of deaths from suicide show an increase in bright weather. To restate a belief in the remedial value of color is merely to insist upon the therapeutic effects of change, since, in advising change of scene, brightness and interest are always the objects sought. No one would recommend a course of fogs as an alternative for sunshine. In other words, stimulants, as a rule, are more valuable than depressants.—*Lancet.*

MALARIA, AND THE CAUSATION OF FEVER IN THE STATE OF NEW YORK.*

By A. N. Bell, A.M., M.D.

It may be premised at the outset that, in this State, as throughout the United States, the most numerous of all diseases, after the communicable diseases common to childhood, are those attributable to malaria, but owing to the relatively low rate of mortality in this class of diseases, as a whole, in this latitude, and to the almost total neglect of morbility statistics, it is impracticable to give even an approximate estimate of the number of cases. Moreover, as *the* cause of fever, though secondary in its etiological relations but primary in its importance, no conditions which give rise to disease of any kind have been so long recognized and continuously urged by the physicians of the State as preventable, as those which give rise to malaria and, consecutively, to malarial fevers. Notwithstanding, the same relative prevalence, and well-nigh the same generally recognized conditions which give rise to malaria continue to obtain now as they did at the beginning of scientific inquiry into the causes of disease in this State fully three quarters of a century ago.

It would be a comparatively easy matter to make a volume of no mean dimensions out of the reports of committees and other contributions to the Transactions of the Medical Society of the State of New York from 1807 to the present time, containing material which would compare favorably with the best literature of the subject anywhere to be found. For example:

John R. B. Rodgers, M.D., President of Society in 1814 in his annual address of that year remarks that intermittent and remittent fevers "arise from a change made in the qualities of the air, or the production of new materials in the atmosphere, arising from the application of long-continued heat on animal and vegetable matter in a state of decomposition." † The

* Read in the Section on State Medicine at the Thirty-ninth Annual Meeting of the American Medical Association, Cincinnati, May, 1888.

† Transactions of the Medical Society of the State of New York, 1807–31, p. 61.

"new materials" of Dr. Rodgers are now called germs. And, as a description of the conditions which give rise to malaria, we know of nothing more perspicuous, more in accord with the present state of knowledge on the same subject, or more worthy of being proclaimed from the house-tops than the following extract from the annual address of Alexander Coventry, M.D., President of the Society in 1824. He remarks:

"On my arrival in New York, in 1785, I found the whole space between the east side of Broadway and the river was vacant; it was a sandy soil with a gradual descent to the west, at whose foot the tide washed a sand and gravel beach; this shore, when fanned with the exhilarating westerly breeze which had swept the surface of the noble Hudson, might have been selected by Hygiea as her chosen abode. The citizens of New York at that time bore in their faces the bloom of health, and no signs of endemic disease were discernible in their looks.

"Ten years afterward my business called me to the capital, but the change I found in the looks of the citizens astonished me. Those living near the docks and wharves, indeed along most of the streets along the East River, had the pale, sallow look, the yellow skin and muddy eyes with which I had become familiar in the lake country during the preceding four years. The inhabitants bore the marks of endemic disease, and on inquiry I found that the disorder that raged in the city had been accompanied with the same symptoms as that which prevailed in the country. A most intimate friend then resided in the lower part of Pearl Street; he had lost a son and daughter and barely survived himself, while his eldest daughter who had nursed her relations had escaped the fever.

"Although there was neither swamp nor marsh, yet sources of disease were not wanting where vessels formerly lay. I found spacious streets and elegant houses, slips and basins filled up, and many acres gained from the sea and converted, as I was informed, not into dry land, but a mass of putrefiable stuff with which the most noxious swamp in Genesee could not compare. The North River side, where encroachment had not commenced, still remained healthy, and proved a safe retreat for the afflicted citizens.

"In the spring of 1820 I was again in the city, and witnessed the improvements going on on the west side, the consequences of which became visible in 1822. Had the bank of the North River been left as it was originally the tide would have removed all the filth brought down the cross streets and all the sugar boxes ever brought from Havana would never have infected a spot large enough for a mosquito to alight on.

"In the country it often requires years, sometimes ages to conquer the source of disease, for vegetation annually supplies the pabulum. In cities, provided their location be favorable, it is man who works his own destruction, first by his improvidence, next by his negligence. . . .

"The records of medicine abound with the most indubitable facts of the dreadful effects arising from the decomposition of animal substance. The wise Romans preserved the ashes of their ancestors in beautiful urns, and perhaps this was a mode preferable to resigning their remains as a prey to the worm and a poison to the living. The delicate Hindoo ascends the funeral pyre of her husband. Custom is everything. The Chinese find the most valuable manure in what with us is a great nuisance. The formation of poudrette, as practised in France, would fertilize our fields and be a valuable relief to the inhabitants of cities. Pure and good water from a distance would be a grand desideratum. The filterings used in the city are extremely offensive, especially to the stomach of a stranger. One ounce of prevention is better than a pound of cure. Probably before the commencement of another century the island of Manhattan will be thickly covered with human inhabitants. He whose patriotic endeavors would insure health to such a number of fellow-creatures would be more worthy of a monument than the proudest hero of the age, ay, if we may believe the Roman orator, he would approach nearer the divine nature, *Homines enim ad Deos, nulla re, proprius accedunt, quam Salutem hominibus dando.*" *

Such observations have not been improved upon during the sixty-four years that have intervened, but all along during the period the medical topography of the State and the conditions of endemic fevers have been among the most constant subjects of investigation and report by the members of the State Medical Society, yet never more completely than twenty-eight years ago, by the late Joseph M. Smith, M.D., in his "Report

* Opus Cit., pp. 270, 271.

on the Medical Topography and Epidemics of the State of New York," to the American Medical Association. (Vol. XIII., pp. 83–269.)

On the organization of the State Board of Health, in 1880, "Malaria and Preventive Measures Against It," was one of the first subjects to engage the attention of the then Secretary, the late Elisha Harris, M.D., who remarks in his first report:

"The reports and various complaints concerning malaria and the local sources of miasmatic diseases outnumber all others received at the office of this Board. The local conditions which are accused as the immediate causes of the evils thus complained of may be summed up as consisting of undrained wet grounds, stagnant pools and partially dried swamps and ponds and unsewered or badly sewered premises. The most obvious fact is that drainage and sewerage for health do not yet appear to be the first object which local authorities have in view in this class of public works, and the rules and regulations they enforce concerning them. This is true alike in cities, villages, and the rural districts." (P. 20). In his third annual report (1883, p. 40), he remarks:

"The localities of paludal malaria, and the extent to which miasmatic diseases prevail cannot be ascertained from the records of death, but from reports of sickness; yet the total mortality from the miasmatic fevers and other kinds of disease from the same class of causes is considerable. The special sources of these diseases abound in the large cities as well as in the regions of drying swamps and stagnant ponds, or undrained basins and water-soaked grounds. The local suffering from malaria is often found to exceed even that which, from other causes, is attended by great mortality. In some instances the increase and persistence of malaria breaks down the health of many families, discourages enterprise, and drives the thrifty classes and their business to more healthful localities."

The foregoing quotations are made, not because they contain anything new, but because the truths which they express continue to be the most important subjects which sanitarians and health authorities can urge upon the civic authorities for the prevention of disease. During the last four or five years considerable headway has been made in the State, under the auspices of the State Board of Health, in arousing the attention of local authorities to the importance of sanitary economy, and there is reasonable ground for hope for continued and increasing progress in this direction.

"Just what groups of signs and symptoms are accepted as evidence of the influence of malaria," it is somewhat difficult to define, but, in general terms: *most* fevers caused by malaria are in their types intermitting, or paroxysmal, and remitting or exacerbating, and hence are properly designated *periodical*. But the exceptions to this definition are by no means rare.

From somewhat extensive observation in regions exceptionally prolific in periodical fevers, I have sufficiently often witnessed the prevalence of *endemic pneumonia* of a peculiarly acute and fatal type to satisfy me of its malarial dependence. Such cases are usually ushered in with a severe chill, intense headache, delirium, rapid pulse, high temperature, overwhelming pulmonary engorgement and fatal termination within four days—and sometimes within forty-eight hours—without any remission. Moreover, I have observed cases of approximately similar character in relation with domiciliary conditions and localities, especially foul cellars and cellars exposed to gaseous emanations from foul soil surroundings, in so much as to be fully satisfied in my own mind that a very large percentage of the numerous deaths from pneumonia in the winter time, among children and other persons mostly confined to indoors, in the colder regions of the United States—in the country as well as in cities—is due to malaria and preventable by sanitary measures.

Other exceptions are found in persistent chronic congestions of the liver and spleen, resulting in dropsies, and congestion of the spinal meninges, giving rise to the persistent pains, aches, and neuralgias common to the inhabitants of most malarial regions and domiciliary abodes, such as those indicated, and more or less proportional with the extent of the conditions.

Dengue, too, may be mentioned as a generally recognized distinct type of malarial fever, with exceptional symptoms, mostly limited to regions where the conditions which give rise to malaria exist in greatest intensity.

With regard to your final propositions—" What *is* malaria" and "what evidence is there for or against a malarial germ?"—the correct reply is yet to be discovered.

The practical conclusions deducible from the foregoing summary are:

1. Malaria is coincident with accumulations of organic matter in process of putrefaction in alluvial bottoms, on the margins of sluggish streams, low humid borders of stagnant ponds and lakes, the marshy borders of the sea-shore, and *circumscribed local conditions*, chiefly artificial, comprehending more or less the same relations to vegetable débris and other organic matter in process of decay as the outlying conditions mentioned in this connection.

2. While it is not possible in the present state of our knowledge to determine the special relations existing between malarial diseases and the geological, thermal, hygrometrical and barometrical conditions under which they occur, those thermal and hygrometrical conditions most promotive of putrefaction coincident with the absence of sunlight are in the highest degree promotive of malarial poison.—*Journal of the American Medical Association.*

NAPHTHA-POISONING IN RUBBER FACTORIES.

In several large factories in Germany, especially in india-rubber factories and establishments for cleaning india-rubber, peculiar morbid symptoms have lately been observed. The faces of many of the girls, who had not left the factory during the day, became flushed and swollen in the evening, and they could not walk steadily. An examination of their clothes and of the work-rooms for brandy, opium, etc., yielded no result, till an accident led to the solution of the mystery. In these factories naphtha is used in large quantities, and kept in special boilers closed against the air. The girls had succeeded in getting keys to the boiler valves, and, soon learning the intoxicating effect of naphtha, were in the habit of slinking unobserved to the reservoirs to inhale the poison, which threw them into a state of happy forgetfulness and conjured up a thousand sweet dreams of wealth, splendor, happiness, etc. The secret was revealed by a novice, who made too deep an inhalation and fell into hysterical convulsions.—*Lancet.*

MEDICAL EXPERT TESTIMONY.

ANNIVERSARY ADDRESS BEFORE THE MEDICAL SOCIETY OF THE STATE OF NEW YORK, FEBRUARY 6TH, 1889.

By SAMUEL B. WARD, M.D., of Albany, President.

THE laws of this country and the practice in our criminal courts differ in some fundamental respects and in many details from those existing under other civilized governments. With us the accused man is entitled to, and, in a vast majority of cases, secures every possible opportunity for defence. He cannot be compelled to give evidence which would tend in the remotest degree to criminate himself; his wife may not give evidence against him; his physician and his legal adviser are not permitted to divulge any information which they may have received in their respective professional capacities; he himself is always supposed to be innocent until he is proved guilty: and the jury are charged to give the prisoner the benefit of every reasonable doubt. If the accused has means, he can employ what legal counsel he may select; should he be penniless, the court assigns to some lawyer the duty of defending him.

Undoubtedly the practice of having counsel for the defence originated in the manly desire in our race that no injustice should be done to a man ignorant of the law. At the present day it is not considered at all dishonorable for most eminent counsel to espouse the cause of a prisoner whom they know to be guilty; and by carefully concealing evidence of the existence of which they are perfectly aware; by confusing and embarrassing witnesses; by taking advantage of every legal technicality; by the weight of their erudition and personal character; and by their persuasive eloquence with the jury they frequently succeed in making the worse the better cause appear. Their position is far different from the witness on the stand, who is supposed to tell the truth, the whole truth, and nothing but the truth. All this procedure may or may not be in strict accordance with the highest code of morals—may or may not, in the long run, be productive of the greatest good to the greatest number. It is certain that we as medical men have no more interest in it than any other body of reputable citizens.

But in a majority of criminal cases questions arise which no layman can answer—questions about which even members of our profession may differ in opinion ; the lawyers on both sides take counsel with the doctors, and the physician called to the stand to express a professional opinion becomes known as a medical expert.

There are other classes of cases, it is true, in which expert evidence becomes necessary, as in determining the strength of material used in constructing a bridge, a ship, or a piece of machinery. But every science is exact just in proportion as mathematics can be applied in working out or demonstrating its results ; and, unfortunately for us, with the single exception of errors of refraction, mathematics does not come to our assistance in any degree worth mentioning. The capacity of a piece of Bessemer steel to resist a strain, longitudinal, lateral, or by torsion, is known with perfect accuracy within certain pretty narrow limits ; it can be accurately expressed in figures ; and it is not possible for truthful experts to make statements concerning it greatly at variance with each other. But the phenomena with which we are called upon to deal are of an entirely different order ; can rarely become the subject of experiment ; are extremely complex in their nature—so complex that to isolate the component elements and prove how much influence is to be ascribed to each, is, up to the present time, simply impossible ; it remains a matter of judgment and opinion. Nor is this condition of things the result of any lack of diligence on our part, or want of native ability on the part of those who have in all the past ages applied their best energies to the study of medicine. It is simply inherent in the complex nature of the problems presented to us for solution. Hence it is that medical experts may honestly differ from each other more widely than those in most other professions.

If, however, questions of law or theology could be submitted to the expert on the stand, as those in medicine are, it would be easy for counsel to procure opinions more radically at variance than those expressed by members of our own profession. The opprobrium cast upon us is, to a certain extent, at least, undeserved and unjust. In support of this statement we have only to note how counsel wrangle with each other over many points of law arising in every case that is argued ; how the decision of the lower court is on appeal alternately reversed and affirmed in each succeeding higher one until the court of last resort is reached ; and how even the highest courts in the land have at different periods rendered decisions incompatible with each other. Or imagine for a moment the divergence of opinion which would become apparent if a Materialist, a Unitarian, a Methodist, and a Roman Catholic were called upon the stand to express their views concerning justification by faith, the divinity of our Saviour, the doctrine of eternal punishment, or even the existence of a future state at all. And yet it is a matter of history that these men have had such profound faith in the eternal righteousness of their convictions that they would rather burn at the stake than abate one iota thereof. We can safely promise entire unanimity of opinion on all points as soon as this blissful state is attained by either the lawyers or the theologians.

The lawyer engaged on one side or the other of a criminal suit finds that medical points are necessarily to be raised, or thinks that they may be raised with advantage to his cause. We all know that almost every important case occurring in our daily practice presents some one or more features that are unusual, are rare, are sometimes almost inexplicable, and criminal cases are no exception to the rule. Counsel therefore looks about for some one of our profession to assist him. He presents his statement to a medical man and finds that his opinion is not of a nature to serve the purpose he has in mind. He goes to another, and another, until finally he finds one who entertains opinions to suit him, or approximating thereto, and this one he engages to appear on the stand as an expert. One defect in the present law is that this man may be subpœnaed to appear in court at an inconvenient hour and distance, to the disappointment of his own patients, to the neglect of any or every other professional engagement, and kept waiting there an indefinite period of time for the paltry remuneration of fifty cents a day and eight cents a mile for travelling expenses.

Such instances are, of course, exceedingly rare, and, as a rule, the medical expert is fairly compensated. In some cases the fee is agreed upon beforehand; in a few an effort is made to have it dependent upon the issue of the case—a condition which cannot be too strongly reprehended.

I believe that medical men, almost without exception, when they go into a case, fully intend and mentally resolve not to take sides; that they will make every effort when on the stand to live up to their oath and to be as impartial as the judge upon the bench. But even the judge does not always succeed in not taking sides, and the doctor, like the judge, is but human. Moreover, he, unlike the judge, has, in private at least, expressed an opinion, and he certainly wants to see that opinion prevail, primarily because he believes it to be the correct one, secondarily because it is his. In all callings, from religion to politics, every man innately rejoices in convincing others of the correctness of his views. Moreover, the lawyer is, collaterally, at least, and in many cases primarily, working to win because his client is paying him. Had he been paid by the prosecution instead of the defence he would have taken an entirely different view of the case. He would not in either event tell an untruth; but he would under different circumstances attach very different values to the same item in evidence; would entertain very different opinions as to the credibility of witnesses; would cite another set of authorities and of precedents; would express to the jury an exactly opposite opinion, and call upon them as good men and true to render a diametrically opposite verdict. The unfortunate medical expert is also human, subject to like temptations and influences as other men. He knows the public puts him on a different plane from the counsel, and expects him to tell what he believes to be the exact truth, no matter whom it may help or hurt. But then, there are many points about which a man may be in doubt; about which he may entertain one belief at one time in his life and another at another—I had almost said that he may believe as he chooses to believe—points that are not matters of fact, capable of demonstration, but absolutely and wholly matters of opinion. And he knows that as the case now stands the side from which he accepts payment expects him to believe and express opinions tending in a certain direction.

Moreover, it is certainly true that there are a few men in our profession who entertain opinions differing widely from those of the large majority. These opinions, expressed in private conversation or in medical meetings, result in very little harm, because they are estimated at once at their true value. But the holders of such opinions are precisely the men whom the counsel in a desperate case is desirous of retaining. By them he can show to the jury how uncertain and divergent medical opinions are, and throw doubt upon the reliability of the evidence produced by the other side. For instance, in a rural community I have heard a physician, whose fine personal appearance, army experience, large and successful private practice, and gray hairs gave weight in the minds of the jury to every word he uttered—every man on the jury knew him by sight and reputation, and a majority of them personally—I have heard this physician say that, in his opinion, "any man who used any splint in the treatment of any form of fracture was guilty of malpractice." Such monumental nonsense as this, is, of course, very rare; but the incident serves well to illustrate the abuses to which the present system of obtaining and using expert evidence is liable.

The physician selected as an expert considers his case carefully; he reads up the various authorities, paying, of course, considerable attention to those whose views agree with his own, and mentally remarking what sensible men they were, while the impression formed of those who differ from him is not nearly so complimentary. He looks up the records of similar cases in medical journals, and finally goes on the stand well prepared to answer truthfully the questions previously arranged to be asked him on the direct examination. During this investigation of the case it is sometimes curious to observe how the expert's opinions will become strengthened in the direction of the side which he has espoused. Without any real additional arguments having been brought to light he will incline to give more and more weight to facts which seem to favor his view, and become more and more inclined to make light of, or even to ridicule, facts or opinions which militate against him. He often ends by being honestly persuaded that there ought to be no manner of doubt on points which are in reality very doubtful and which at the outset he willingly admitted so to be.

When the expert goes on the stand he is first questioned by the lawyer on whose behalf he appears. The questions are hypothetical ones, supposed to be based on the facts proven on the trial. As a rule this is fairly done, and the expert has no difficulty in giving honest, straightforward answers.

The direct examination completed, the counsel for the other side takes the expert in hand and his trials begin. In some cases, in the majority of cases perhaps, he receives perfectly fair treatment. The cross-examiner simply endeavors to bring out all the weak points in his view of the case. to show how very weak they may be ; that they are matters of opinion and not of fact ; that other honest men may take a different view of the case, and that an entirely different theory may not be wholly without foundation. Even though the treatment he receives be perfectly courteous the ordeal is a trying and disagreeable one. While he is honest and frank in his answers he must be very cautious in the wording employed, resting assured that every slip will be taken advantage of, and every response stretched to its utmost limit of construction, even if it be not entirely twisted out of its original meaning, when the case comes to be summed up before the jury.

At other times, and especially if the counsel is conscious of having a bad case, the expert may be treated very differently. Instead of its being assumed that he is a gentleman who has taken the stand for the sole purpose of giving information of a technical character and telling the exact truth, it is assumed that he is there for the purpose of aiding the side which called him, and sometimes it appears to be further assumed that he is scarcely hampered by the ownership of a conscience ; he is treated as though it was known that he was lying, and every effort must be made to catch him at it. Questions are asked which cannot be answered truthfully without conveying an entirely erroneous impression to the jury ; a categorical answer is insisted upon, when such an answer without an explanation is virtually a falsehood ; questions are asked which are capable of several different subsequent explanations ; others which have, in the form in which they are put, absolutely no meaning at all. On one occasion I recollect a lawyer's laboriously going over all the organs and tissues of the body from the scalp to the toe-nails, and being informed by the medical expert that, in his opinion, no one of the organs was the subject of pathological change. He then inquired if this man was sound from head to foot what ground he had to claim damages. The answer was that the functions of the nervous centres were so deranged as to prevent the claimant from pursuing his vocation and supporting his family. The expert was then requested to state to the intelligent jury precisely where these "functions" were located and what they looked like. By this time the expert was so thoroughly annoyed, angry, and disgusted that he declined, for the moment, to answer any more "stupid" questions—and woe betide the expert who for a single moment loses his temper.

Sometimes the "stupid" questions are put for the very purpose which was reached in the instance quoted, of confusing, annoying, and angering the expert, or of catching him in apparent contradictions, the explanation of which, to the average layman on the jury, is always tedious and often impossible. At other times the questions are not intentionally "stupid," but are so simply by reason of a lack of medical knowledge on the part of the counsel propounding them. Your president last year, in his inaugural address, speaking of medical experts, said: "Their testimony is often of little value, on both the direct and cross-examination, from the fact that the questions which they are called upon to answer are formulated by lawyers who have little medical knowledge; or if, as sometimes happens, a physician is employed to assist a lawyer, the lawyer not understanding the real import of the questions which his Mentor may suggest, perplexes the witness, and too often places his assistant in an undignified position, so that medical-expert testimony often disgraces our profession." When a lawyer is asking questions prepared for him by his medical expert for use in the examination, it is not uncommon to see a well-laid train of reasoning entirely destroyed by a single unexpected answer, when, in point of fact, the answer given is more favorable to his view than his medical friend had dared to expect or hope for, and the only trouble is that the counsel, not knowing enough of medicine to take advantage of it, abandons his argument just when success is within his grasp.

While medical experts are, as a rule, men of large experience in the practice of their profession, each of them must, on some occasion, have gone on the stand for the first time. The position is then to him novel and embarrassing. He is unfamiliar with the rules of the court, the audience is a strange one, and the counsel is not averse, if it suits his purpose, to take advantage of these circumstances. Sometimes the lawyer will undertake the process of brow-beating the witness, repeatedly reminding him that he is under oath ; cautioning him to be careful about his statements ; gesticulating violently ; and sometimes succeeds in getting the young man, if he is at all bashful, in such a condition of mind that it is impossible for him to recollect facts with which he is perfectly familiar, or to couch his answers in appropriate language. A favorite device with some is to ask the expert concerning all the possibilities of the case, not taking at all into account the probabilities. The timid expert is, perhaps, unwilling to admit a possibility, fearing that his admission will be afterward misrepresented to the jury as expressing his opinion of what was a probability. Under such circumstances I have repeatedly heard good, honest, careful men deny the possibility of an occurrence which, in their cooler moments, and when they did not fear that their meaning would be misinterpreted and misapplied, they would freely admit. Indeed, since it is a matter of record that an iron tamping-rod, five feet long and three-quarters of an inch in diameter, has passed vertically through a man's skull, scattering his brain more or less extensively over a forty-acre lot, the patient living more than twenty-five years afterward, and the accident resulting in no great permanent disability other than the loss of sight of one eye, it is difficult to swear that anything is impossible ; and yet an infinity of possibilities are not in the slightest degree probable.

One of the most unfortunate results of this condition of things is, that it is frequently impossible to get the most substantial and reliable men among us to go on the stand under any circumstances, or for any consideration, and their places are sometimes taken by ambitious men, with more assurance than mental balance or experience, who see an easy way of attaining a notoriety which they mistake for well-founded fame, and whose main object is to be on the winning side, if that end can be obtained without stretching their consciences beyond the breaking-point.

If the present system of obtaining medical expert evidence resulted simply in the annoyance occasioned to medical men, or the disgrace brought upon the profession by an apparent or real difference of opinion expressed on the stand, there would be great cause for complaint on our part, though we could not expect much sympathy from others. But it is respectfully submitted that, above and beyond this, the present system does not tend to bring out the truth in the shortest and clearest manner; in fact, in many instances is believed to have resulted in a miscarriage of justice. Almost any lawyer of large experience in the conduct of criminal cases will tell you that he has been sometimes ashamed of the use which he has made of expert testimony, or else will gleefully chuckle over it. This matter was brought to the attention of this Society as long ago as 1879, when, in his anniversary address, Dr. Roosa so eloquently spoke of the evils attendant upon the present system.

Many remedies have been proposed, but up to the present time no action has been taken toward applying them. Dr. Loomis last year proposed that the questions to the expert should be framed by a medical man employed or appointed for that purpose. This would undoubtedly help matters to a certain extent, but would, after all, fall far short of accomplishing all that might be wished for.

A well-known judge of the Supreme Court has suggested that in each judicial district, a physician of eminence should be appointed by the court, whose duty it would be to appear as expert in every case where his services were required. This man would, upon the stand, be free from all the bias which arises from the fact that he is paid by one side or the other, and a great advantage would, without doubt, be gained. But he would be subjected to all the annoyances and vexations of the examination, and the plan would be manifestly impracticable on account of the varied acquirements demanded of the expert in different classes of cases. The same man can scarcely be expected to be an expert in chemistry, surgery, medicine, and obstetrics, and, while the expert would be free from partiality toward either side, his evidence would probably be entirely satisfactory in only some one class of cases. Moreover, there are few medical men who would be willing to be placed in a position where the expression of their individual opinion virtually results in the imprisonment of a fellow-being for a term of years, or launches him into eternity. It is scarcely probable, again, that this plan would meet with the approbation of the legal profession, who would, naturally, desire that the views of each side should be presented in their best light.

In most cases where medical expert evidence is required, at least two physicians are called to the stand, and in many cases a half-dozen. The remedy which we would suggest would be that, under such circumstances, a board of three experts should be appointed by the court; one on the suggestion of the counsel for the defence, one nominated by the counsel for the prosecution, and a third by the court itself; that these experts should be paid by the court and the charge divided equally between the two sides; that to this board of experts should be submitted in writing the questions involving medical matter; that the answers should be submitted in writing and sworn to, and that medical witnesses should not be required to go upon the stand. In the event of the failure of the board to entirely agree, a minority report might be admitted, and if each side desired to be represented by two or three experts instead of a single one, there would be no objection to such a course.

The adoption of this method would certainly result in obtaining from medical experts opinions free from the bias which arises from the expectation of pecuniary reward from either side, the unseemly antagonisms between the expert on the stand and the cross-examining counsel would be avoided, and the ends of justice be more speedily and surely attained.

SOME POPULAR MEDICAL SUPERSTITIONS.—In a book entitled "A Bird's-eye View of France in the Middle Ages," M. Challemel refers to a number of superstitions which were current at that time, many of which have not yet died out. There were several means of warding off fevers. One was to eat neither meat nor eggs at Easter and on other solemn festivals; another to carry about on the person a piece of a human bone; and still another to pluck and eat the first daisy found in the field. In order to cure a fever the sufferer would rise early in the morning and go out into the field, walking backward all the time, pluck a handful of herbs, and without looking at it, throw it behind him, and then return quickly to the house. The fever then forsook him and fastened itself upon the devil. The Bretons preserved their children from all evils by putting on them a damp shirt. A knife with a white handle was a sure preservative against colic. The toothache was quickly relieved by touching the painful part with a dead man's tooth. Running here and there, without particular aim, through a church, was sufficient to ward off pleurisy. The formation of gall-stones was rendered impossible by rolling one's self naked in a field of oats. Spitting in the mouth of a live frog was a very efficacious remedy for a cough. Earache was cured by touching the ear with the hand of a skeleton, and headache was quickly relieved by binding the temples with a cord by which some one had been hung.—*Journal de Médecine et de Chirurgie Pratiques, October*, 1888.

INDIA-RUBBER PAVEMENT.—The latest innovation is paving streets with india-rubber, which material threatens to enter into competition with asphalte. The new pavement is an invention of Herr Busse, of Linden, who has introduced it in Hanover. He used it first in the summer of last year for paving the Goethe Bridge, which has a surface of about 1000 square metres, or 10,764 square feet. The new pavement, it is stated, proved so satisfactory that 1500 square metres (16,146 square feet) of ordinary carriage-way in the city were paved with it last summer. The Berlin corporation, being favorably impressed with the new pavement, has had a large area on the Lutzow-Ufer paved with india-rubber as an experiment, and the magistracy of Hamburg is likewise trying the pavement. It is asserted that the new pavement combines the elasticity of india-rubber with the resistance of granite. It is said to be perfectly noiseless, and unaffected either by heat or cold. It is not so slippery as asphalt, and is more durable than the latter. As a covering for bridges, it ought to prove excellent, as it reduces vibration ; but a question may be asked as to its cost. The expense must be heavier than that of any known pavement.—*Iron.*

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

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THE NEW YORK QUARANTINE ESTABLISHMENT, we are gratified to learn from the Annual Report for 1888 of Dr. William M. Smith, Health Officer, is sufficiently advanced in the process of repair to warrant the conclusion that it will be equal to the demands of the service during the coming season of special activity and public concern; although it is yet far from being complete, according to the original design and the suggested necessities of advancing practical knowledge of preventive measures against portable diseases, and for which additional appropriations are required. The magnitude of the work of the New York quarantine service is measurably indicated by the following extract from the Health Officer's report:

"The number of vessels inspected during the year 1888 was 6344. Of this number 5291 were from foreign ports, and 1053 were vessels from domestic ports subject to quarantine.

"The number of vessels from foreign ports in 1880, the first year of the present Health Officer's administration, was 7827. There were 2536 vessels less in 1888 from such ports than in 1880, and 637 less in 1888 than in the previous year. It will be seen that the number of arrivals is progressively less each year.

"The number of inspections of vessels from domestic ports during the past year was 1035. The number given *pratique* in 1888 was much less than the previous year.

"The decrease is in great degree owing to the effect of the law passed March 22d, 1888, 'To amend section fifty-three of chapter three hundred and fifty-eight of the Laws of 1863, entitled "An Act establishing a quarantine and defining the qualifications, duties, and powers of the Health Officer for the harbor and port of New York."'

"The inspection of domestic vessels from ports south of Cape Henry commenced June 1st, last.

"The bill which subsequently became a law, whose title is referred to above, when introduced, provided that all coastwise vessels south of Cape Henlopen should be inspected between May and November in each year. The bill was unwisely amended, so that the inspections were not allowed to commence until June 1st; a further amendment exempted from inspection all vessels from ports north of Cape Henry.

"Vessels from all Southern ports should be inspected after May 1st. Yellow-fever is liable to develop at any port in the South by the first of May, if the infection hibernates in the extreme South, as there is good reason to believe it did during the winter of 1887-88, or, if the infection is imported from the West Indies and secures, as it frequently does, an early lodgment in the South. . . .

"During the past year 383,595 steerage passengers were inspected by the medical officers of this department, making a total since January 1st, 1880, of 3,323,580."

It is remarkable that only last year—simultaneously with the threatening recurrence of yellow-fever northward—the Legislature of New York should have come to the conclusion that the time had been so long since the coasting vessels from ports north of Cape Henry have been required to keep clean, under the operation of the law of 1863, that they might now be permitted to return to their filthy habits of former times at the risk of former results. Fortunately, however, the law of 1863 has a saving clause which was not repealed, making it the duty of the Health Officer to take the responsibility of applying such additional measures to the letter of the law as may be deemed indispensable for the protection of the public health. While, therefore, he is justified by the Legislature in neglecting needful precautions, he is left to the exercise of his judgment independently of legislative shortsightedness.

The report before us shows a painstaking watchfulness of the Health Officer throughout in the exercise of his office.

Carefully drawn-up instructions and rules for the prevention of infectious diseases, and, in case of their recurrence notwithstanding, the proper care of them on board emigrant vessels, have been issued in several languages and distributed to the masters and medical officers. By such and other means the sanitary service on board emigrant vessels has been greatly improved. Small-pox, especially by the restrictions against the freedom of unvaccinated persons, has been almost wholly excluded—the rare cases which occasionally crop out, attributable to immigrants, being the result of undiscoverable infected baggage.

The cases of the United States naval ships *Boston* and *Yantic*, infected with yellow-fever, are reported in detail, essentially the same as before published in our January number from official sources.

In concluding his report, the Health Officer makes gratifying reference to the successful administration of his office in arresting cholera at the port in 1887, to its final disappearance from Europe, and to the non-fulfilment of the prophecies so generally entertained of its certain and speedy invasion of the United States.

The report is altogether alike creditable to the service and to its author, and should be largely circulated.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000: Reports 64 deaths during March, of which 14 were under five years of age. Annual death-rate, 19.2 per 1000. From zymotic diseases, 8, and from consumption, 5.

CALIFORNIA.—For the month of March, 1889, the Secretary's abstract of the reports received from 74 cities and towns, with an aggregate population of 741,500, the number of deaths was 907. Annual rate, 14.88. Deaths from consumption during the month, 157. From zymotic diseases: Diphtheria and croup, 30; typhoid-fever, 18; typho-malarial-fever, 2; cerebro-spinal-fever, 4; diarrhœal diseases, 7; whooping-cough, 4; scarlatina, 8.

San Francisco, 300,000: During the month of March the number of deaths was 479. From zymotic diseases, 37. From consumption, 78.

Los Angeles, 80,000: 54; from zymotic diseases, 5; consumption, 5.

Oakland, 55,000: 74; from zymotic diseases, 16; consumption, 10.

San Diego, 32,000: 19; from zymotic diseases, 1; consumption, 1.

Sacramento, 35,000: 26; from zymotic diseases, 1; consumption, 5.

CONNECTICUT.—The Secretary of the State Board of Health reports for March, 1889, 1049 deaths from 167 towns, comprising a population of 758;662, representing an annual death-rate of 16.5. Deaths under five years of age, 230. Deaths from zymotic diseases, 161. From consumption, 125.

New Haven, 85,000: total deaths, 127. From zymotic diseases, 15; consumption, 13.

Hartford, 52,000: total deaths, 88. From zymotic diseases, 17; consumption, 15.

Bridgeport, 46,000: total deaths, 65. From zymotic diseases, 16; consumption, 15.

Waterbury, 34,000: total deaths, (?). From zymotic diseases, 3; consumption, 9.

DISTRICT OF COLUMBIA.—Report of the Health Officer for the year 1888: Population—white, 150,000; colored, 75,000: 225,000. Deaths—whites, 2778; colored, 2262: 5040—exclusive of 458, or 12.4 per cent, still born. Death-rates per 1000, respectively, 18.52; 30.16: 22.40. Mean average death-rate of the total population for the thirteen years ending June 30th, 1888, 23.88. Of the white population for the same period, 18.77; colored, 34.00.

The ratios of deaths from zymotic diseases for 1888 are given as 4.26 per 1000 for whites; 6.45 for colored: 4.99. "About 57 per cent of the white population of this class, and 68 per cent of the colored were of children under five years of age. The causes of death in which the whites furnish a higher rate as compared to the colored, are scarlet-fever, diphtheria, croup, and alcoholism ; in which the colored are to be noticed for preponderance—typhoid-fever, malaria-fevers, diarrhœal diseases, congenital syphilis, and inanition ; 1935 of the deaths were of children under five years of age, and of these 70 per cent were under one year, 15.10 per cent of the mortality of the white, and 18.08 of the colored population—16.59 in the aggregate—were caused by consumption."

The report is, altogether, remarkable for its statistical completeness, even to the daily mortalities and meteorological observations, and taken in connection with the diagrams and charts with which it is abundantly illustrated affords an unusually valuable fund of practical knowledge on vital statistics.

FLORIDA.—*Pensacola*, 15,000 : Reports 19 deaths in four weeks ending March, 23d, 1889, of which 2 were under five years of age. Annual death-rate, 16.4 per 1000. From zymotic diseases there was 1 death, and from consumption, 3.

"Be it resolved by the Board of Health of the county of Escambia, State of Florida :

"First. That from and after the 1st day of May, A.D. 1889, and until the 30th day of November, A.D. 1889, no vessel arriving at the port of Pensacola between the 1st day of May and the 30th day of November, 1889, from any port or place where yellow-fever or other malignant disease prevails, shall be permitted to discharge ballast or cargo or load cargo in the bay of Pensacola ; and that all other vessels arriving in said bay, between said dates, shall immediately upon crossing the bar proceed to the Quarantine Station designated by a yellow flag, to be inspected, and, if deemed necessary by the quarantine physician, discharge ballast or cargo and be submitted to a cleansing and disinfecting process."

"*Sanford* (Press dispatch), April 24.—Mrs. C. Demont died at ten o'clock Monday night, and was buried yesterday. Dr. R. P. Daniel, President of the State Board of Health, was present and pronounced it a sporadic case of yellow-fever. Dr. Caldwell and President of the State Board of Health Daniel held a post-mortem examination over the body of Mrs. Demont who died yesterday, and they say it was unmistakably a case of yellow-fever. We do not apprehend any further trouble. Every step is taken to protect against an infection spreading." No additional case has been reported up to the time of this writing, May 5th.

IOWA.—The State Board Bulletin for March reports:

Keokuk.—February—No deaths from contagious diseases. Total deaths, 12. Death-rate, 18.0. March—Consumption, 3; diphtheria, 1; pneumonia, 3. Total deaths, 14. Death-rate, 10.56.

Davenport.—February—Diphtheria, 14; measles, 1; consumption, 3; pneumonia, 2. Total deaths, 33. Monthly death-rate, 12. March—Croup, 1; membranous croup, 1; diphtheria, 4; consumption, 6; pneumonia, 1. Total deaths, 31. Death-rate, 11.2.

Des Moines.—March—Consumption, 9; pneumonia, 7; diphtheria, 3; whooping-cough, 2. Total deaths, 44. Death-rate, 10.56.

ILLINOIS.—Ninth Annual Report of the State Board, for the year 1886, with appendix, pages 362. The quarterly summaries, and the special subjects of this report, State Sanitary Survey, Vital Statistics and Coroners' Inquests, and State Medicine, have already been commented upon, and in part republished in our pages.

Preliminary Report on the Water Supplies of Illinois and the Pollution of its Streams is a pamphlet of one hundred and fifteen pages, hastily prepared "to meet the inquiries of the General Assembly for information concerning certain subjects of pending legislation." The subject is well known to have engaged the attention of the Secretary of the Board for more than ten years; hence it is that this "hurried preparation," in excuse for its "incomplete appearance," is, notwithstanding, one of the most cogent of statements of the importance of prompt legislative measures for the protection of the water supplies of Illinois. The investigations embrace the data of more than one thousand chemical analyses of various water supplies, comprehending most of the important cities and towns of the State, and of all the State institutions, in conjunction with a very thorough presentation of the general physical characteristics of the Illinois and Lake Michigan basins and their tributaries. It is said to be a current opinion among those who have observed the results of surface drainage continually going on in the general tiling of the heavier soils, that the ditching out of the sloughs, bogs, and prairies, and the wholesale reclamation of the great marsh areas by drainage districts, destroy most of the natural reservoirs for the equalization of flow to the streams. Hence it seems impracticable to determine at present what will be the result to the water-courses and the supplies in the future if wholly left to the natural trend of the conditions involved.

The liability to sewage pollution of the water supplies, and the relations of such water to the propagation of disease, under the present conditions, is clearly and forcibly presented, and it is difficult to believe that the Legislature of Illinois, supplied with the knowledge which this report conveys, will fail to appreciate the importance of promptly making the needful appropriations to complete this most important work of the State Board of Health, to provide an abundant water-supply to all the people of the State under the best practical safeguards against every species of pollution.

Chicago, 830,000: Reports 1260 deaths during March, of which 585 were under five years of age. Annual death-rate, 18.22 per 1000. From zymotic diseases, 252, and from consumption, 134.

LOUISIANA.—In accordance with resolutions adopted by the State Board of Health, the Governor has issued his annual proclamation of quarantine at all the seaports of Louisiana, from and after May 1st, instant.

Special suggestions to owners, agents, masters of vessels, and passengers.

The Louisiana State Board of Health recommends the following suggestions to agents, owners, masters of vessels, and passengers, for the purpose of facilitating the work of quarantine officers and reducing the period of detention to a minimum:

1. That vessels should be stripped during the quarantine seasons of all woollen hangings, carpets, curtains, and such like materials, and upholstered furniture as far as practicable. Hair or moss mattresses to be replaced by wire or wicker beds.

2. That as far as possible vessels trading with tropical ports should be manned with acclimated crews.

3. Masters of vessels, ship and consular agents are earnestly requested to instruct passengers from quarantinable ports to dispense, as far as possible, with baggage which may be injured by wetting, in case of pestilential outbreak on board, while undergoing disinfection. Such passengers are especially warned against bringing silks, laces, velvets, and other fabrics of delicate texture, as they will be compelled to assume all risks of injury.

4. While in ports infected with yellow-fever, vessels should be anchored out in the harbor, when this is possible, and the crew prohibited from going ashore, especially at night.

5. When practicable, cargoes should be loaded in such a manner as to allow access to the pumps, and also to enable the quarantine officials to pump out and wash the bilge.

6. Special attention should be given to cleanliness of vessels and persons, and provision should be made for all possible ventilation of the entire vessel. The best disinfectants and instructions for using same can be obtained by application to the Board of Health or any of its officers.

7. Masters should, before arrival, see that the bilge is thoroughly pumped out and cleansed, and that the entire vessel be put in such good sanitary condition as to permit of the least possible detention. Fruit-vessels, particularly, should be kept thoroughly cleansed for the purpose of avoiding delay at the quarantine station.

8. Vessels observing the above recommendations will receive special consideration at the quarantine station, detention and cost of cleaning, disinfecting, etc., being materially lessened thereby.

"MAINE," observes the *Sanitary Inspector*, "still stands alone in the sisterhood of New England States with no provision whatever for the collection and recording of vital statistics. And yet public health officers, physicians, local historians, political economists, have hundreds of questions, not trivial or unimportant, which can be answered only by means of the data which a record of births, marriages, and deaths would furnish. This long-continued negligence by the State of Maine of a work now held to be of very great value by almost all modern State and National governments, has caused the finger of depreciation to be pointed at us. Not simply to remove the stigma from our State, but because there is a strong need of this work, three independent moves were made to get a vital statistics bill ready for the Legislature which has just gone home—by the State Board of Health, by the Maine Genealogical Society, and by F. W. Hovey, Esq., of Pittsfield, Member of the House. Curiously, each had made the New Hampshire law the basis of its proposed bill. The bill which was presented to the Legislature needed but very slight changes to meet the approval of all who were interested in the matter, and the result was—we are grateful to the committee which had it in charge for referring it to the next Legislature."

MARYLAND.—*Baltimore*—Annual Report of the Health Department for 1888: Population—white, 423,782; colored, 76,561—500,343. Marriages, 4390; rate per 1000, 8.78. Births—white, 7500; rate, 17.45; colored, 1225; rate, 15.91; combined birth rate, 17.45; still-births, 694. Deaths (exclusive of still-born)—whites, 6894; colored, 2042. Death-rate—white, 16.26; colored, 26.50 : 17.87.

"The reduction of the annual mortality from zymotic diseases since the enforcement of the 'Plumbing Ordinances,' January 1st, 1884, has been very remarkable. The percentage of deaths from zymotic diseases to the total mortality from all causes, during a period of forty-eight years, 1836-83, was 28.08; during the five years, 1884-88, 22.00."

Scarlet-fever, during the period of fifty-four years, 1830-83, caused an annual average mortality of 226; for the five years, 1884-88, 57. In 1830, with a population of 81,000, the number of deaths from this cause was 149; in 1888, with a population of 500,000, the number was 44.

Typhoid-fever, during the period of twenty-four years, 1860-83, caused an annual average mortality of 190; during the last five years, the average number has been 55.

Diphtheria, during the last seven years previous to the Plumbing Ordinance, 1877-83, caused an average of 469 deaths annually; during the five years since, 1884-88, the average number from this cause has been 143. In 1882 the number was 707. "This," these results in the aggregate, the Commissioner of Health justly remarks, "may well be claimed as a triumph in sanitation, demonstrating the value of good laws, diligently and strictly enforced." And to this added an important additional illustration, "there has not occurred more than five cases of small-pox in the city during the last five years (all imported), and not more than two deaths. This is due to vaccination carefully and persistently practised by the excellent corps of vaccine physicians, added to the watchfulness and diligence of our able quarantine physician."

The several subordinate reports of the detail of the health service are in keeping with the foregoing excellent results.

During the five weeks ending March 30th, there were 800 deaths, of which 244 were under five years of age. Annual rate, 16.63. From zymotic diseases there were 75 deaths, and from consumption, 125.

MASSACHUSETTS.—*Boston's* Annual Report of the Board of Health for the year 1888: Population, 415,000; deaths, 10,197; death-rate, 24.57. Deaths from zymotic diseases, 1841—18 per cent of the mortality from all causes; 3598, or 35.2 per cent of the deaths from all causes, were of children under five years of age—the lowest percentage since 1871.

The number of deaths from zymotic diseases were 2221, 21.7 of the total mortality; but the only one that assumed an uninterrupted prevalence throughout the year was diphtheria, from which (and croup) the number of deaths was 589—5.77 per cent of the deaths from all causes. From typhoid-fever, 170—1464, or 14.34 per cent of the total mortality, was caused by consumption.

The public school-houses were all inspected once during the year, and better ventilation is urged as the common necessity. The average proportion of carbonic acid gas of all the rooms in the best house examined was 8.3 volumes to 10,000 volumes of air; and the poorest one, the average amount of impurity was 18.1 to 10,000.

MICHIGAN.—The Secretary reports that for the month of March, 1889, compared with the preceding month, the reports indicate that influenza and pleuritis increased, and that scarlet-fever decreased in prevalence.

Compared with the average in the month of March, in the three years, 1886–88, measles, intermittent-fever, tonsilitis, inflammation of bowels, consumption of lungs, and rheumatism were less prevalent in March, 1889.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of March, 1889, at twenty-nine places, scarlet-fever at thirty-two places, typhoid-fever at eight places, measles at twelve places, and small-pox at five places.

Reports from all sources show diphtheria reported at two places less, scarlet-fever at twenty places less, typhoid-fever at three places less, measles at five places more, and small-pox at five places less in the month of March, 1889, than in the preceding month.

Detroit, 230,000: Reports 284 deaths for March, of which 61 were under five years of age. Annual death-rate, 14.53 per 1000. From zymotic causes, 37, and from consumption, 29.

MINNESOTA.—Official report of infectious diseases for the month of February, 1889: Diphtheria, 91 cases, 16 deaths; scarlatina, 69 cases, 3 deaths.

Diseases of animals: Cases of glanders remaining isolated or not accounted for, 11; reported during the month, 8; killed, 6; released, 3; isolated, 4; remaining March 1st, isolated or not accounted for, 10.

"*Meat and Meat Inspection.*—A very small proportion of the cattle killed for public consumption are sufferers from infectious or contagious disease. The most common and dangerous of these diseases, as respects the use of the meat for human food, is *tuberculosis.* It affects in far the largest proportion dairy stock—domestic cows. Professor James Law informs the writer: 'Cannot give accurate statistics. Have seen eight per cent in State (New York) steers, more on plains than Texas steers, and always much more in dairy stock than in steers. Have seen thirty, fifty, and even eighty per cent in some dairy herds.' And Dr. Salmon, Chief of the Bureau of Animal Industry, informs me that, 'There are no accurate date as to proportion of different kinds of cattle affected with tuberculosis in this county; it is generally admitted that milch cows are most affected; thoroughbred breeding stock, next; native steers, least.' They state the opinion of the most experienced observers.

"In order of danger from this source, dairy stock and all cows are by far the most to be feared, and should invariably be subjected to rigid inspection before and after slaughter. Next comes domestic steers; then western stock, and lastly Texas steers.

"The liability to the disease increases as the stock are removed from natural conditions of living and food, and, in cows, their exclusive use for milk supply is a strong provocation, if conjoined to artificial feed, close quarters, and general unsanitary condition.

"There are other infectious (and some parasitic) diseases of cattle, but none which affect this question at present.

"*But there are other conditions of health which affect the value of beef as food than infectious disease.* Those of most common occurrence are *bad conditions, ill-defined sickness, fatigue, overheat.* It is for these that inspection of domestic stock is very important. Any of them may cover tuberculosis, and fatigue, excitement, over-heating, and injuries, particularly in the warmer months, do seriously affect the healthfulness of their meat as food. This is the testimony of butchers, who often complain that they are compelled to buy such meat, and after what seemed reasonable care, find the meat lacking in brightness, sweetness, dryness, and keeping qualities. I believe it not unlikely that such meat is the occasion of many bowel troubles and obscure fevers commonly attributed to more apparent causes."

Minneapolis.—Annual Report of the Board of Health for the year ending March 31st, 1889, opens with a vigorous sketch on the tardiness of civic authorities in the application of measures for the prevention of disease, and the inexactness of physicians in reporting it, no less applicable to other communities than to that of Minneapolis. The reckless reliance upon the natural advantage of situation and sunshine to counteract the equally natural results of filth storage, foul water, and bad plumbing; and certificates of death from "lack of vitality," "weakness," "stomach trouble," "heart failure," "premature birth," "still-born," "peritonitis," "septicæmia," etc., to shield criminal mortality, are unfortunately common conditions throughout the country, to which health authorities generally would do well to give more earnest heed.

The tables of the report are based upon an estimated population of 200,000. Deaths, 2689; death-rate, 13.4. Deaths under five years of age, 1488—55.33 per cent; from zymotic diseases, 979—36.4 per cent. These ratios are so unusually large in conjunction with so low a death-rate as to lead to the inference of some defect; probably, in an overestimate of population, for under such excellent executive management as appears to obtain, the registration is supposably complete. The especially prevalent zymotic diseases were, as indicated by the number of deaths therefrom, as follows: Diphtheria, 159; typhoid-fever, 134; measles, 36; scarlet-fever, 24. Deaths from pulmonary consumption, 218—12.2 per cent of the deaths from all causes.

St. Paul, 180,000: Reports for March 160 deaths, of which 82 were under five years of age. Death-rate, 10.66 per 1000. From zymotic diseases there were 24 deaths, and from consumption, 11.

MISSOURI.—*St. Louis,* 440,000: Reports for March 722 deaths, of which 274 were under five years of age. Annual death-rate, 19.69 per 1000. From zymotic diseases there were 136 deaths, and from consumption, 67.

NEW HAMPSHIRE.—Official organ of the State Board reports for the month of March: Diphtheria in Manchester, Bridgewater, Nashua, Concord, Newport, Dover, Hooksett, East Kingston, New London, and Jaffrey. The largest number of cases for the month reported from any town or city was five in Nashua. No epidemic of the disease exists in the State.

Scarlet-fever was reported for the same period from Manchester, Nashua, Chichester, Pittsfield, Concord, Dover, New London, and Jaffrey. The largest number of cases was four in Pittsfield. No epidemic of the disease prevails.

Typhoid-fever was reported from Manchester and Nashua.

NEW JERSEY.—*Hudson County,* 282,254: Reports 634 deaths for March, of which 259 were under five years of age. Annual death-rate, 26.9 per 1000. From zymotic diseases there were 135 deaths, and from consumption, 60.

Paterson, 80,000: Reports 145 deaths during March, of which 38 were under five years of age. Annual death-rate, 21.75 per 1000. There were 12 deaths from zymotic diseases, and 25 from consumption.

Newark, 181,351: Reports 364 deaths during March, of which 140 were under five years of age. Annual death-rate, 25.45 per 1000. From zymotic diseases there were 59 deaths, and from consumption, 52.

NEW YORK.—The number of deaths reported during March is almost identical with that of March, 1888. Of zymotic diseases, a considerably larger number of deaths occurred from scarlet-fever, measles, and whooping-cough than a year ago; from diphtheria and all other zymotic diseases, a smaller number. Other diseases do not show a material variation. The chief increase in scarlet-fever is in New York City, Troy, Albany, Middletown, and Goshen. Whooping-cough and measles are chiefly reported from New York and Brooklyn. Diphtheria is not specially prevalent in any locality. But one death from small-pox occurred during the month; Geneva is the only new locality, it having been carried thence from Lyons. In each 1000 deaths, 167.50 were from zymotic diseases (147.37 in March, 1888); and the percentage of infant mortality is higher than a year ago. From consumption, 129.60 per 1000 deaths occurred, and nearly 200 per 1000 deaths above five years. The proportion of deaths from zymotic diseases as a class and separately is a little less than it was in February.

New York, 1,571,558: Total deaths, 3778; under five years of age, 1634; annual rate, 28.30. Zymotic, 803; consumption, 485.

Brooklyn, 821,525: Total deaths, 1686; under five years of age, 725; annual rate, 24.17. Zymotic, 315; consumption, 181.

Buffalo, 230,000: Total deaths for five weeks ending March 30th, 373; under five years of age, 158; annual rate, 17.30. Zymotic, 50; consumption, 47.

Rochester, 110,000: Total deaths, 177; under five years of age, 52; annual rate, 19.31. Zymotic, 26; consumption, 22.

Albany, 103,000: Total deaths, 211; under five years of age, 73; annual rate, 24.58. Zymotic, 35; consumption, 29.

Syracuse, 80,000 : Total deaths, 127 ; under five years of age, 31 ; annual rate, 19.50. Zymotic, 14 ; consumption, 25.

The five cities or towns reporting the highest rates of mortality are : Saugerties, 39.00 ; Newburgh, 36.60 ; Waterford, 35.55 ; Goshen, 32.75 ; Greenwich, 30.75.

The five lowest mortalities are : Brockport, 2.4 ; Cooperstown, 4.00 ; Herkimer, 4.00 ; Ellenville, 4.00 ; Salamanca, 6.00.

NORTH CAROLINA.—In sixteen towns in the State, representing a population of 101,144, there were in the month of March 6 deaths from zymotic diseases and 3 from consumption. Total deaths, 125, of which 36 were under five years of age. Annual rate of mortality, 14.8 per 1000 of population.

OHIO.—*Cincinnati*, 325,000 : Total deaths, 533 ; under five years of age, 185 ; annual rate, 19.68. Zymotic, 82 ; consumption, 66.

Columbus, 101,000 : Total deaths, 102 ; under five years of age, 28 ; annual rate, 12.00. Zymotic, 19 ; consumption, 16.

Toledo, 80,000 : Total deaths, 100 ; under five years of age, 29 ; annual rate, 15.00. Zymotic, 15 ; consumption, 12.

PENNSYLVANIA.—*Philadelphia*, 1,040,245 : Reports for five weeks ending March 30th, 2066 deaths, of which 628 were under five years of age. Annual death-rate, 19.84 per 1000. From zymotic diseases there were 211 deaths, and from consumption, 280.

Pittsburgh, 224,660 : Reports for March 394 deaths, of which 163 were under five years of age. From zymotic diseases there were 63 deaths out of 209 cases reported, and 11 deaths from whooping-cough and 18 from measles, which are not by law required to be reported. From diseases of the respiratory system there were 100 deaths. Annual death-rate, 20.6.

Reading.—Report of the Board of Health for the year 1888 : Population, 57,750 ; marriages, 622 ; births, 1628 ; deaths (exclusive of 128 premature and still-born), 823. Death-rate, 14.2 —4.13 less than the average of the four years preceding. Deaths from zymotic diseases, 200—32.1 per cent ; an unusually large percentage, considering the low death-rate. Moreover, 288

—59.3 per cent of the deaths were of children under five years of age; also an unusually large proportion, indicative of unhealthful conditions generally. And so, indeed, they are made to appear. C. P. Bassett, C.E., E.M., having been employed to prepare plans for the disposal of sewage, reports "the method now in vogue within the city for the disposing of household filth, especially human excrement, consists in pouring it into excavations in the ground preferably deep enough to reach to open crevices in the limestone, and walled up with loose stone work, open jointed. Twenty feet is the depth usually attempted for these vaults. Where the ground water stands nearer the surface, or difficulty is encountered in removing rock a less depth, greater than six feet is considered satisfactory."

Taken all together, the report is suggestive of possible omissions in the registration or an overestimated population.

RHODE ISLAND.—The number of deaths recorded in the different towns and cities, from which returns have been received, was 533, in an estimated population of 315,800.

The *annual* death-rate upon the estimate given is 19.3 in every thousand of the population. The death-rate is somewhat larger than for the previous month. The general sickness throughout the State was reported greater during March than in February.

Newport's Board of Health Annual Report for the year 1888: Permanent population, 22,000; deaths, 315; death-rate, 14.31. Deaths of children under five years of age, 99—31.4 per cent of total number of deaths. Deaths from zymotic diseases, 68—21.6 per cent of total; the chief and the number of deaths from which were: Cholera infantum, 19; diphtheria (and croup), 17; typhoid-fever, 7; scarlet-fever, 4. Deaths from consumption, 25—8 per cent, probably the lowest rate of any equal city population in New England.

TENNESSEE.—The State Board Bulletin for March reports the principal diseases, named in the order of their greater prevalence, in the State for March, were pneumonia, malarial-fever, consumption, bronchitis, catarrhs, rheumatism, and tonsilitis.

Typhoid-fever is reported in the counties of Davidson, Decatur, Fayette, Franklin, Grundy, Hamilton, Hardin, Hawkins, Humphreys, Knox, Lincoln, Maury, and Shelby. Mumps in Chester, Decatur, Dyer, Fayette, Gibson, Grundy, Hardin, Henry, Lake, Lawrence, Madison, Shelby, and Williamson. Whooping-cough in Davidson, Decatur, Dyer, Franklin, Gibson, Grundy, Hamilton, Henry, Lincoln, Maury, and Shelby. Measles in Chester, Fayette, Franklin, Gibson, Henry, Humphreys, Lawrence, Lincoln, and Madison. Scarlet-fever in Davidson, Dyer, Lake, Montgomery, and Shelby. Diphtheria in Davidson, Decatur, Hamilton, Montgomery, and Shelby. Cerebro-spinal meningitis in Franklin, Maury, and Shelby. Erysipelas in Bledsoe, Decatur, and Maury. Crop in Knox, Robertson, and Shelby. Meningitis in Shelby. Ratheln in Gibson. Varicella in Robertson. Roseola in Stewart.

In the chief cities the respective annual death-rates for the month per 1000 of population are reported as follows :

Chattanooga,	white,	11.55 ;	colored,	30.46 :	17.70
Clarksville,	"	21.60 ;	"	28.00 :	24.80
Columbia,	"	16.00 ;	"	24.00 :	19.20
Knoxville,	"	15.10 ;	"	18.61 :	15.81
Memphis,	"	18.26 ;	"	33.24 :	25.08
Nashville,	"	12.03 ;	"	22.64 :	15.82

WISCONSIN.—*Milwaukee*, 210,000 : Reports for the month of March 273 deaths, of which 57 were under five years of age. Annual death-rate per 1000, 15.6. From zymotic diseases there were 39 deaths, and from consumption, 31.

ENGLAND.—The 28 large towns dealt with by the Registrar-General, which have an estimated population of upward of 28,500,000, during the four weeks ending March 30th, returned 24,157 births and 15,198 deaths. Birth-rate in London, 32.6 per 1000 ; average in the other 27 towns, 33.3. Death-rate in London, 18.9 ; average in the whole 28 towns, 20.8. The lowest death-rate was in Derby, 15.5 ; the highest in Blackburn, 30.9. Of the 15,198 deaths from all causes in the 28 towns, 709 resulted from measles, 436 from whooping-cough, 189 from scarlet-fever, 171 from diphtheria, 133 from diarrhœa, 115 from "fever" (principally enteric), and 2 from small-pox.

CUBA.—*Havana*, 200,000: Deaths reported for the month of March, 514; under five years of age, 149. From consumption, 116--22.58 per cent of total mortality. From *yellow-fever*, 7; small-pox, 1; diphtheria, 10. Death-rate, 30.26.

SMALL-POX.—The number of deaths from this disease in foreign cities, according to the most recent reports received, has been as follows: During the four weeks ending April 4th, 1889, in Bruges, 4; Ostend, 125; Roulers, 2; Wasmes, 2; Dour, 5; Boussu, 1; Arlon, 10; Furnes, 1; Paris, 18; Nancy, 6; Havre, 9. During the four weeks ending March 30th: Lyons, 19; Amiens, 19; Marseilles, 16; Vienna, 1; Prague, 84; Lemberg, 8; Trieste, 6; Brunn, 2; Warsaw, 22; Odessa, 6; Venice, 14; Bucharest, 3; Cairo, 16. During the month of February: Moscow, 4; Genoa, 7; Bologne, 8; Madrid, 10; Algiers, 23; Bombay, 43.

YELLOW-FEVER in Rio de Janeiro, according to the most recent consular reports, as summarized in the Weekly Abstract by Surgeon General Hamilton, shows some abatement. The number of deaths reported for the six weeks ending consecutively: February 17th, 136; 24th, 101; March 3d, 107; 10th, 126; 17th, 81; 24th, 68.

THE MORTALITY AMONG SEAMEN AND SOLDIERS IN THE FRENCH COLONIES is the subject of an interesting report recently made to the *Académie de Médecine* by Dr. Lagneau, as follows:

"In France the yearly mortality varies between 9 and 11 per 1000 of the effective force, while the proportion in young men in civil life, between 20 and 30 years of age, is from 8 to 10 per 1000.

"In Algiers, in 1848, the mortality in the army was 77 per 1000 men in service, now it averages 11 to 12.

"In Tunis, in like manner, the death-rate has fallen from 61 in 1881, to 12 in 1887.

"In the French possessions in Oceania, the death-rate is remarkably low. It is only 8 to 9 in Tahite.

"In the French possessions in the West Indies, except during the prevalence of epidemics of yellow-fever, the mortality has greatly diminished, and is now only about twice as great as in France.

"In French Guiana the mortality is enormous during the prevalence of epidemics of yellow-fever. That of 1885 carried off nearly one fourth of the effective force.

"In the East Indies the mortality is great; at Pondichery the average is 37 per 1000.

"In Cochin China the mortality during the first years of French occupation was very great. In 1861 it was 115 per 1000, but it has progressively fallen, so that now it is about double that of France.

"It is difficult to fix the death-rate in Tonquin, even approximately. The excessive fatigue imposed on the soldiers, in consequence of the great diminution of the army of occupation and the frequent epidemics of cholera morbus, have raised the mortality to more than 40 per 1000.

"In the island of Réunion the mortality among the seamen and soldiers would not be excessive if the hospitals did not receive the sick from Madagascar and the adjacent islands.

"Senegal has the reputation of being the most unhealthful of the French colonies. The average mortality, from 1832 to 1837, was 148 per 1000; but now, in consequence of the frequent changes among the men and the order to send each year 150 of the sick to France, for every 1000 men in the service, the mortality has been reduced to 73 per 1000 of those who remain. Unfortunately, the epidemics of yellow-fever frequently carry off more than half the Europeans."

From the facts in his report, Dr. Lagneau draws the following conclusions:

"To lessen the sickness and lower the death-rate among our native troops in the colonies, it is necessary not only to shorten the term of service abroad, to send the sick to suitable health resorts at altitudes more or less elevated above the sea level, and to islands where they may be refreshed with healthful air, but to send the convalescents and the sick who are able to undertake the journey to their native country, and, above all, it will be necessary to supply with native troops the place of Europeans, who are acclimated with such difficulty. The army in the colonies should be recruited only from among those who volunteer for such service.

"In establishing colonies abroad, France not only increases her political importance and extends her commercial relations, but she favors emigration, which, by draining the population, tends to increase the birth-rate, which is now so low. Let her cast aside that dangerous optimism which has too long prevailed in official circles, and, following the example of other nations, as England, publish official reports showing the amount of sickness and the death-rate among her soldiers and sailors in the colonies, especially the ratio of the deaths to the number of men in the service.

"The nation which supplies the men ; the Parliament which decides the question of peace or war ; the Government which determines to take possession of territories in certain localities ; the generals and the admirals who direct the expeditions into distant parts, or who govern established colonies are interested to know the death-rate in each war, in each campaign, or in each of the territories occupied.

"In our country, far more rich than populous, it is necessary to be economical of human life ; it is necessary that a precise estimate of the amount of sickness and the deaths enable us constantly and fully to apply the hygienic measures necessary to limit their proportions ; it is necessary that, for colonial troops, the volunteer system take the place of conscription, that the natives and the *metis*, better able to resist epidemics and endemic diseases in the tropics, should gradually but steadily take the place of Europeans, who are so severely tried in tropical countries ; it is also necessary that the dangerous service rendered by our soldiers in the colonies should be better appreciated, and both soldiers and sailors should be compensated in proportion to the dangers they encountered in maintaining the authority of France in distant countries.'

That is certainly a very reasonable programme for the guardians of the health of our soldiers. It remains to be seen if it will be put in force with greater care when formulated by a member of the Académie de Médecine than it has been hitherto when formulated by experienced hygienists, of whom, speaking *de visu et de experientia*, the medical corps of the navy has reason to be proud.—*Dr. de Fournès, in Journal d'Hygiene.*
—T. P. C.

THE HUNGARIAN PUBLIC HEALTH ASSOCIATION, which meets at Buda-Pesth, held during the year 1888 twenty general sessions and eighteen meetings of special commissions, at which one hundred and eighty-five questions relating to scientific and administrative business were considered. Among the questions considered and adopted were the following:

Revision of the second edition of the Hungarian Pharmacopœia, which is published in both Hungarian and Latin, in one volume.

Removal of the tax on medicines, ordered by the council.

Instructions for supervising and regulating the sale of meats, and such modifications as experience has suggested have been introduced.

The manufacturers of siphons for seltzer having presented objections to the law proscribing the use of more than one per cent of lead in their manufacture, the council instituted a new series of investigations, and concluded to continue the existing restrictions in full force.

Being asked to decide whether the sale of artificial (margarine) butter, and saccharine, a common addition to other adulterants of sugar, should be permitted, the "Conseil General" decided that these substances should be prohibited in Hungary for the following reasons:

Margarine is digested with great difficulty, and causes disease of the stomach. Besides, it is difficult to insure its purity, and therefore permission to make and sell it would only encourage the fraud.

Saccharine has no nutritive value whatever, and is not always well tolerated by the human system; therefore it should not be used as a substitute for sugar. Moreover, innumerable other frauds would result from its use, and their detection would be rendered more difficult.

At the request of the Secretary of the Interior, the "Conseil General," after a careful study of the fever prevailing at Cairo, reported that the disease is not contagious, and that it does not for that reason need to be quarantined.—*Journal d'Hygiene.*—T. P. C.

MEDICAL EXCERPT.

CEREBRAL LOCALIZATION.—Péan, Gibbert Ballet, and Gélineau have sent a communication to the Academy of Medicine announcing the success of their experiments in the localization of the cerebral regions and its application to the successful treatment of epilepsy. The diagnosis was made of a tumor in the motar tract in a patient who suffered from frequent attacks of epilepsy, and, by means of the topographical description of the brain, the skull was opened exactly over the point occupied by the tumor, which was successfully removed. The epileptic attacks had the following characteristic features: First, they began with painful spasm of the great toe of the right foot, followed by stiffness of the lower limb of the same side; tonic, followed by clonic spasms, which extended to the arm and the face also on the same side. Loss of consciousness did not follow every attack; when it occurred it was only at an advanced stage of the seizure. It never occurred at the beginning. In the interval between the attacks, which followed one another quite rapidly, a partial paralysis of the lower limb was very marked on the right side.

The operation was performed by Dr. Péan, after the method described by Dr. Lucas Championière, over the motar tract of the lower limb, near the upper extremity of the fissure of Rolando. Crucial incisions were made in the integuments, which were then dissected back together with the periosteum, and a piece of bone about the size of a twenty-five cent piece was removed; the dura mater and the pia mater were then divided.

Beneath the pia mater was found embedded in the substance of the brain, a small tumor, which was removed in pieces, proceeding from the centre to the periphery; it was a fibro-lipoma.

A drainage tube was placed in the cavity left by the tumor; the divided portions of the dura mater were united with catgut and the scalp with hair sutures, and the whole covered with an antiseptic dressing.

Eight days after the operation the sutures and the drainage tube were removed; the tenth day the cicatrization was complete.

Some slight convulsions occurred a few days after the operation, but the attacks soon disappeared entirely, and the cure remains complete at the end of two months. According to the authors of this communication, the operation and its immediate results show :

First. The absence of danger in opening the skull when care is taken to use efficient antiseptic applications.

Second. The value of the recent discoveries in cerebro-motor localizations and in cerebro-cranial topography. With these facts in view it is possible to locate with surprising accuracy, as in the case described, the seat of certain tumors, and we are enabled to go directly to these abnormal growths.

Third. The importance of the results obtained in the case described, which seems to prove that surgical interference is destined to render valuable service in some cases of tumors in the brain.—*Gazette Heb. des Sciences Méd.*—T. P. C.

FACIAL PARALYSIS IN INFANTS is found in at least three forms :

First. Paralysis caused by the application of the forceps.

Second. Paralysis caused by slow labor resulting from malformation of the pelvis, or from internal pelvic tumor.

Third. General paralysis accompanied with defect of hearing, which are really congenital.

The first and second admit of a favorable prognosis regarding the final result, while the last is incurable. The functional troubles which follow are not great, because the individual soon learns to adapt himself to the conditions, as he never knew the normal action of the paralyzed side. If at birth the paralysis result from the use of the forceps, it will recover ; if from pressure, probably, if it be congenital, it will remain during life.—*Ibid.*—T. P. C.

INTESTINAL OCCLUSIONS.—Goltdammer, who has studied the treatment of intestinal occlusions at great length, rejects the use of purgatives, and puts his patients on strict diet and opium in large doses—*seven* grains a day.

Simultaneously with this treatment the stomach may be washed ; and injections, or the insufflation of air into the intestines may be employed. Laparotomy is always dangerous in these diseases, because the peritoneum is generally in a state of hyperæmia.

Laparotomy may be performed when the diagnosis of invagination can be arrived at with more or less certainty and when the following conditions exist: youth in the patient; rapid invasion of the disease; absence of meteorism; bloody stools, tenesmus, and especially if on palpation a tumor is found.

It should be performed when, notwithstanding the free administration of opium, there is fear of compression of the intestine.

It ought to be performed when, after temporary relief, a relapse occurs accompanied with rapid loss of strength on the part of the patient. If a hernia is supposed to exist, the same means should be resorted to promptly.—*Gazette Hebdomadaire de Bordeaux.*—T. P. C.

COCAINE INJECTIONS have recently been introduced as a new treatment in inflammatory and spasmodic contraction of the joints. The operator uses a long needle, and with the usual antiseptic precautions, injects .05 to .10 of a gramme of a ten per cent solution of cocaine. In coxitis the needle is introduced at the posterior surface of the joint, just above the extremity of the trochanter, in the direction of the neck of the femur into the articulation. The pain ceases instantly, and the contracted limb is easily straightened; but extension should be made with care.

This treatment has been employed a score of times in cases of coxalgia in the service of Professor Albert.—*Ibid.*—T. P. C.

FLUORIC ACID IN PHTHISIS.—At a meeting of the "Société de Médecine Pratique," M. Léon-Petit, speaking of hydrofluoric acid in phthisis, said: "The question of phthisis is infinitely more complex than the chemists and micrographists seem to believe. It must not be forgotten that tuberculosts, although having a single origin, is extremely variable in its manifestations. For my part I have for a long time used hydro-fluoric acid in the treatment of phthisis, and I am forced to admit the fact that with some temporary improvements I have had very many complete failures. Moreover, I do not think it possible that a single article will ever be found to cure phthisis. It must not be forgotten that along with the bacillus we have the patient, besides the researches in the laboratory we have the clinical study, and the facts obtained by the practitioner who is in immediate contact with the disease very often disprove what seem to be the best theories."—*Journal de Médecine de Paris.*—T. P. C.

BROMIDIA AS A HYPNOTIC.—Edward Warren-Bey, M.D., C.M., LL.D., Chevallier of the Legion of Honor, thus refers to the remarkable success which bromidia has achieved in France. "The French, as a nation, are remarkably conservative in everything, save their politics, adhering tenaciously to the ideas and objects with which they are familiar, and regarding with corresponding suspicion all novelties and innovations, especially those coming from abroad. Hence it is that the materia medica of France has not marched *pari passu* with that of its neighbors. The bromidia (Battle) at once attracted the attention of the French physicians, and their experience with it so developed their confidence in it as a prompt, reliable, and harmless hypnotic that, in utter disregard of all that they had been taught and believed respecting the danger and unreliability of alien products, they promptly accorded it a place in their repertoire of remedial agents, and are now using it as freely as any medicinal preparation included in the codex. In no other country, in fact, does it enjoy a larger measure of popularity than in France, and so great is the demand for it that it has been found necessary to manufacture it here in large quantities in an establishment especially arranged and organized for that purpose.

"As no extraneous influences have been brought to bear in its favor, it has had to make its own way in the face of opposition and prejudice of the most formidable character, upon the strength alone of its virtues as a remedy for insomnia and other corresponding disturbances of the nervous system, the conclusion is legitimate that it really possesses the therapeutical properties claimed for it, that it is a hypnotic *par excellence*, and without a rival.

"To those familiar with the use of bromidia (Battle) no argument like this is necessary, for it speaks for itself by fulfilling the indications for which it is administered with a certainty, efficiency, and harmlessness which elicit at once the delight of the prescriber, and give to the profession the assurance of possessing one remedy at least which approximates so near to infallibility of action as to justify the title of *specific.*"
—*Medical Press and Circular, March 27th,* 1889.

LITERARY NOTICES.

AMERICAN RESORTS; WITH NOTES UPON THEIR CLIMATE. By BUSHROD W. JAMES, A.M., M.D., Member of the American Association for the Advancement of Science; the American Public Health Association; the Pennsylvania Historical Society; the Franklin Institute, and the Academy of Natural Sciences, Philadelphia; the Society of Alaskan Natural History and Ethnology, Sitka, Alaska, etc. With a translation from the German by Mr. S. Kauffmann of those chapters of "Die Klimate der Erde," written by Dr. A. Woeikof, of St. Petersburg, Russia, that relate to North and South America and the islands and oceans contiguous thereto. *Intended for invalids and those who desire to preserve good health in a suitable climate.* 8vo, pp. 300. Price, $2. Philadelphia and London: F. A. Davis.

"This book," the author says prefatorily, "does not aim at a scientific consideration of the subject of climatology, but has been prepared in the hope that it may be of some practical service to numerous health-seekers in search of information regarding our climate and health resorts." To this end he has summarized a long category of reputed health resorts throughout the country, which may and ought to challenge the scrutiny of "health-seekers." It begins with a short chapter on and a good definition of medical climatology in general terms, which may be usefully applied as a basis of inquiry with regard to the promised healthful conditions of a multitude of diverse localities. But the misfortune is that these are without data, and must therefore be judged of by their relations to such known conditions as may be accessible independently of the descriptions herein given, because these are evidently, for the most part, derived from "health resort" manuals, railway inducements to travel, and proprietary advertisements generally.

The special chapter on the therapeutics of climate, as compared with the rest, is excellent for its precautionary suggestions in the selection of climates and local conditions, with reference to known pathological indications and constitutional predispositions.

THE PREVENTIVE TREATMENT OF CALCULOUS DISEASE, AND THE USE OF SOLVENT REMEDIES, by SIR HENRY THOMPSON, F.R.C.S., M.B., Lond.; and SPRAINS: THEIR CONSEQUENCES AND TREATMENT, by C. W. MANSELL MOULLIN, M.A., M.D., Oxon., F.R.C.S., Eng., are the especially valuable essays in the current number of Wood's Medical and Surgical Monographs.

Sir Henry Thompson is well known to be the most eminent authority on the subject of which his essay treats in this number. His consideration of the subject is concise, though full and eminently practical, and will doubtless afford a revelation to many practitioners regarding the amenability of this affection to medical treatment.

Dr. Moullin's monograph is on an equally important subject—one which every medical practitioner is more or less frequently called upon to treat, primarily, or as the result of neglected slight injury resulting in chronic and frequently by ordinary methods of treatment in permanent disability. The subject is here treated of in all its aspects, and it is one which no physician can afford to be unacquainted with. Monthly, $10 a year; single copies, $1. New York: William Wood & Co.

A HAND-BOOK FOR THE HOSPITAL CORPS OF THE UNITED STATES ARMY AND STATE MILITARY FORCES, by MAJOR CHARLES SMART, U.S.A., is announced by Messrs. William Wood & Co. to appear at an early date. It may be safely said in advance that this work will be replete with the best knowledge upon the subjects of which it treats.

MANUAL OF DIETETICS FOR PHYSICIANS, MOTHERS, AND NURSES. By W. B. PRITCHARD, M.D. Price. 25 cents. The Dietetic Publishing Co., 115 Fulton Street, New York.

This is a pamphlet of eighty-eight pages, containing a great deal of useful and practical information on food for and feeding of the sick.

REPORT OF THE DAIRY COMMISSIONER, WILLIAM K. NEWTON, M.D., OF THE STATE OF NEW JERSEY, 1888, pp. 156, comprehends a great deal of useful work to the people of the State on one of the most important subjects that can engage their attention—healthful foods. During the year 623 articles of food were analyzed, and of these 303, or 48.64 per cent, were found to be more or less adulterated. The leading articles in the degree of impurity were: Ground spices, ground coffee, lard, butter and oleomargarine, milk, and imported canned goods. Of ten samples of extracted honey, five were adulterated with glucose; of nine of maple sugar, four; of seven samples of pickles, two contained copper. Under the head of Drugs: Of ninety samples of cream of tartar analyzed, forty-nine were impure; of fifteen samples of iodide of potassium examined, four only were equal to the requirements of the United States Pharmacopœia; of nine samples of carbolic acid, two only were of the purity demanded by the Pharmacopœia; of twenty-eight seidlitz powders, sixteen were deficient in quantity or quality, and so on to the end of the chapter.

Brandy, whiskey, and gin: Of forty-three samples, purchased at drug-stores, six only answered to the tests of purity and quality given in the Pharmacopœia. The price paid for the samples varied from $4 to $20 a gallon, yet this was no indication of the quality.

The report is eminently worthy of extensive circulation.

TRANSACTIONS OF THE MEDICAL AND CHIRURGICAL FACULTY OF MARYLAND, NINETEENTH ANNUAL SESSION, 1888. Pp. 250. G. LANE TANEYHILL, M.D., Secretary, Baltimore. Besides the Address by the President, J. E. Atkinson, M.D., the reports of the sections on the different departments, and several special papers on curative medicine, of interest to all medical practitioners, the two papers of the section on Sanitary Science—"Practical Measures for the Restriction of Contagious and Infectious Diseases," by George H. Rohé, M.D., and "Insanitary Agents in Common Use—Trees, Refrigerators, Ice-Boxes, Filters," by John Morris, M.D.; and "Inebriety as a Disease," by Charles G. Hill, M.D., are more particularly allied with preventive medicine, and deserve the attention of practical sanitarians. Dr. Rohé invites attention to the large percentage of mortality from infectious diseases in Baltimore, and strenuously urges *notification*, *isolation*, and *disinfection* as special measures of prevention which should be enforced by the health authorities with the co-operation of all medical practitioners, and supports his argument by citations of the best authorities. Dr. Morris, except his misnomer of *in*sanitary, as a designation of inanimate things, concisely but lucidly describes the healthfulness of shade trees ; the danger of uncleanly ice-boxes, and the contaminating effects of storing milk and butter in the same apartments with other food, particularly with meats ; and points out the special importance of ventilation to ice-boxes and refrigerators of all kinds. His description of the unreliability of filters as means of removing the most dangerous impurities of water, and the consequent danger of relying upon them, is worthy of special heed.

Dr. Hill refers to the dogmatical assumptions and speculative theories commonly entertained by moralists and others who have, from commendable motives, crystallized themselves into various reformatory movements, as reason sufficient for more assiduous attention to inebriety in all its phases by medical men generally than has hitherto obtained. He concludes with a quotation from Dr. Clouston that, " What we want is an island where whiskey is unknown ; guardianship, combining authority, firmness, attractiveness, and a high bracing moral tone ; work in the open air ; a simple, natural life ; a return to mother-earth and to nature ; a diet of joints, vegetables, bread, milk, eggs, and fish. No opportunity for one case to corrupt another, and suitable punishments and deprivations against the rules of life laid down. All this continued for several years in each case, and the legal power to send cases to this Utopia for as long as medical authority determines, with or without their consent. This would be the ideal mode of treatment."

" But this," he says, " is too Utopian for practical consideration here. What we want, first, is a State inebriate asylum, or, in lieu of this, a ward in the State Insane Asylum set apart for this purpose. And, most important of all, we should have the power of commitment so simplified that the testimony of two or more physicians, as is done in cases of insanity, would be sufficient to commit any inebriate, *nolens volens*, to such an institution for a sufficient time to guarantee a thorough trial of the efficacy of treatment, and if he persists in returning to his old habit on being released, for the sake of himself and his family, for the sake of society, for the sake of humanity, let him be detained there throughout the term of his natural life, rather than have him propagate a race of neurotics who would probably become drunkards like himself, and after setting a terrible example and wasting his means and impoverishing his family, go down at last into a drunkard's grave."

TRANSACTIONS OF THE MEDICAL ASSOCIATION OF MISSOURI, THIRTY-FIRST ANNUAL SESSION, 1888, pp. 462. L. J. Matthews, M.D., Carthage, Secretary. A volume of numerous and, for the most part, excellent papers on curative medicine; and besides contains the following contributions to State medicine and practical sanitation: "The Ounce of Prevention," and "What has been done and What has not been done by the State Board of Health of Missouri," by George Homan, M.D.; "Pneumonia-Malaria the Probable Cause of the Large Mortality," by W. B. Lucas, M.D.; "Report on the Recent Outbreak of Small-pox in Schuyler and Adair Counties," by G. A. Goben, M.D.; "Laws and Appropriations of the Federal and State Governments in the Interest of the Public Health," by G. Hurt, M.D. These papers, collectively, are especially important and timely to the people of Missouri, and well would it be for them and the purpose for which the papers were written, if they were unlocked from this report and its limited circulation, and scattered broadcast over the State. Such an act might have the effect of rousing the people to a recognition of the importance of State medicine as an essential subject of public economy. "What has not been done by the State Board of Health," by reason of the ignorance and indifference of the legislators—so well shown by Dr. Homan—doubtless reflects the sense of the people to the same degree, and until this is reached legislators are likely to continue obtuse and obdurate. Staid volumes of State Medical Society Transactions are a means of filing away such papers without benefit to the people.

JEAN FRANÇOIS MILLET.—The *Century Magazine* was the first to publish the "Life of Jean François Millet"—this was even before its appearance in France. The May number contains still further recollections of him—"With Some Account of his Drawings for his Children and Grandchildren," by

Wyatt Eaton, the well-known American artist, who lived in Barbizon and was intimate with the famous painter. The article is illustrated not only by many of the drawings referred to, but also with a portrait of Millet made by Mr. Eaton from various sources, including his own remembrance of the original. There is also a full-length portrait of Millet, at the age of forty, from a photograph taken in his garden. A picture of the interior of his studio, taken soon after Millet's death, is also given.

WONDERS OF THE CAMERA.—The peculiar rhythmical effects which accompany discharges of powder and of nitroglycerine compounds have been elaborately investigated by the aid of photography. It has also been suggested that careful photographs, taken of steel and timber just at the point of rupture under a breaking load, would conduce to our knowledge of the complicated subject of elasticity.

The lightning flash can be investigated. Dr. Koenig, in a recent communication to the Physical Society of Berlin, states that he has photographed a cannon-ball which was moving at a rate of 1200 feet per second. The ball was projected in front of a white screen and occupied one fortieth of a second in its passage. Marey has photographed the motions of limping people, and has thus given surgeons the materials for a study of lameness. It is said, moreover, that photography often reveals incipient eruptive diseases which are not visible to the eye. Photographs taken by flash-powders of the human eye, showing it dilated in the dark, give the oculist a new method of studying the enlarged pupil.—*Professor John Trowbridge, in the May Scribner's.*

THE EXTERMINATION OF THE BUFFALO.—At the present time, outside of the National Park, where about two hundred and sixty buffaloes are now harbored, there are not over three hundred, probably not as many, left in the whole United States. The survivors of this magnificent race of animals are scattered in little bunches in several localities. There are about one hundred in Montana, or at least there were a year ago, some at the head of Dry Creek, and the remainder at the head of Porcupine Creek. In Wyoming there are a few stragglers from the National Park, which, when chased, run back there for protection. In the mountains of Colorado last summer there were two bunches of mountain bison, one of twenty-five head and the other of eleven. These have probably been killed. There are none in Dakota, though eighteen months ago thirty were known to be there. It was estimated in 1887 that there were twenty-seven in Nebraska, and about fifty more scattered in the western part of the Indian Territory and Kansas. Those in Nebraska have since been killed by the Sioux. Of the thousands that once inhabited Texas, only two small bunches remain. Thirty-two head are near the Ratons, in the northwestern part of the Panhandle, and eight in the sand-hills on the Staked Plains north of the Pecos River. These were seen and counted on April 1st of last year. This estimate of the remnant of a great race is believed to be essentially correct. It was obtained from reliable and well-informed persons throughout the West, and in part from personal observation during the past years.—*Franklin Satterthwaite, in Harper's Magazine for May.*

PAMPHLET REPRINTS, REPORTS, ETC.

"Physical Condition of the Police Force of St. Louis." By George Homan, M.D.

"The Relation of the Abdominal Surgeon to the Obstetrician and Gynæcologist." By A. Vander Veer, M.D., Albany, N. Y.

"Sixty-fourth Annual Report of the Retreat for the Insane," Hartford, Conn.

"Suicide and Legislation." By Clark Bell, Esq., New York.

"Annual Report of the Murdock Free Hospital for Women," Boston.

"Nineteenth Annual Report of the Manhattan Eye and Ear Hospital," New York.

"Twenty-ninth Annual Report of the Medical Superintendent of the State Asylum for Insane Criminals," Auburn, N.Y.

"First Annual Report of the Methodist Episcopal Hospital," Brooklyn, N. Y.

"Thirty-eighth Annual Report of the State Lunatic Hospital," Harrisburg, Pa.

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PULMONARY CONSUMPTION, AND ONE OF ITS CAUSES.

PULMONARY consumption is more to be feared in every community than any other disease that affects mankind. It is the great placid ocean of mortality, compared to which the occasional epidemics that terrify the public mind are but turbulent inland lakes. Cholera, yellow-fever, and small-pox, diseases that paralyze with fright entire States, provinces, and countries, are exceedingly limited in their results in comparison with the steady, silent, and awful slaughter of consumption.

Last year Florida was panic-stricken from the havoc of yellow-fever ; but during the same year consumption destroyed more than twice as many lives in the little State of New Hampshire, and not a tremor ran through the body corporate. The average annual death-rate in this country, from cholera, yellow-fever, small-pox, typhoid-fever, diphtheria, and scarlet-fever, all combined, does not reach the enormous total of deaths from consumption.

It is time that some determined and systematic effort be made to lessen this disease, which the most eminent pathologists and sanitarians now regard as preventable. Its communicability by contagion and infection has been proven, and its natural history is so well known that much may be done to limit its prevalence.

Among the general sources of infection there is one, at least, that should be removed, or, if not wholly removed, greatly lessened by legal action, and that is the sale of tuberculous food products. Such foods, chiefly in the form of tuberculous meat and milk, particularly the latter, are undoubtedly extensively sold to unsuspecting consumers ; and that the results are not infrequently lamentable, no sanitarian doubts. Pulmonary consumption is a very prevalent disease among the cattle of this country; and since the general government has taken no measures to restrict the malady, it becomes the duty of the individual States to inaugurate some course that will reduce the danger to the public therefrom.

To illustrate, we will give one instance in this State very recently investigated by the Board of Cattle Commissioners: Complaint was made to the Board that some disease existed in a herd of thirty cows, in a certain town of the State; and under the assumption that the disease might be pleuro-pneumonia, the Government, upon notification, sent a competent veterinary surgeon to inspect the herd. The inspector immediately diagnosed tuberculosis, had an infected cow killed, and the *post-mortem* examination revealed tubercles in nearly every organ of the body, including the udder. The inspector reported that about seventy-five per cent of the herd was already infected. All, or nearly all the cows were being milked, and the product being sold daily to a milk dealer for distribution among his customers. The dairyman, ignorant of the character of the disease, was bringing up a baby upon the milk of a single cow in which the disease had advanced nearly to its fatal termination.

This is only one case, but there are many others; and when, as a result, consumption appears in the human subject, the unfortunate victim and the friends accept the edict as wholly unavoidable and perhaps inexplicable. It is time that this great danger be taken in hand by every State, as it can be, with every probability of lessening in a marked degree the annual death-rate of this terribly insidious and fatal disease.

Under our present laws, neither the Board of Cattle Commissioners nor the State Board of Health has any authority to deal with tuberculosis in cattle in a way necessary to restrict its spread among other herds, or to prevent the appalling dangers to which it subjects the human family. The next Legislature should enact a law that will require the Board of Cattle Commissioners to stamp out the disease wherever found by destroying the animals infected, and for which the State should, in some measure at least, reimburse the farmer for his loss.—*Sanitary Volunteer.*

WATER ANALYSIS.

SANITARY ASPECTS.*

By CHARLES SMART, M.D., Surgeon U. S. A.

WATER exercises a sanitary influence as a climatic factor, by its geographical distribution and the quantity present as vapor in the atmosphere; it has a potent influence on the human race by its presence in soils, causing disease as well when the temperature is low as when it is high; it is an essential in the sanitary police of individuals, families, and communities; but it is only as a supply for the physiological necessities of the human organism that we propose now to consider it.

Natural waters have been variously classified, for convenience in discussion, by their source, into rain, snow, ice, river, lake, spring, well, sea-water, etc.; by their prominent inorganic impurities, into saline, chalybeate, sulphurous, calcareous, magnesian, etc.; by their abstergent qualities, into hard and soft. For sanitary purposes no system of classification appears to be needful or of value, for we can rarely generalize when a water-supply is in question, or predicate of one from the known qualities of another. Every specimen must be analyzed, its history carefully examined, and an opinion formed upon the results independent of its source from well, river, or lake, or of its hardness, softness, or mineral characteristics. But there is a marked difference in the results of the analysis of certain naturally pure waters, and to give expression to this difference, which will be explained hereafter, waters may be divided into surface waters and percolated waters. These classes are frequently found in natural supplies to be mixed one with the other. Rain-water stored in sound cisterns may be taken as an illustrative specimen of the one, deep well-water of the other, while river-water consists of varying proportions of both.

Rain-water is generally regarded as a pure water. It contains but minute traces of the mineral salts which are found in

* Continued from page 423.

well-waters. The solid residue left on its evaporation is small as compared with that of the average well-water; but it cannot on that account be considered as correspondingly pure, for it contains other matters which are characterized by chemical reactions as marked after their kind as the mineral films and crusts, or crystalline residues, which can be seen, handled, and weighed.

It is by means of the rainfall that the atmosphere is purified after long periods of drought. The detritus—mineral, vegetable, and animal—of the earth is swept up into the air, where it becomes diffused, and may accumulate so as to dim the outlines of distant views. If in the air, there are miasmatic exhalations and volatile poisons which are unsusceptible of destructive oxidation by atmospheric influences, spores of bacilli or fungi capable of instituting a fermentative action in organic substances under congenial conditions; these, although undiscoverable, or as yet undiscovered by the microscope, will be washed down by the falling rain as certainly as the pollen and starch grains, carbon particles, fibres, filaments, and mineral dust which may always be detected in the sediment of a rain-water. In times of epidemic prevalence of disease, as of cholera or yellow-fever, it is possible that the rain-washed impurity from the air may contain the essence of the prevailing disease. When the exhalations from extensive malarious tracts rise into colder strata of the atmosphere, it is probable that the disease cause is carried thence with them, where it is condensed and falls as a constituent of the rain. When, during the warm days of summer, the atmosphere stagnates in the streets of a city and becomes so saturated with the foul issues from sewer ventilation, half-dried gutters, unremoved garbage, and a generally impure soil, that a putrefactive tendency is established, it is probable that the falling shower, in purifying the atmosphere, becomes itself exceedingly impure and the source of subsequent diarrhœal, choleraic, dysenteric, or typhoid troubles, if used as a drinking-water. The rain is the sewage of the atmosphere, and it is hardly to be supposed that spores, germs, bacilli, ferments, poisons, or other deleterious organic substances which have resisted the atmospheric oxidizing agencies, will become destroyed or rendered inert by their transference from an aërial to an aqueous medium.

The ammonia which is evolved during the putrefactive process escapes into the air and is diffused therein ; the bacteria, the cause of this putrefactive change in organic matter, also pervade the atmosphere. The presence of the one may be shown by chemical means, that of the other by culture experiments. But the presence of both may be in like manner demonstrated in the rain which has washed them down from the atmosphere. Since these bacteria and the products which accompany them as exhalations from fermenting organic matters may be found in the rain, it seems within the limits of probability that a malarial germ or microphyte, or a product of its growth during the fermentative change in organic matter which is connected with paroxysmal fevers, may be exhaled into the atmosphere, and be found thereafter in the rain or snow ; or that a choleraic germ may in like manner be present in the rain during the epidemic prevalence of the disease.

Moreover, rain-water is liable to be contaminated by impurities on the collecting surface. The cleanest of roofs become covered with dust in dry seasons, and this dust, although largely mineral in character, contains a percentage of organic matter which requires only moisture for the inception of fermentative change and the development and growth of organic forms. The germ, essence, or poison of specific disease, which may be air-borne, must thus, of necessity, be also susceptible of transmission to the system by means of a rain-water supply ; for it may be either carried down by the falling rain, or be washed into the reservoir from the collecting surface on which it may have been condensed or deposited.

Nevertheless, rain-water, as will be shown hereafter, is one of the purest sources of water-supply. By rejecting all short summer storms and the first part of the fall of continued rains, thus excluding from the reservoir the atmospheric impurities and the washings from the water-shed, a water may be obtained which, although containing traces of ammonia and of organic matter, must, from its natural history, be considered as a perfectly wholesome supply.

When the rainfall reaches the ground it is disposed of in one or other of two ways. It runs off by surface channels or it penetrates. Its disposition is determined by the rapidity of the fall, the superficial characteristics of the receiving surface, its porosity, and the permeability or impermeability and dip of the underlying strata. That which runs off by surface channels into ponds, lakes, or river-bottoms, is practically a rain-water which has become somewhat changed in its character by its contact with the ground forming the water-shed. It has lost some of its impurities which it washed from the atmosphere, but it has gathered more in its course over the surface; and the alteration in its quality depends upon the nature of these fresh acquisitions. Running over the rocky ground of an unpeopled country, it acquires only a few grains of mineral matter per gallon; sweeping over the foul streets of a city, it may become converted into veritable sewage.

The rainfall which penetrates the surface soil percolates until it joins some body of subsoil or subterranean water. This may be immediately below the surface, as when the ground-water is upheld by an impervious layer underlying a shallow stratum of superficial soil. In river bottoms the subsoil water is usually found close to the surface, upheld in this position by the bed-rock. In some situations, as in the mesas of Arizona and New Mexico, the impervious layer is at such a depth under porous sand and gravel that there is practically no subsoil water. In other localities, as where the rainfall penetrates the uplands of a river-valley, the water, on reaching the impervious stratum, may have to percolate along its slope for a long distance before it reaches the general body of subsoil water in the river-bottom. In its passage along this slope it may return to the surface as a spring at some point where a rift or erosion of the surface-soil has exposed the bed-rock of the water-shed.

Where the rainfall is absorbed on ground which forms the outcrop of a porous stratum underlying an impervious layer, it may have to percolate for great distances before it reaches the subterranean basin where its level is temporarily found. Here it may be tapped by deep wells, or it may issue by natural crevices in the form of springs. The water which percolates the soil becomes altered in character by the penetration, and the extent of the alteration depends on the solubility of the mineral matter through which it passes and its freedom from, or saturation with, organic substances in a decomposing state. If the distance traversed is great the inorganic constituents of the water may be increased, but the organic will probably be diminished ; for the chances of encountering soluble mineral matters are augmented and time is afforded for the progress of changes which transform organic matter into inorganic salts. The mineral matters which a percolated water takes up do not usually come up for consideration in questions as to wholesomeness or usefulness as a domestic supply. When they are large enough to be unwholesome the taste of the water generally interferes with its use as a potable supply, and its hardness with its use for domestic and economic purposes. When they are not in sufficient amount to be perceptible to the taste, they are usually neither unwholesome nor injurious in other ways. Organic matter dissolved in water, such as that carried down in the rainfall and that gathered by contact with an impure receiving surface, becomes transformed into ammonia and nitric acid during its percolation. This was formerly considered to be an oxidation of the organic nitrogen by the air in the pores of soil. The explanations given were theoretical and obscure so long as chemical laws only were conceived to be involved in the process. It is now well known that the retrograde metamorphosis of organic matter which fits it for absorption by living vegetation is due to the action of micro-organisms. Bacteria are recognized as the agents which reduce the organic nitrogen to the ammoniacal condition, and the experiments of Schloesing, Warington, and many others following them, have shown that the formation of nitrates from this ammonia is likewise due to actions of a similar character, although the living ferment has not been identified.

The influence of percolation through the soil has thus a purifying tendency. As an offset to the comparatively harmless mineral additions, the subtle organic matter and the complex and unstable substances formed during its decomposition are transformed into innocent inorganic salts. Even some of the germs which are washed from the air by the falling rain or collected from an impure surface may be removed by this natural process of filtration, if we assume the essence of malarial diseases to reside in a minute organism ; for while such diseases have been frequently referred to the use of surface-waters, no instance has been recorded which throws suspicion on percolated waters. On the contrary, the testimony is strong as to the efficiency of filtration in removing the malarial germ ; for the purer water-supply which, in all countries, has succeeded the use of surface-collections, and which has been coincident with the diminished prevalence of malarial diseases, has been in the first instance derived from wells and springs ; in other words, a percolated water. But this favorable change, exercised by percolation in the case of the malarial germ, is, unfortunately, exceptional. The experiments of Pumpelly and Smythe for the National Board of Health, and those more recently recorded by P. F. Frankland (*Van Nostrand's Engineering Magazine*, xxxv., p. 315, 1886), warrant the assertion that bacteria are not completely removed from water by any process of filtration. The history of certain outbreaks of typhoid-fever and cholera give full assurance that percolation does not purify water from the essence of these diseases. So it is probably with the causes of other specific diseases, as scarlet-fever, diphtheria, small-pox, yellow-fever, etc., which may be washed from a contaminated atmosphere.

But it is not so much from the air as after its contact with the soil that rain-water becomes impregnated with specific-disease poisons. The germs of typhoid-fever and cholera find their way to the soil with the excretions of individuals suffering from these diseases, and are taken up by and accompany the percolating water. The dead organic matter which may be dissolved at the same time may afterward disappear by nitrification ; but there is no assurance that any modifying influence is exerted on the living matter.

The purity of water depends on the purity of the substances with which it comes in contact. Rain-water shed from a well-washed slate roof into a clean cistern is a pure supply, but collected in a tank, ditch, pond, or lake, it will be pure or impure according to the condition of the water-shed and the receiving basin. Subsoil water may be rain-water purified by filtration, as in springs or wells in a clean sand, or it may be so altered by the addition of organic matter from a foul soil as to be unfit for use, as in the shallow wells of most localities which have been occupied for some time. Subterranean springs or deep well-waters are usually organically pure, and wholesome if not excessively charged with mineral salts, but even these have occasionally been the source of epidemic diseases. River-waters have their quality determined by the characters of the water-shed and soil-drainage, and especially by the presence or absence of masses of population on their banks.

The effects of impure water vary according to the impurity. Where the mineral matter does not exceed 30 parts per 100,000 (17.5 grains per U. S. gallon, or 21 grains per imperial gallon), and does not give a taste to the water, it may be accepted as wholesome without inquiry into the special constitution of the inorganic salts. It has been suggested that mineral salts in the drinking-water may supply certain wants in the economy, as, for instance, lime for the bones of the growing child; but as every article of food contains its percentage of such matters, it would seem that ample provision has been made by nature without requiring their introduction by means of the water-supply. Moreover, as water is, so far as we know, intended for the solution of fresh nutritive materials and the removal of the products of tissue-change, its freedom from dissolved solids would seem desirable.

Where the mineral salts are in excess of 30 parts per 100,000 of the water, yet do not give a taste to it, some doubt as to its qualities may be entertained, for it is well known that certain waters induce relaxation of the bowels or affect the kidneys through the agency of their mineral constituents. These doubts are usually settled, not by chemical analyses, but by the test of experience.

If the water contains more than 100 parts of salts in the 100,000 it is evidently unsuited for a potable supply. The sense of taste objects to many lime, magnesian, and alkaline waters even before this limit is reached. Iron in comparatively minute quantities may be recognized, but when it is so the water containing it is thereby removed from the potable to the list of mineral waters.

As water is frequently distributed by *leaden pipes* and sometimes stored in lead-lined cisterns, the possibility of the solution of poisonous quantities of the metal must be held in view. Such instances are of rare occurrence; but it is possible that noxious effects from lead may have been overlooked in some instances and attributed to other causes.

Where lead is used for service-pipes the water which has stood in the pipes during the night should be run to waste before drawing a supply for use. The contact with the metal of the service-pipes during daily use is so slight that lead is seldom found in such quantities as to be harmful. But the use of lead for cisterns is of doubtful propriety. Where metal is used iron should be employed, protected, as Professor Nichols recommends, by a coating of asphalt paint or black varnish.

Zinc is also acted upon by most waters, and may be detected in those which have been stored in galvanized-iron tanks. The corrosion is especially active if the coating is imperfect. Dr. Downes, of Chelmsford, England, who studied this subject, remarked with truth that if the zinc were seriously injurious we should have more cases of poisoning on record, for a great number of people must be in the habit of drinking water more or less contaminated with the metal. Dr. Boardman, of Boston, came to the conclusion, as the result of his own experiments and of an examination of the literature of the subject, that if all the zinc found in water existed in the form of chloride, which is known to be the most actively poisonous of the zinc salts, the amount would be insufficient to endanger health.

Decomposing *vegetable matter* in water is well known to be the cause of diarrhœas; and in tropical countries, or where the water is unusually foul, dysentery has been attributed to its use. Many of our medical officers, during the war, referred certain attacks of diarrhœa, which occurred in their commands, to vegetable impurity in the drinking-water. The minute organisms that are associated with, and live upon, the decay of vegetable matter in water have in no instance been convicted of causing injurious effects on the human system. Their presence is sometimes of value as an indication of an impurity that experience has shown to be harmful; but there is no evidence to show that they are themselves pathogenic agents. Sluggish amœboid masses are characteristic of foul, stagnant, or swamp-waters that are almost certain to occasion diarrhœal troubles. Those that contain a profusion of vorticellæ are also dangerous. Many organisms, such as oxytricha, kerona, euplotes, anguillula, and paramecia, have their habitat in waters that do not give satisfactory results on chemical examination. Others, such as acomia, enchelys, alyscum, euglena, peranema, rotifers, and entomostraca, occur frequently in supplies which both experience and chemical examination show to be not unwholesome. The palmellaceous algæ, desmids, diatoms, and confervoid general have usually no value as an indication of impurity. Sometimes, however, the minute algæ which grow in vast numbers in some lake-waters become the cause of a tainted and unwholesome condition of the supply, as when, from some temperature-change or variation in the depth of the water inconsistent with their vitality, death overtakes them in mass and their decomposition renders the water impure. Thus the waters of certain ponds become affected occasionally with what has been called a pig-pen odor from the sudden death and decomposition of an abundant growth of nostocs.

At the present time, however, the bacteria in water-supplies occupy the attention of all students of water-organisms. That many of these microphytes, particularly those connected with decomposing fragments in the sediment, are concerned in the reduction of organic matter is now an accepted doctrine ; but waters which seem perfectly free from all putrefactive tendencies may be shown, by Koch's process of cultivation on gelatine, to contain extraordinary numbers of bacteria. What are these ? Whence do they come, and what is their object in the economy of nature ? Nothing certain is known, but meanwhile there is much speculation. Following Buchner and Naegele, some fear that by a transformation of species there is danger in all of these bacteria—harmless they may be under ordinary conditions, but capable, on account of their rapid succession of generations, of becoming developed into pathogenic organisms. Others consider that where there are many individuals and, particularly, many varieties, there is an increased likelihood of danger. Others, again, remembering Koch's opinion, that the bacteria of putrefaction may exterminate the comma bacillus, conceive that the presence of a large number decreases the likelihood of the coexistence of a pathogenic variety. Fortunately, in this incertitude there is one thing certain, and that is, that the majority of water-bacteria are harmless.

But the writer, without indulging in speculation, would go a step further than this, and maintain that the majority of these organisms are not only harmless but that they are engaged in an important and beneficent work. It is now an accepted and well-known fact that the organisms which cooperate with the bacteria of putrefaction and transform into nitric acid the ammonia which these evolve in the destruction of organic matter have their habitat in the surface-layers of the soil. Warington's latest researches have shown that they are confined to within one or two feet of the surface.

Among the germs in a natural water there may be pathogenic organisms. Typhoid-fever and other diseases are propagated by water; the comma bacillus of cholera has been found in it, and the spirochæte of Obermeyer and the tubercle and anthrax bacilli may be present; but, as T. Mitchell Prudden expresses it: "If we can be certain that the water from our city-supplies cannot contain sewage or human or animal excretions of any kind, we are pretty safe, so far as our present knowledge goes, in giving ourselves little concern about the number of bacteria which it may contain."

Decomposing *animal matters* are likewise productive of diarrhœa, and gastric disturbance with much prostration frequently accompanies the flux. Yet the quantity of either animal or vegetable organic matter required to produce evil effects is generally such that its presence cannot be overlooked, as it is manifest to the senses of taste and smell.

The water of wells slightly contaminated by privy-drainage has been known to be used for years without producing any apparent harmful effects. And it has been frequently instanced that the water of rivers subject to sewage-inflow is daily used by immense numbers of people without any evil results; but this argument is of no value, as it assumes what has to be proved—that the fevers, diarrhœas, etc., which prevail among the people who drink the water are endemic among them and do not depend for cause upon the water-supply. Much has been said on the self-purification of rivers in connection with this subject.

The English Rivers-pollution Commission paid much attention to the claim that running water becomes purified in its flow, and the result of many experimental investigations constrained its members to report that there was no river in the United Kingdom long enough to secure the oxidation and destruction of any sewage which might be discharged into it even at its source.

It is true that sedimentation, oxidation, nitrification, and, particularly, dilution tend to obliterate the chemical tracks of sewage in a running stream, and may even give it the reputation of a better quality below than above the point of sewage-inflow, just as in wells which are exposed to privy-drainings the water, after percolation through the soil and admission into the well, may give better results on analysis than it gave as rain-water before its pollution by the privy. But in both instances the purification, so far as is known, affects only the dead and decomposing organic matter, which is productive of no evil effects on the system unless in amounts rendering it more or less objectionable to the senses. A favorite idea of many bacteriologists is that the common water-bacteria which are engaged in the destruction of organic matter displace and destroy the specific organisms in the struggle for existence, and thus prevent the occurrence of typhoid and other epidemics from sewage-tainted water; but this is no more than a pleasing optimistic romance which must be set aside when we turn to the cold facts of medical experience. There are many instances on record in which comparatively pure, chemically speaking, well-waters with privy-connections have been associated with the spread of typhoid-fever; and if such a record does not appear in the case of the comparatively pure water of a self-purified sewage-contaminated stream, it is probably because of the difficulty of obtaining the necessary conditions for manifesting the results of its use. To demonstrate the wholesomeness of a river-water which has been contaminated with sewage it is not enough to show by analysis that it contains but a small proportion of organic matter; it should be shown at the same time that none of the diseases which are generally recognized as transmissible by the water-supply prevail in the districts where the water in question is used. There are many difficulties in the way of effecting this demonstration, but chief among them is the well-attested fact that certain of these diseases frequently *do* prevail in the districts in question. Usually there is no difficulty in showing that a disease—typhoid-fever, for example—prevails among a population which uses a sewage-tainted water; but it is often extremely difficult to prove the charge of causation against the water. When an epidemic outbreak is sudden and virulent, as at Plymouth, Pa., coming like a visitation of Providence or a pestilence of the olden time, and stirring up the health authorities to careful investigations because the eyes of the scientific world will scrutinize their methods and conclusions, the water-supply is convicted by an unbroken chain of evidence; but when the cases are isolated or scattered in a community—when they are merely every-day occurrences in the routine practice of the profession—the testimony that convicts the water on the epidemic charge seems to be forgotten, and all sorts of unsanitary predisposing conditions are brought forward in explanation of the existence of the so-called sporadic disease. When it is known that a large quantity of an infected sewage in a water-supply will spread a disease with epidemic virulence, it is not inconsistent with our knowledge of the essence of such diseases to infer that a small quantity, even though diffused through an immense volume of flowing water, will strike its victim when the glass of water which contains the essential particles is ingested.

The writer, in a discussion of the subject of wholesome water at the Philadelphia Sanitary Convention of 1886, gave full expression to the facts and arguments which expose the danger of the belief in the doctrine of the self-purification of a running stream and the consequent assumed harmlessness of a sewage-inflow. Among these he pointed out that the sporadic prevalence of typhoid-fever is in a great measure proportioned to the sewage-pollution of the water-supply. The water used by Brooklyn, L. I., is perhaps less contaminated with sewage than that of any large city in this country. In 1885 23 persons died of typhoid-fever in every 100,000 of the population; and this was not an accidentally small rate due to the absence of so-called epidemic influences during that year, for the average annual rate of the previous decade was only a little over 15 per 100,000. The water of New York is guarded with care, but it is derived from a more extensive area than the Brooklyn supply; the typhoid rate in the year mentioned was 21, and the average annual rate for the decade 26. A constant supervision is exercised over the supply of London, England; and the corresponding typhoid rates were 17 and 28. These rates, varying from 15 to 28 per 100,000 of the population, may be regarded as standards of comparison for the rates of other cities. Notwithstanding a careful superintendence by the health authorities, the water-supply of Boston is known to have a certain amount of sewage-inflow; correspondingly, we find the mortality-rate to be higher than those already instanced—38 for 1885, and 45 for the decade. Cincinnati, supplied by the Ohio River, with many large settlements on its upper waters, had higher typhoid rates—44 for the year specified, and an average of 63 for the decade; and Philadelphia, supplied chiefly from the Schuylkill, which is acknowledged to be in foul condition, recorded 64 deaths for the year and 66 as the average of the previous ten years. Looking at these figures in their consolidated proportions, the sporadic typhoid cases of Philadelphia—and of other cities similarly situated as regards water-supply—assume the proportions of a continued epidemic, for they mean that during the decade there died of typhoid-fever 4400 persons who would not have died had the Brooklyn rates prevailed; and that over 50,000 people suffered from a dangerous and debilitating illness who would have escaped attack had their water-supply been derived from a purer source than the sewage-tainted Schuylkill.

Let the health records of any city be examined, and it will be found that a notable improvement has invariably followed the introduction of a water-supply that is free from sewage. But it may be claimed that this improvement is due to the system of sewerage, which is usually a coincident sanitary work; and, in fact, the removal of the filth by water-carriage constitutes so important a change in the sanitation of the municipality that the influence of the water-supply is generally regarded only in so far as it has contributed to that end. Fortunately, the city of New Orleans is able to give important testimony on this point. It has no sewers; its liquid filth flows sluggishly in open channels by the sidewalks, flushed from time to time in recent years by water from the Mississippi; its more solid refuse is collected in boxes in closets and out-houses, in confined areas, whence it is carried to the current of the river; the subsoil water which is found within a few feet of the surface is so impregnated with drainage as to be unfit for use; and the exhalations from the sluggish drains, the closets, and out-houses not infrequently taint the air in many parts of the city. Here are conditions as to subsoil and surface which would be regarded as accounting sufficiently for the extensive prevalence of typhoid, were it found to be present. Certainly they must be considered as more conducive to the spread of zymotic disease than the corresponding conditions of the subsoil and surface in Philadelphia, for the general results of modern sanitation show a sewered city to be a more healthful abode than one that is not sewered. But this city of New Orleans has a water-supply that is free from sewage-inflow. The Mississippi water is pumped up mainly for use in flushing the streets and drains, while the domestic supply consists of rain-water, collected and stored in cypress-wood cisterns which are raised above the suspicion of contamination by sewage. And the typhoid mortality, 16 during 1885, and 25.6 as the average of the previous ten years, is as low as the standard rates furnished by the cities of New York and London.

The latest testimony bearing on the influence of a pure water-supply on the diminution of typhoid-fever comes from Europe, and in this instance the complicating influence of sewerage is eliminated. M. Mosny (*Revue d'Hygiène*, January 20th, 1888) compares the history of the water-supply of Vienna with that of its typhoid-fever. From 1851 to 1874 well-water of an impure character was used to a large extent, in addition to a systematic supply from the Danube. During this period the deaths from typhoid-fever ranged from 100 to 340 annually per 100,000 of the population. In the last-mentioned year a spring-water was introduced, and the typhoid rate fell immediately to 50. Since then, by the disuse of impure wells and the extension of the new supply, the rate for the past three years has fallen to 11; and inasmuch as the sewerage system was in existence during the period of high rates, the low rates since 1874 are necessarily referred to the use of water that is free from sewage. The fall in the typhoid rate experienced an interruption in 1877 when, owing to the freezing of some of the sources of the spring-supply, the water of the Danube had to be pumped into certain of the mains ; and it is of interest to observe that the sections of the city that were chiefly affected by this epidemic were those in which the Danube water was distributed. According to Professor Nothnagel : " Typhoid-fever has become such a rarity since we have had spring-water that, when by chance a case appears at the hospital, I show it to the students as one of unusual interest ; and I should add that the larger proportion of the cases now seen come from outside the city."

The close investigation into the organic matter in water which has of late years been prosecuted has indicated certain specific micro-organisms or disease-germs as the special danger in connection with a potable water-supply, the decomposing organic matter being of importance only in its relation to these as furnishing a pabulum for their growth and multiplication, or as indicating to some extent the possibility or likelihood of their presence in certain instances. The specific micro-organisms which are of interest are those containing the essence of miasmatic diseases, as malarial-fevers and dysentery, on the one hand, and miasmatic contagious diseases, as typhoid-fever and cholera, on the other.

Miasmatic exhalations when disseminated in water may be expected, from the known natural history of the malarial miasm, to be accompanied by the soluble organic substances, chiefly of a vegetable nature, which are taken up by the water from the soil whence the exhalation is evolved. The germs of typhoid-fever and cholera are, on the contrary, connected with organic matter of an animal character by the multiplication of the disease-germs in the intestines of the affected subject and their discharge with the excreta. Vegetable organic matter in water points, therefore, to malarial or dysenteric possibilities, and animal matters to such specific poisons as those of typhoid-fever and cholera. Not that the organic matter in any quantity gives in either of the cases an assurance of the presence of the germs of specific disease, but that a water which contains much of the generally associated organic matter is more likely to be contaminated by the specific disease than one which contains little or none.

Malaria is believed to be exhaled from the decomposition of organic matter in the soil. A certain amount of moisture with a high summer heat increases the activity of the fermentative processes and the consequent exhalation. The miasm has been traced by its effects to a distance from its source, wafted thither by light winds. It rises into the air and is dissipated or lost by dilution in the aerial ocean. But it has been known to reappear by its manifestations in the mists and fogs that sometimes settle on mountain-slopes. We must infer that the aqueous vapor in its condensation has concentrated the previously diluted miasm. If the condensation of the watery vapor reaches the point at which precipitation takes place a malarious water will fall, to be taken into the system in the water-supply, instead of a veil of mist producing its toxic effects more slowly by cutaneous or pulmonary absorption. The vast extent of the malarious districts of our country, and the constant exhalation produced therefrom during the hot season, suffice to account for an accumulated malarial miasm in the air, and a corresponding impurity in the rainfall when the air becomes purified by nature's processes. If in the rainfall of a certain region the pollen grains of plants which grow in distant parts of the country are detected, it is evident that they must have been swept up from their native soil, transported, and precipitated. It is readily understood how an infinitely less ponderable body, the malarial miasm, may have been similarly transported.

Diarrhœa and dysentery, as has been already indicated, are generally acknowledged as resulting from decomposing organic matters in water. Arising from this cause, the flux is regarded as the result of a local irritation similar to that produced by any other dietetic error. It is an effort of nature to eliminate the offending substance, and terminates spontaneously in a speedy return to health unless the action of the cause is sufficiently powerful or prolonged to institute inflammatory action. But in epidemic dysentery a specific cause is generally recognized, a terrestrial miasm evolved in localities where the soil has been turned up for agricultural purposes or in the progress of extensive engineering works. That this miasm may enter the system through the medium of the water-supply is acknowledged by most writers. But to the infection of the water contact with the miasmatic soil is needful. It seems probable, also, that the specific poison of the epidemic disease may be communicated by water which has been contaminated with the excreta of dysenteric patients.

There are so many instances on record of the propagation of typhoid-fever by an infected water that it is almost needless to do more in this connection than mention some well-known outbreaks which have been traced by competent observers to a contaminated supply.

One of the most interesting illustrations of the propagation of typhoid-fever through the medium of the water-supply is found in the history of the epidemic in Lausen, Switzerland, in 1872. Isolated cases had occurred in this village from the time of the Napoleonic wars, but for the seven years preceding the epidemic no case had been recorded. The village had a population of about eight hundred inhabitants, and was supplied with water by a spring which rose at the foot of a neighboring mountain. The water was stored in a covered reservoir, whence it was distributed to four public fountains. Six of the houses in the village had an independent supply. Suddenly typhoid-fever broke out in this settlement. On August 7th ten of the inhabitants, living in as many different houses, were seized, and in a short time one hundred and thirty persons were attacked, the only houses which escaped visitation being the six which had a private water-supply.

During the investigation into the origin of this outbreak it was shown that a subterranean communication existed between a stream on the other side of the mountain and the spring which supplied Lausen. It was known that when the waters of this stream were used in irrigating the meadows the flow in the Lausen spring was greatly augmented; and on one occasion, when a break occurred on the surface and the waters of the stream sank, the flow in the spring became correspondingly increased. The subsequent filling in of the hole permitted the stream to resume its surface-course. Three typhoid-fever cases had occurred on its banks during the summer of 1872, and the privies in which the typhoid excreta were deposited drained into it. In July the meadows bordering the stream were irrigated with its waters for the second hay-crop, and three weeks later the outbreak occurred at Lausen. To prove the communication between the stream and the springs a large quantity of salt was thrown into the former, and next day the salt was found in the Lausen waters. But when wheat-flour was mixed with the waters on the one side the spring on the other remained perfectly clear and gave no reaction with the tests for starch, showing that while a subterranean communication existed it was not of the nature of an open channel, but of a porous filter capable of removing granules as minute as those of the wheaten starch.

In urging the disposal of sewage by irrigation on farms or by downward intermittent filtration, sanitary engineers have instanced the purity of the water from the efferents and the absence of all danger to health from the flushing of the surface with the sewage. It has been stated, for instance, that while cholera prevailed in Edinburgh no cases occurred in the neighborhood of the meadows which received the sewage of the city. But, in view of the experience of Lausen, it would seem that the outflowing water should be regarded with suspicion, notwithstanding satisfactory results yielded by chemical analysis; for the germ or poison of typhoid-fever may be present in a water which might not be suspected to be unwholesome from an examination of the report of its analysis.

The typhoid epidemic at Plymouth, Pa., in 1885, is one of the most instructive on record, inasmuch as the facts relating to its causation and spread are accurately known. At the time stated Plymouth was a coal-mining town of eight thousand inhabitants, situated on the Susquehanna River about two and a half miles below the city of Wilkesbarre, which threw the greater part of its drainage and about one half of the sewage of its thirty thousand people into the river. There were always a few scattered cases of typhoid-fever in Plymouth, but up to April 10th nothing uncommon was noted in the prevalence of the disease. On that day, however, about fifty persons were seized, and the fever spread so rapidly that within a month 1200 persons were or had been ill, and 130 deaths had taken place. Post-mortem observations revealed the characteristic intestinal ulcerations. A board of local physicians investigated the causation of the fever, and their report was subsequently confirmed by Drs. French and Shakespeare, who were sent by the Mayor of Philadelphia as a committee of experts. These reports show that the water-supply was derived from a mountain-brook which was dammed at four different elevations just beyond the western edge of the town. From the lowest and smallest of these reservoirs the water was distributed by a main which speedily divided into two branches, one supplying the higher levels back from the river, the other the main street and other low levels on the Susquehanna front. About fourteen or fifteen days before the sudden outbreak of the epidemic this supply became infected by the discharges from a single typhoid-fever patient, an inmate of a house situated on a declivity not eighty feet from the brook, and just below the highest of the dams. This patient had suffered from January, and during the progress of the case the evacuations passed at night were carried out of the house and thrown on the snow covering the ground on the slope toward the stream. The long-continued frosts of winter had meanwhile bound up the sources of the brook so that the supply in the reservoirs became almost exhausted, and recourse was had to the Susquehanna water, which was pumped directly into the mains for the use of the town. On March 25th a general thaw began, followed by light rains, and next day the superintendent of the water company, finding the two upper reservoirs to be full, caused the waters of the third to be let down to the lowest or distributing reservoir; and, that evening, pumping from the Susquehanna was discontinued and the town was supplied with the water of the mountain-brook charged with the thawed-out dejecta that had been deposited on the snow. To exonerate the water pumped from the Susquehanna from the suspicion of having caused this sudden and disastrous outbreak, Plymouth had fortunately two suburbs which were not supplied from the company's reservoirs: one, Broadway, containing forty families, averaging five persons each; the other, Ridge Row, containing twenty families. In the former no case of the fever was found; in the latter, one or two cases occurred among persons who had frequented the town and made use of the water from the hydrants. The water-supply of these settlements was from the Susquehanna, through the pumps and water-mains of the Delaware and Hudson Coal Company.

The contamination of drinking-water by the germ or poison of cholera is also now very generally accepted. Instances are numerous where local outbreaks of the disease have been supposed to be due, as in the case of typhoid-fever, to an infection of the water by the alvine discharges of affected individuals. In many cases, also, immunity from the disease has been conferred upon a locality by the introduction of a pure water-supply. In India many illustrations of the connection between the disease and the water have been recorded. Dr. Macnamara mentions, as one of the characteristics of cholera, that the more explicit the examination the clearer the fact appears that the disease, in the majority of cases, spreads from one human being to another by means of the cholera-fomites finding their way into drinking-water, and thus into the intestines of other people.

Analogy leads to the supposition that an investigation into the cause of yellow-fever would probably manifest its propagation by means of water. But no strong evidence has been recorded in favor of this view. In fact, the testimony given by the last great epidemic (1879) in this country seems to exclude the water-supply from any participation in the extension of the disease. It prevailed in New Orleans, where rain-water is stored in wooden tanks raised above the surface of the ground and susceptible of contamination only by the air; and while some of the cistern-waters in the localities where the disease prevailed were not good, others were of excellent quality. It prevailed extensively in Memphis, Tenn., where the rain-water was collected in underground brick cisterns, many of which were sound and clean, containing a water free from contamination by matters in the soil, while others were impure and impregnated with privy-drainage. It prevailed, also, in 1878, in Grenada and Holly Springs, Miss., where the wells and cisterns generally yielded a pure supply, and in Brownsville, Tenn., where a large proportion of the wells were found to be contaminated by sewage.

While it seems probable that other specific diseases, such as diphtheria and scarlet-fever, may be occasionally communicated by an infected water, there is no evidence on record to establish the point.

Ice.—In the progress of the development of the methods of water-analysis in this country the character of the ice-supply naturally received some attention from the sanitary analysts. The extensive use of ice-water in summer rendered the purity of the ice a matter of the first importance. In a recent article on its growth, harvesting, storage, and distribution (*Popular Science Monthly*, March, 1888), T. Mitchell Prudden states that twenty to twenty-five million tons are annually harvested in the United States, and that not far from fifty million dollars are invested in the business. The greater part of this supply may fortunately be considered as of fair quality. Formerly, under the assumption that water became purified in freezing, less care was given to the purity of the source from which the ice-harvest was gathered. Thus Nichols, in 1875, examined ice which was supposed to have caused sickness. This ice had been cut from a brackish pond into which a small brook brought a quantity of sawdust from several sawmills. At that time ice was often cut in winter from shallow ponds which for a considerable portion of the year had no existence, or existed merely as stagnant pools. Even at the present time ice is frequently gathered from waters that are known to be impure, the claim being made that the ice is not intended as a potable supply, but for commercial purposes, for which a high standard of purity is not essential. Ice furnished by the Health Officer of St. Paul, Minn., was examined by the writer in 1886, and found to be in reality solidified sewage, two melted specimens giving respectively .100 and .074 of free ammonia, and .069 and .084 of albuminoid ammonia, while samples of the river-water collected just below the sewage-inflow gave .321 and .241 free ammonia and .066 and .056 albuminoid in 100,000 parts (see "Public Health in Minnesota," vol. ii., No. 12). Manifestly the harvesting of ice from impure sources should be interdicted, because the uses to which such ice may be applied cannot always be controlled.

Pengra, of Michigan ("State Board of Health Report," 1882), investigated the influence of freezing in removing certain saline and albuminoid matters from water. About fifty per cent of the crystalloids were cast out and only about twenty per cent of the colloids. He therefore denounced the use of ice from impure sources, "even if used for no other purpose than that so common of packing poultry or any fresh meats," and urged the State health authorities to warn the people that pure ice can come only from pure water. Two years later he published the results of experiments on the freezing of water which contained bacteria and certain infusorial animalcules, showing the casting out of about ninety per cent of these organisms. Good ice should be as free from organic matter as a pure spring-water.

Artificial ice is usually good, as distilled water or water of known wholesomeness is selected as its basis. No sample examined by the writer has been of a questionable character.

Storage and Purification of Water.—The storage of a water-supply on a small scale, with its protection from avoidable defilement, and its purification when needful and possible, lies with the householder or consumer. Spring-water merely requires protection. If a pure distilled water be collected in a receiver which is half-filled with decaying vegetation, it will immediately cease to present the characters of a pure water; if the reservoir of a spring be similarly lined, the water that comes from the seam of the rock will be similarly changed. The basin should be kept free from all organic accumulations, and its edge and sides should prevent the inflow of surface washings. Wells which penetrate an impervious stratum to reach the water-supply should be carefully lined to exclude surface-drainage. Wells should not be sunk in the vicinity of large trees, as their roots may penetrate the clay and form channels which permit of inflow from the surface. The writer has met many instances of foul water in wells situated in richly manured gardens bearing many fruit or shade-trees, the soil a porous sand, but the tree-roots extending below this through the clay to the water-bearing stratum. Of course, no matter how carefully the well may be lined, it should be at a proper distance from privy-pits, stables, and other sources of impurity. The dangers attaching to the use of wells in cities and other closely-built settlements is now fully recognized by health officers, who, in many municipalities provided with a public supply, have directed their disuse and closure.

Rain-water is usually stored in brick cisterns or cypress-wood tanks, the former generally underground, the latter raised above the surface. The raised tanks are only used in situations where the high level of the ground-water denies a favorable site to the underground reservoir. The purity of the water depends, in the first instance, on the cleanliness of the shedding surfaces and conduits. The first part of the fall, particularly after seasons of continued drought, should be cast aside as the impure washings of roofs and pipes. Many ingenious contrivances to effect this have been invented, under the title of automatic cut-offs; but, as a rule, the whole of the rainfall enters the cistern unless the careful householder gives his personal attention to the collection of the water-supply. Sometimes, instead of a cut-off or other means of rejecting the first falls, the whole of the rainfall is received into the cistern, which acts as a sedimenting reservoir, and feeds a second or distributing cistern by its overflow. In every case the conduits from the roof should enter at a low level, that the sediment may not be stirred up by every rainfall. The underground cistern is, from its position, frequently exposed to all the dangers of a well. Its water always contains more lime than that which entered from the roof, showing that its cement lining is becoming gradually destroyed. Hence follows either loss of water or contamination by inflow of surface-drainage. Of 558 cisterns examined by the writer at Memphis in 1879, 167 were undoubtedly leaky and tainted with soil impurities, 177 were apparently sound, and the remainder on the border-line—one half probably sound, and the other half probably siping. That many of these were found to contain water contaminated with animal excretions may easily be understood when it is recalled that of 4744 cisterns and wells in the city mentioned, 369 were built under the basements of houses and within ten feet of privy-vaults, the contents of which had often a higher level than the water in the cistern; 3039 were between ten and fifty feet from the privy, and 1336 over fifty feet from accumulations of organic matter.

The raised cistern is protected from dangers of this kind; but in the hot weather of summer, when the sediment bears a large proportion to the overlying water, the latter is prone to become tainted by the fermentation of organic matter. The purification which takes place in underground cisterns and the method of effecting a similar purification in wooden tanks have already been referred to.

The ground-water forms a dangerous source of supply in localities that have been occupied for some time. The accumulated filth of continued settlement drains through the surface-layers and enters into the constitution of the water-supply. The percolation may destroy the dead and decaying organic matter, so that the water may be reported by analysis as comparatively pure ; but if there be specific infection associated with any of the excreta, the well may become the focus of an epidemic outbreak. Sanitary authorities are united in condemning the use of these shallow wells.

On the other hand, the ground-water in certain localities forms one of the purest sources of supply. When the surface-layers consist of clean gravel and sand the subsoil water is a rain-water purified by natural filtration, and stored or retained in position by the conformation of the underlying clay. When there is an extensive filtering area of this character, water may be obtained on a large scale by digging wells or basins as storage-reservoirs. Brooklyn is mainly supplied by this sand-filtered rain-water. Filtering galleries are sometimes built for the collection of the water. That at Lowell, Mass., is a long tunnel with heavy masonry sides supporting a water-tight semi-circular brick arch ; the water rises through the gravel and sand at the bottom of the tunnel. At Columbus, O., and Taunton, Mass., the water is drawn from the gravel by long circular tunnels of pervious brickwork. At Dresden, Hanover, and other German cities the water is drained off by perforated pipes of iron or clay into suitable reservoirs, from which it is pumped for distribution. In this country wells or filtering galleries are sometimes constructed by the edge of a river, the impression being quite general that the water is derived by filtration from the bed of the stream, when, on the contrary, it consists of the drainage of the higher levels toward that bed. At Winona, Minn., for instance, the general water-supply, although supposed to be Mississippi River water filtered into the reservoir, consists really of the same character of water that percolates into the wells in other parts of the city ("Public Health in Minnesota," January, 1887).

The character of the water from driven wells depends in part on the depth of the well. If the tube be sunk merely into the pervious superficial strata, the water is pure or dangerous according to the sanitary condition of the area of drainage. If it be sunk through layers of clay and other impermeable strata to some water-bearing sand, the water procured is usually of good quality. One of the purest natural waters examined by the writer was obtained from wells in the city of Memphis, Tenn. Organically it was pure as distilled water; it contained no more organic substances in solution than a cistern-water; even the chlorine was scarcely in larger quantity than in a good cistern-water, and this, with the absence of nitrates, showed that the water was no percolation from the overlying surface-soil but drawn from another and distant source.

Very deep or artesian wells give a water which is free from all taint of recent organic matter; but the mineral substances held in solution are frequently of such a character as to interfere with potability.

As the natural filtration in the case of springs and wells usually effects the purification of the water, the only questions that arise are those relating to quantity and distribution; but in the case of surface-waters methods of purification become of the first importance. Rains and snow-meltings carry much of the organic detritus of the surface into the streams and ponds, rendering them turbid and impure, irrespective of the sewage and manufacturing waste that are cast into them from every settlement.

The claim as to the self-purification of a stream has already been discussed. Dilution, sedimentation, aeration, and nitrification have been shown to so dissipate the vegetable matter of the uplands and swamps, and even the sewage of cities, that the chemist may have difficulty in recognizing the continued existence of some particular polluting substance in the general organic impurity of a stream. This general impurity, in view of many of its known elements, calls for treatment. In England sedimentation and filtration are the methods adopted; in this country, sedimentation alone. The water is taken from a tank or pond which forms a natural sedimenting basin; dams are thrown across the bed of a stream to impound its waters, or the water is pumped from the stream into storage and distributing reservoirs. Primarily these basins were intended merely for storage, but, if they are large enough, the turbid waters of the stream become clear and give better results on analysis. There are now at St. Louis four settling-basins holding eighteen millions of gallons each. The floors are paved with brick on edge, and slope toward the centre and the river-side. The sediment is floated off from the floor of each basin once in about four months, the quantity removed annually amounting nearly to two hundred thousand cubic yards. The wants of the city permit the water to settle only from eight to eighteen hours, while a period of thirty hours is required for a satisfactory subsidence. On this account the extension of the works is at present contemplated. Surveys have been made and land purchased for larger settling-basins and conduits to carry the water to the present high service or clear-water pumping plant. The estimated cost of these improvements is three and a half million dollars.

But although stored waters undergo a purification by the subsidence of their suspended matters, they are prone to become affected, particularly in summer, with a vegetable taint which has sometimes occasioned diarrhœal troubles. In August, 1859, the bad taste and smell of the Croton reservoirs caused much anxiety. In 1876 Professor Lattimer investigated and reported on the fishy taste which affected the pond-water supply of Rochester, N. Y. In 1881 the disagreeable odor and taste of the Boston supply was referred by Professor Remsen to the presence of a large quantity of a spongilla or fresh-water sponge in a more or less decayed condition. The Boston water-supply has also suffered from the decomposition of certain algæ of the nostoc family, species of cœlospherium, clathrocystis, and anabœna, which float as minute greenish filaments in the water or gather as a scum on its leeward surface. The sudden death of large masses of these in a reservoir, from such causes as changes of temperature or of the depth of water, communicates an offensive taste and odor to the supply. Professor Leeds attributes their death and decay to a want of aeration of the water resulting from stagnation and high temperature; and, in the case of the Hoboken supply, he has succeeded in removing the odor and taste, and the green scum of oscillariæ which caused them, by pumping air under pressure into the water-mains.

Filtration.—As the storage-reservoirs and sedimenting basins of this country fail to give a clear water at all times, a very general demand has arisen for small or domestic filters.

Those that are furnished for application to the tap or faucet are valueless. The filtering area is so small that, if it act efficiently, the flow is necessarily by drops. Rapidity of flow is gained at the expense of efficiency, and when attained, the so-called filter becomes a mere strainer, retaining only the grosser particles ; and these have usually been removed already by partial sedimentation. Household or domestic filters generally combine with the filter a storage-chamber from which filtered water may be drawn off as required. Gravel, sand, charcoal, spongy iron, and blocks or beds of various porous materials are used as the filtering medium. If the water flow freely, and give satisfaction to the eye, the filtration may be accepted as efficient, for with the removal of the fine particles of clay and other inorganic substances which cloud the natural water, organic matter in a state of fine division is also removed, and processes of oxidation and nitrification diminish the quantity of dissolved organic matters. If the filtering medium become clogged or cracked, the necessity for interference will be manifested in the one case by the inadequate flow, in the other by the cloudiness of the filtered water. The fine clay in many of our streams will choke an ordinary filter after twenty-four hours' use by forming an impermeable layer on the surface of the filtering material ; this has brought into existence filters which may be cleaned from time to time by breaking up the layer by means of a reverse current, and floating off the turbid and impure washings.

The profession and, indeed, the general public of this country are aware that the filtration of a turbid water does more than effect an improvement in the appearance of the water. They understand that there is an associated improvement in its quality ; but it is by no means generally understood that the prevalence of malarial-fevers may be lessened by avoiding the use of unfiltered surface-waters. In no instance has malarial disease been traced to the use of well-water untainted by a direct inflow from the surface. Dangerous malarial waters, from marshes and other soils rich in vegetable decay, leave their noxious constituents behind them in percolating through the soil, and appear in the well as pure and non-malarious waters.

Filtration is therefore capable of removing from a surface-water the essence of the remittent fevers that may be present in it. The great prevalence of these paroxysmal fevers in many sections of this country calls for the adoption of every means which may offer a prospect of diminishing the evil. Surface-water, whether collected from the roof in the domestic cistern or supplied by the municipality from rain-fed ponds or running streams, should be filtered before being used as a supply for drinking. Yet with us filtration on the large scale has not extended beyond the experimental stage, while in England and in Continental Europe it is an accepted method of purification. In England the first filter on the large scale was constructed by the Chelsea Water Company as long ago as 1829. A Royal Commission had reported that the Thames water, when free from extraneous substances, was a water of considerable purity, but that as it approached the metropolis it became loaded with much filth, from which, however, it was perfectly possible to purify it by filtration through sand, and this with all requisite rapidity and within reasonable limits of expense. In experimenting with a view to carrying out the suggestions of the commission, the water companies found that a filtering-bed of sand speedily became choked by the mass of fine matter removed from the water; but that if the water was permitted to stand for some hours in a settling-basin, to rid it of its heavier and grosser particles, the sand-filter would afterward give satisfactory results. The experimental filter of the Chelsea Company had an area of one acre, and as it proved a success, it led to the general adoption of filtration as a means of purifying the surface water-supply of England. According to Professor Leeds, who has recently visited the works of the London companies (SANITARIAN, xix., p. 25), the average daily supply to the 5,274,542 inhabitants of the metropolis for the month of May, 1886, was 160,388,316 gallons. Of this more than half, or 82,366,466 gallons, came from the Thames, and the remainder from the River Lee, from certain chalk springs in the valleys of the Lee and Thames, and from twenty-one deep wells sunk into the chalk formation north and south of London. There are fifty-four subsiding reservoirs for unfiltered water, with an area of four hundred and sixty-five acres and an available capacity of 1,290,100,000 gallons, and fifty-three covered reservoirs, with a capacity of 160,002,000 gallons, for the storage of water after filtration. The number of filter-beds is ninety-nine, with an area of ninety-eight acres; of this surface ninety-two acres were cleaned during the month stated.

Filtering basins have the sides of solid masonry and the floors of brick, laid in hydraulic cement, with channel-ways for the collection of the filtered water. The filtering medium consists of several layers of broken stone, screened gravel, and sand—the coarser materials at the bottom, the finer on top. The thickness of these layers varies in different beds, but the sand always forms a considerable proportion of the whole, as it in fact constitutes the intercepting layer. The Chelsea Company filters through four feet six inches of sand, the West Middlesex through three feet three inches, the Southwark and Lambeth through three feet, and the Grand Junction through two feet six inches. The rate of filtration depends upon the pressure or head of water, the porosity of the filter, and the freedom of the unfiltered water from suspended matters. The maximum permissible rate of filtration is two gallons per hour per square foot of surface; but, as a matter of fact, the actual rate is generally much smaller than this, many of the filters passing only one and one-third gallon. When the surface-layers of the sand become choked, the water is drawn off and the filter-bed cleaned by removing as much of the sand as has become fouled by use.

Poughkeepsie, on the Hudson, was the first city in this country to construct filter-beds for the improvement of the water-supply. As originally built these works consisted of a settling-basin $60 \times 25 \times 12$ feet, and two filter-beds, each $200 \times 73\frac{1}{2}$ feet, and 12 feet deep, one half of which was occupied by the filtering materials. These consisted, from below upward, of two feet of four to eight-inch broken stone, and six inches each of two-inch stone and one-inch, one-half-inch, and one-fourth-inch gravel, topped with two feet of sand. The expense of running such filter-beds, variously estimated at from \$2.50 to \$5 per million gallons, exclusive of the cost and interest of the plant, has prevented their general adoption in this country.

The English Rivers-pollution Commission concluded, with regard to sand-filtration as carried out in water-works, that it

" not only clarifies the water by removing suspended impurities, but also diminishes the proportion of organic matter in solution to an extent dependent upon the thickness of the filtering medium and the rate at which the water passes through that medium." This conclusion has been verified by all who have since investigated the subject; indeed, the constant watch kept upon the condition of the London supply furnishes all the testimony needful in this connection. Recently, however, fresh evidence of the efficiency of sand-filtration has been placed on record by P. F. Frankland (" Transactions Sanitary Institute of Great Britain," viii., p. 276). He made a continued series of observations on the quality of the unfiltered Thames water, and of the same water as filtered for delivery by the various metropolitan water companies. Taking, for instance, the averages of the month of March, 1886, the unfiltered water at Hampton gave evidence of the presence of 11,415 microbes in each cubic centimetre, while a striking reduction was found in all the filtered waters. The West Middlesex Company gave 175; the Lambeth, 287; Chelsea, 299; Grand Junction, 379; and Southwark, 1526. The influences which determined the efficiency of the filtration by the various companies were: 1. The storage-capacity for unfiltered water, inasmuch as extensive basins obviated the necessity for taking in water from the river when it was impure and turbid from floods; 2. The thickness of fine sand used in filtering; 3. The rate of filtration; and 4. The care taken in cleaning and renewing the filter-beds.

Frankland's experiments extended to other filtering materials than sand and to other modes of purification than filtration. Most of the filtering media that were tested—ferruginous sand, animal charcoal, iron sponge, brick-dust, coke, vegetable charcoal, etc.—were efficient at first, but afterward the organisms passed through, although in reduced numbers. It was found also that substances which, like vegetable carbon, exercised but little chemical action, were nevertheless highly efficient in removing the microphytes. Their separation was effected mechanically, for the greater the rapidity of the flow the less efficient was the filtration. Sponge-iron, charcoal, and coke gave the best results. Sedimentation, after agitation with such substances as china clay, brick-dust, plaster of

Paris, and oxide of manganese, was of no value, but when porous substances, as coke and charcoal, whether animal or vegetable, were used, the number of microbes became greatly reduced. In these experiments the fact was recognized that the greatest improvement in the sedimented water was shown when it was examined immediately after it had become clear, for the multiplication and growth of the unremoved organisms speedily altered the character of the sample as developed on the bacterial culture-field. Sometimes, indeed, this multiplication more than offset the purification effected by the subsidence. On one occasion a water which gave 3000 colonies was agitated with coke, and when subsidence was completed, at the end of twenty-six hours, the microbes had increased to 20,000 per cubic centimetre. Precipitation by lime, in the case of hard water, was also efficient in reducing the number of colonies derived from a water. Water softened on the large scale at Colne Valley Water-works showed only four colonies when examined after two days of subsidence, although previous to treatment it had yielded 322. Some of the laboratory experiments in this process of precipitation are of interest as placing on record the varying qualities of the same water at different times. Thus a water which contained 85 microbes per cubic centimetre was in one bottle precipitated by lime, and in another permitted to stand untreated for future comparisons. At the end of eighteen hours, when subsidence was completed, the treated water yielded 42 colonies, while the 85 of the untreated water had become augmented to 1922. The principal conclusions drawn from his experiments are tabulated by Frankland as follows :

1. That the complete removal of micro-organisms from water by filtration is unattainable without frequent renewal of the best filtering materials, and duly restricting the rate of filtration.

2. That a very great reduction in the amount of organized matter in water may be accomplished by filtering materials which have hitherto been generally regarded as almost ineffectual.

3. That organized matter is to a large extent, and sometimes to a most remarkable extent, removable from water by agitation with suitable solids in a fine state of division, but that such methods of purification are unreliable.

4. That chemical precipitation is attended with a large reduction in the number of micro-organisms present in the water in which the precipitate is made to form and allowed to subside.

5. That if subsidence, either with agitation or after precipitation, be continued too long, the organisms first carried down may again become redistributed throughout the water.

About ten years ago a filter known as the Newark filter was found to answer well for household, hotel, and factory purposes, in localities where the public water-supply was turbid from clay or fine silicious particles which choked the ordinary filter. The water-pipes connected with this filter were so arranged that when needful a current could be sent through the filtering materials in the reverse direction, to clean them by dislodging and floating off the intercepted accumulations. From this as a beginning, that which is now known as the Hyatt system was developed—a system in which the filtration takes place in a strong iron cylinder under considerable pressure, the filtering bed being cleaned from time to time by a reversal of the current. Coagulants, as alum, iron, lime, etc., are used to facilitate the removal of the suspended matters. The general supply of several cities, among which may be mentioned Somerville and Brunswick, N. J., Charleston, W. Va., and Belleville, Ill., are now filtered by this system, which is favorably regarded by many sanitary engineers and others interested in public water-supplies.

The addition of alum, iron, permanganate of potash, and other substances has often been suggested and employed in special cases for the purification of impure water. Waters turbid from fine clay particles, which take a long time to settle, are frequently cleared satisfactorily by the use of alum; hydrate of alumina is precipitated, carrying down with it the suspended matters. A similar action takes place when a solution of perchloride of iron is used, the precipitated hydrate clearing the water and at the same time removing some of the albuminoids. Lime-water throws down lime carbonate from bicarbonated waters, softening them and improving their organic quality. The readiness with which permanganate of potash parts with its oxygen renders it of use in oxidizing those matters which, being in a putrescent or transition state, give an unpleasant odor or taste to the water. It has little influence on recent organic matter, and, so far as known, none whatever on the dangerous elements derived from an infected sewage. It is added in solution, in small quantities at a time, until the faintly pink tint which is produced remains visible for five or ten minutes. Boiling the water, if it be hard, precipitates excess of lime and removes albuminoids, particularly if a little tannin be introduced, in the form, for instance, of tea-leaves. But boiling has a more important influence on the purification of water on the domestic scale, inasmuch as it destroys the infection of specific diseases. According to the Committee on Disinfectants of the American Public Health Association, Report 1885, boiling in water for one hour does not destroy the spores of bacillus subtilis, but is effective for the destruction of the spores of the anthrax bacillus and of all known pathogenic organisms. Distillation gives a pure water, except in occasional cases, in which the original water is tainted with the volatile products of decomposition.

Iron as a precipitating or filtering agent has been used in various forms, to a considerable extent on the large scale, as a water-purifier. L. H. Gardner, of New Orleans, La., recently made inquiry, through the Belgian consul in his city, concerning the cost and success of these works at Antwerp, and received in reply the following (*Scientific American, Supplement*, October 10th, 1886), which was signed by E. Devonshire, Engineer of the Antwerp Water-works, and approved by the city authorities: "The motive power required to turn the apparatus is trifling. The cost of cleaning is really nothing, from the fact that the particles of iron are kept clean by reciprocal friction. All oxidized matters are removed by the current of water and deposited on the sand filters. The quantity of iron used in the Anderson apparatus does not exceed one tenth of a grain per gallon, or about 15 lbs. per million gallons. The filings of cast iron that can be employed for the purification would cost perhaps 10s. per ton, making the cost of iron employed amount to about ¾d. per million gallons. The cost of cleaning the sand filters averages 12s. per million of filtered gallons, including the cost of purified water employed to wash the sand. In our works at Waelham we have established three Anderson purificators No. 10, which can together purify 2,200,000 gallons of water per day. The value of these three machines is £1350, and the cost of their installation, including the building in which they are located, was about £300. The water retains no trace of iron after being filtered through sand. The daily consumption of water at Antwerp at this time of the year [July] is about 2,000,000 gallons, and it is all subjected to this process of iron purification."

Mr. Gardner, in the journal cited, makes a strong plea on behalf of iron for the purification of the surface-waters of this country. He reviews the attempts to carry out the English system of filter-beds, and condemns them on the score of expense. He claims that, speaking generally as regards our Western waters, filtration on the large scale accomplishes only what a twenty-four hours' rest in a reservoir would effect, and that by the addition of a solution of iron their clarification can be promptly secured. The European methods for purification by iron contemplate actual contact with natural or prepared ore, or with cast-iron borings or turnings, with a subsequent sand filtration for eliminating the excess of iron. Mr. Gardner's suggestion is the introduction of a solution of iron in such a quantity as experiment may have demonstrated to be needful for the desired purpose, and no more. He tried a solution of red hæmatite ore in hydrochloric acid, on Mississippi water, at the New Orleans Water-works, and the clarified water gave satisfactory results to Professor Chandler, of New York, and other chemists. Later, he treated a body of thirteen million gallons in the sedimenting basins at St. Louis, Mo. The solution used, the water in various stages of precipitation, and the colorless resultant water met with favorable reports from the analysts. The action is chemical and mechanical. In the water of the Mississippi there exist carbonates of lime and magnesia. Contact of the chlorine of the iron solution forms chloride of calcium, and coincident therewith is the formation of the hydrated oxide of iron. The latter settles rapidly, carrying with it all suspended matters and leaving the water clear. The use of a solution of 1.60 sp. gr. in the proportion of one part to 20,000, clarifies the muddiest water, neither hardening it nor leaving in it any excess of the iron. The Mississippi water at New Orleans is clarified by a rest of eight hours in a reservoir, at a maximum cost of one cent per 1000 gallons of the water. The present writer has a practical knowledge of the sedimentation of the Mississippi River water at New Orleans and elsewhere, and if the addition of iron gives, as claimed, a crystal-clear water after eight hours' subsidence, the advantage of its use needs no lengthened argument.

The lime process, that patented in 1844 by Professor Clark, of Aberdeen, has also been used on the large scale as a softener and purifier of hard water. In this process lime is removed from the water by the addition of lime. If a water which contains carbonate of lime, dissolved by the agency of free carbonic acid, has that free acid neutralized by the addition of caustic lime, the original carbonate will be rendered insoluble by the loss of its free acid, and the carbonate, formed by combination with the added lime, will also fall in an insoluble state. The precipitated lime-salt carries down with it all the suspended matters, organic or inorganic, which may be present, and, to a certain extent, purifies as well as softens the water. Professor Frankland's recent experiments at the Colne Valley Water-works have demonstrated the efficacy of this process in removing bacteria from the water.

All the processes of purification that have been mentioned remove suspended matters and more or less of the dissolved saline and organic substances that are present in the water; but, with the exception of boiling and distillation, none of them can lay a well-defined claim to the removal or destruction of the causative agencies of the acute infectious diseases that are known to be propagated by the water-supply. The conclusions of the English Rivers Commission remain unaltered by recent additions to our knowledge concerning the impurities in water: "1. The existence of specific poisons, capable of producing cholera and typhoid-fever, is attested by evidence so abundant and strong as to be practically irresistible. These poisons are contained in the discharges from the bowels of persons suffering from these diseases. 2. The admixture of even a small quantity of these infected discharges with a large volume of drinking-water is sufficient for the propagation of those diseases among persons using such water. 3. The most efficient artificial filtration leaves, in water, much invisible matter in suspension, and constitutes no effective safeguard against the propagation of these epidemics by polluted water." Boiling the water is the only sure disinfectant, and this can only be effected on the small or domestic scale. At present the object of sanitary legislation in England is not to preserve the rivers as a source of water-supply, but to prevent them from becoming a nuisance in their character of open sewers. It is desired to permit the inflow of water into their channels only when it contains less than a stated maximum of organic impurity; to treat sewage chemically for the removal of its filth, so that its water may flow in a clear and comparatively pure condition into the streams; or to effect the same result by filtration through the soil. The advocates of sewage-irrigation become enthusiastic over the clearness and purity of the water from their under-drains, and suggest that the general use of their system would reclaim the polluted streams and permit them to be again used with safety for household purposes. But the purifying factor in sewage-irrigation is filtration, and filtration through a notoriously polluted soil. The unwholesomeness of water that has percolated into a well through a soil saturated with sewage has been so often illustrated, that we may well be excused for showing some hesitancy in accepting the effluent water of sewage-farms as a general household supply. The adoption of this system of irrigation would certainly improve the appearance and quality of the river-water; but so long as we know that at Lausen, not sewage, but a sewage-tainted mountain stream, used for irrigating purposes in one valley, occasioned a general outbreak of virulent typhoid among the inhabitants of another valley who used the clear water of the effluent, we must acknowledge that filtration cannot be trusted to render an infected water safe. The English Commissioners gave positive expression to this view: "Of all the processes which have been proposed for the purification of sewage, or of water polluted by excrementitious matters, there is not one which is sufficiently effective to warrant the use, for dietetic purposes, of water which has been so contaminated. In our opinion, therefore, rivers which have received sewage, even if that sewage has been purified before its discharge, are not safe sources of potable water." It is often urged that sewage is harmless, as evidenced by the long-continued use of sewage-polluted wells; and that, even were it harmful, the natural processes taking place in the running stream effect its destruction. The fallacy of these arguments may easily be understood from what has been already stated. It is not the excreta of health that are dangerous, but those that contain the contagion or germs of disease; and although the former may be deposited or decomposed in their passage down stream, there is no evidence that the germs of typhoid-fever are destroyed in this manner; but, on the contrary, positive evidence that they are not. Moreover, a river-water that contains sewage must always be regarded as infected. The contributors to the sewage of a river are so numerous, and typhoid-fever so continually and extensively prevalent, that the outflow of sewage from a populous city cannot safely be assumed to be uninfected. Below the point where sewage enters there should be no more thought of using the waters as a potable supply. The stream should be left to fulfil its part in the economy of nature as an open drain for the water-carriage of surface-swept impurities. River water-supplies should be taken from above all points of sewage entrance, and the drainage area placed under the control of the sanitary authorities for its better protection from contamination. In this way only, so far as our present knowledge extends, can a truly wholesome water be obtained. Sedimentation and filtration, with or without chemical additions for promoting their action, will improve the quality of the water when this is needful, but only by avoiding the presence of animal excretions can we avoid the unnecessary propagation of certain dangerous diseases by the water-supply.

THE INFLUENCE OF A BETTER WATER-SUPPLY UPON THE HEALTH OF A COMMUNITY is remarkably illustrated in the experience of the town of Havre de Grace, Md. In times past the only available water-supply was from wells within the town limits, and for many years the town had been notorious for the prevalence of malarial diseases, usually ascribed to the situation of the town on the banks of the Susquehanna River, and to the fact that it lies within a so-called malarial district.

In 1883–84 water-works were built and the supply taken from the Susquehanna River, and the use of well-water was abandoned. As an immediate consequence, for which he can in no otherwise account than by the change from well to river-water, Dr. Cochran, the leading physician of Havre de Grace, reports that whereas three years ago he usually treated about seventy-five cases of shaking chills daily, he now has scarcely a single case. The town site is certainly the same, and the river, tide-water, and surrounding natural conditions remain unchanged; but the one change is that this town of several thousand inhabitants has suddenly, upon the introduction of a better water-supply, become singularly free from the one special disease which was so lately and for so long a time previously prevalent. Account for it as you please, the results at Havre de Grace are well worth noting by other towns in the United States which now experience what that town did in the past, and by a similar remedy they may meet with similar relief.—*Engineering News.*

THE DEVIL CAST OUT BY SCIENCE.—Conscientious men still linger on who find comfort in holding fast to some shred of the old belief in diabolic possession. The sturdy declaration in the last century by John Wesley, that "giving up witchcraft is giving up the Bible," is echoed feebly in the latter half of this century by the eminent Catholic ecclesiastic in France who declares that "to deny possession by devils is to charge Jesus and his apostles with imposture," and asks, "How can the testimony of apostles, fathers of the Church, and saints who saw the possessed, and so declared, be denied?" And a still fainter echo lingers in Protestant England.

But despite this conscientious opposition, science has in these latter days steadily wrought hand-in-hand with Christian charity in this field, to evolve a better future for humanity. The thoughtful physician and the devoted clergyman are now constantly seen working together; and it is not too much to expect that Satan, having been cast out of the insane asylums, will erelong disappear from monasteries and camp-meetings, even in the most unenlightened regions of Christendom.—*From "Diabolism and Hysteria," by Dr. Andrew D. White, in the Popular Science Monthly for June.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.

By Dr. HORATIO R. STORER, Newport, R. I., Member of American Public Health Association, etc.

X. *Epidemics.* Continued from page 247.*

V. YELLOW-FEVER.

A. THE UNITED STATES.

Dr. Jean Charles Faget, of New Orleans (1818–). "Medical Reflections (etc.), and a Short Account of a Paludal Endemic Disease of Catarrhal Form, which Prevailed at New Orleans During the Epidemic of Yellow Fever in 1858." New Orleans, 1859, 8°; "Mémoires et Lettres sur la Fièvre Idune et la Fièvre Paludéenne." 1861; "The Type and Specificity of Yellow Fever Established with the Aid of the Watch and Thermometer." *New Orleans Medical and Surgical Journal,* 1873, i., N. S., p. 145; *ibid.*, Paris and New Orleans, 1875, 8°.

1063. Obverse. Æsculapius facing, with the cock in his right hand, and his staff in the left. Beneath, upon a bifid band: Et Prudens Et Vigil. Inscription: Société De Médecine De Caen.

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* The previous portions of this paper will be found in THE SANITARIAN for May, July, August, October, 1887: February, April, July, August, November, 1888; February, March, and April, 1889.

Since my chapter upon the medals of The Plague, in THE SANITARIAN for November last, I have received from Signor Francesco Gnecchi, of Milan, impressions of another plague medal of that city, unknown to Pfeiffer and Ruland, and apparently as yet unpublished.

867 a. Obverse. Bust to right, with collar and coat of mail. Inscription: Phillippvs·IIII· Hispaniarvm. Rex Exergue: 1630

Reverse. View of Milan. Above, an angel, in clouds, with flaming sword. In front, many dead persons. Legend · Et Inde Salvs-Vive Mediol.

The reverse is the same as of No. 867. The obverse of that was of the Emperor Charles V., and was without date. It presumably commemorated the epidemic of 1576 (made famous by the devotion of St. Charles Borromeo), though the Emperor had then been dead for eighteen years. In 1630 The Plague raged again in Lombardy; in Venice and its surroundings nearly a hundred thousand persons died of it.

Silver. 44 mm. In the collection of Signor Gnecchi.

Reverse. A wreath of flowers. Within, engraved: 2me Prix Exceptionnel Decerné A Mr le Dr Faget 1853. Gold. 24.

For a description and impressions of this medal, conferred upon the late Dr. Faget by the profession of Caen, France, I am indebted to his daughter, Mlle. Hélène Faget, of New Orleans.

Dr. James Francis Harrison, of Virginia (1822–).

The medals conferred by the French Government and the city of Portsmouth, Va., upon this gentleman will be described in another connection, in the present Section.

Dr. David Hosack, of New York. On Yellow-fever. 1830.

Already mentioned in Section I., and will be subsequently again referred to in the present Section under Typhoid.

Dr. Robert W. Mitchell, of Memphis, Tenn.

The medal upon which Dr. Mitchell's name appears in an official capacity, that of the Howard Association of Memphis, will be described a little later.

Dr. John Morris, of Baltimore (1824–). "Prison Physicians, Their Duties and Influence." An Address before the National Prison Congress at Atlanta, Ga. *Maryland Medical Journal*, November 27th, 1886.

Dr. Morris is one of the gallant band of medical men who hazarded their lives during the epidemic of 1855 at Norfolk, Va. The medal, that of the Howard Association of that city, will be described subsequently.

Dr. Benjamin Rush, of Philadelphia (1745–1813). "An Account of the Bilious Yellow Fever as it Appeared in Philadelphia in 1793." Philadelphia, 1794, 8°; and of each successive year till 1805; "Facts Intended to Prove the Yellow Fever not to be Contagious." 1803, 8°.

During the epidemic of 1793, Dr. Rush rendered extraordinary services. For these he received gold medals from the King of Prussia in 1805, and the Queen of Etruria in 1807, and a diamond ring from the Czar of Russia in 1811.

1064. Obverse. Bust, with queue, to left; a neckcloth under the collar. Beneath shoulder: F. Inscription: Benjamin Rush M:D: Of Philadelphia ∴

Reverse. A river, flowing forward. In background, the setting sun, with clouds and mountains. Large trees in foreground, to right. To the left, Sydenham. In front, a block of stone, on which : Read | Think | Observe Upon this, an open book. Beneath, to right, M. Furst Fec. Exergue : A(NNO). MDCCCVIII.

As regards the name upon the reverse, Dr. Rush has been called "The American Sydenham." The legend is from one of his lectures. Silver (?), bronze, lead. 41 mm. 27.

In the Lee Collection. I also have it, both in bronze and lead. It is very rare, and seems unknown to all numismatic writers. The engraver, Fürst, was Chief Engraver at the United States Mint, where this was struck, and of which Dr. Rush was Treasurer for fourteen years. There are said to exist two specimens in silver, but I have endeavored in vain to trace them.

1065. Obverse as in preceding.

Reverse. An altar, upon which rests an open book. In front, upon an oval panel, a bust of Æsculapius, with staff and serpent. In another, at right, an urn. Beneath, to right, M. Furst Fec. Exergue : A. MDCCCVIII. Bronze, gilt bronze. 41 mm. 27. The size is given as 20 in the Wood Catalogue, February 25th–29th, 1884, No. 2372.

Unknown to all writers upon medals. Still rarer than the preceding. It is in the Lee Collection and my own.

Dr. Rush has already been referred to under Section VIII., Diet. He will be again mentioned in the present Section, and under Section XI., Military Hygiene.

Dr. J. M. Toner, of Washington. "Contributions to the Study of Yellow Fever in the United States ; Its Distribution, with Weather Maps." Washington, 1874, 8°.

Several medals of Dr. Toner have already been mentioned, but since their publication I have learned of another that has been conferred upon this distinguished physician.

1066. Obverse. Laureated head of the Emperor Wilhelm, to right. Exergue : J. Tautenhayn.

Reverse. Three persons, with distaff, wreath, and cornucopia. In background, a plough. Inscription : Weltausstellung 1873 Wien Exergue : Dem | Verdienste.

This, the "medal for merit" of the Vienna Exposition of 1873, was given to Dr. Toner for the collection of the reports of medical institutions, hospitals, etc., then contributed by him.

Dr. Thomas H. Williamson, U. S. N.

This medal from the French Government, like that of Dr. Harrison, will be described hereafter.

B. ENGLAND.

Dr. Frederick Rose, Assistant Surgeon, R. N.

The two American medals to Surgeon Rose will be described in their more appropriate connection, later on in the present Section.

C. FRANCE.

Dr. Matthieu F. Maxence Audouard (1776–1856). "Lettre sur la contagion de la Fièvre jaune." Paris, 1821, 8°; "Relation historique et médicale de la fièvre jaune qui a regné à Barcelone en 1821." Paris, 1822, 8°; "Typhus Nautique ou Fièvre Jaune." 1825, 8°.

1067. Obverse. A recumbent figure, with civic crown and armorial shield. Upon her, a flying spirit of evil pours from a vase. To her aid, come Faith and Hygeia. In the background, the city walls. Legend: Pietas — Gallica Exergue: Saeviente In Barcinonam | Pestilentia | MDCCCXXI To left, Gayrard Inv.

Reverse. In field: V· (the five) Viri·Medici· | Qvorvm· Primvs Occvbvit· | Mazet· | Pariset· | Bally· | François· | Audouard· | Sancti-Moniales·II· | Sancto·Camillo·Devotae· | Lvdovici·XVIII· | Regni | Ann·XXVIII· At left, a laurel, and at right, a palm branch. Legend: Morte·Venalem·Petiere· Palmam· Silver, bronze. 48 mm.

Rudolphi, Kluyskens, and Duisburg have the dates in Roman. Rudolphi has a dot after Medici, and Duisburg both here and after Regni. Rudolphi does not mention the branches upon the reverse. Kluyskens calls the second of them olive instead of palm.

Rudolphi, 1829, p. 105, No. 440; Kluyskens, ii., p. 203; Duisburg, p. 64, clxi.; P. and R., p. 152, No. 439, fig. of obv. In the Lee and Fisher collections.

Dr. François Victor Bally (1775–1866). "Opinion sur la contagion de la fièvre jaune." Paris, 1810, 8°; (with Dr. Pariset) "Fièvre jaune." 1821.

His medal is conjoint with that of Mazet, Audouard, and others just described. He has already been referred to under Cholera.

Baron Dr. R. N. D. Desgenettes, of Paris (1762–1837). "Discours relatif a la fièvre jaune." Paris, 1827, 8°.

This medal has been described under Section I.

Dr. Guillaume Dupuytren, of Paris. "Rapport etc. sur l'epidémie qui ravage a Barcelone en 1821." Paris, 1828, 4°.

Described in this Section, under Cholera.

Dr. André François (1775[?]–1840). "Sur la fièvre jaune à Saint Domingue." Paris, 1804, 4°.

His medal, conjoint with that of Mazet and others, has just been described.

Baron Dr. J. D. Larrey. "Considerations sur la fièvre jaune." Paris, 1821, 8°.

Described under Cholera, in the present Section.

Dr. André Mazet (1793–1821). "Relation abregée du voyage fait en Andalousie pendant l'epidemie de 1819." Paris, 8° ; (with Dr. Pariset) "Observations sur la fièvre jaune faites a Cadiz en 1819," etc. Paris, 1820, fol.

His conjoined medal, as the first of the five French physicians investigating yellow-fever at Barcelona in 1821, to die a victim to the epidemic, has already been described.

1068. Obverse. At the right, sick persons for whom physicians and religious sisters are caring. At left, Death with a sickle removes the lid of a tomb, upon which : Ils Me Les Ravissent. Behind, a cypress, and a pyramid bearing : Mazet. Upon its summit an angel places a crown. Above, a head encircled by rays. Below, to left, Morel F. Exergue : Devouement Des Médecins Français A Barcelone 1821.

Reverse plain. Bronze. 73 mm. Kluyskens, ii., p. 204. Unknown to Rudolphi, Duisburg, Rüppell, and P. and R.

Dr. Étienne Pariset (1770–1847). "Rapports sur la fièvre jaune de Cadix et de Barcelone ;" and with Drs. Bally and Mazet, already mentioned.

1069. Obverse. Bust. Beneath, L. Dubour F. Inscription : Étienne Pariset.

Reverse. Inscription : Cadix. 1819. Barcelone. 1821. In field : Ire. Obviam. Cadentibus. Miseris. Aegris. Bronze. 40 mm.

Kluyskens has no dot after Cadix. Rudolphi, 1829, No.

500 ; Kluyskens, ii., p. 295 ; Duisburg, p. 71, clxxxii., No. 1. Unknown to P. and R.

The two other medals of Pariset have already been described. The one conjointly with that of Mazet and others, is in this Section under Audouard, and the other, to himself from his friends, is also in this Section, under the subdivision of The Plague.

The medals conferred by the French Government upon Drs. James F. Harrison and Thomas H. Williamson, of Virginia, for their services in an outbreak of yellow-fever upon the ship-of-war "La Chimère" in the summer of 1854, will be shortly described.

D. SWEDEN.

Dr. Pehr (Peter) Dubb, of Gothenburg (1750–1834).

Distinguished for his practical knowledge of yellow-fever.

1070. Obverse. Bust. Beneath, C. E(nhoerning). Inscription : Doctor Per Dubb Admiralit. Medicus Ridd. Af K. W. O.

Reverse. Erkänsla Af Gotheborgs Stad Hwars Fattigvård Invättad Efter Hans Förslag Vann Verkställighet Genom Hans Drift. Exergue : På Stadens Äldstes Bekostnad. 1806. Silver.

Rudolphi has dot after Per, and Kluyskens has Pet instead. Both have Amiralit.

Sacklén, p. 281 ; Silfverstolpe, p. 825, No. 31 ; Rudolphi, 1829, p. 43, No. 168 ; Kluyskens, i., p. 262, No. 1 ; Duisburg, p. 213, dlxviii., No. 1.

1071. Obverse. Till Tacksamhet For Ytterligare Tio Års Möda Åt Directorerne Pehr Dubb Och Johan Wohlfahrt Af Vänfaste Bröder D. 19 Nov. 1799.

Reverse. A spreading oak, to whose shelter birds are flying. Exergue : Sorgfältigt Vårdad J 20 År.

Silfverstolpe, p. 804, No. 15 ; Rudolphi, 1829, p. 43, No. 169 ; Kluyskens, i., p. 262, No. 2 ; Duisburg, p. 213, dlxviii., No. 2.

Dr. A. H. Florman, of Lund (1761–1840). "De febre biliosa anno 1788 nautas afficiente." Lund, 1789, 4°.

1072. Obverse. Bust, to right. Under shoulder, P. H. L(undgren). Inscription : A. H. Florman. Anat. Et Chir. Prof. Lund. Below : Nat. 1761. Den. 1840.

Reverse. A statue of Hygeia before an altar, and a priest sacrificing thereat. Legend : Arcana Deae Scrvtatvs In Extis. Exergue : Socio Svo Meritiss. R. Acad. Scient. Svec. A. MDCCCLI. Silver. 20.

Duisburg, Supplement II., 1868, p. 22. In the Lee Collection.

E. GERMANY.

Johann Heinrich von Chaufepié, of Hamburg (1773–1856). "Historia febris flavae Americanae." Halae, 1794, 8°.

1073. Obverse. Head, to left. Beneath, F. Alsing F. Inscription : Jean Henry De Chaufepié Med & Chir. D^r.

Reverse. Inscription : Preismedaille Des Ärztlichen Vereins. In field : Dem Geehrten | Kunstgenossen | Zur Fünfzigjährigen | Jubelfeier | Der Ärztliche Verein | Hamburg D. 4 Oct. 1844. Gold, silver, bronze. 21. Duisburg has Et for &. Gädechens, Die Neueren Hamb. Münzen und Med. St. 5, p. 221 ; Duisburg, p. 167, No. ccccli. In the Lee and Fisher collections and my own. Unknown to Kluyskens.

1074. Obverse as preceding.

Reverse blank, for name of recipient. Rüppell, 1875, p. 46. This is a premium medal of the Medical Society of Hamburg, as was the last. It was unknown to Duisburg, Kluyskens, and Gädechens.

There exist several medals commemorative of yellow-fever, other than those already mentioned. They are, save one, American, and all but that have been unknown to foreign writers.

A. THE UNITED STATES.

a. Norfolk, Va. (1855).

1075. Obverse. Faith, Hope, and Charity. In background at left, an altar ; in foreground, an anchor, and at right, a lamb. Above, the All-seeing Eye, and stars, irradiated. Beneath, W. N. Dunnell, N. Y. Inscription, within a double circle : Presented By The Howard Association of Norfolk, Va. | 1855.

Reverse. The Good Samaritan. Legend, within a double circle : I Was Sick And You Visited Me. | Matt.xxv.xxxvi. Chased at the edges. Gold, bronze. 22. Snowden, miscellaneous medals, in his Medallic Memorials of Washington in the United States Mint, p. 112, No. 23. Very rare. In the Lee Collection and that of the United States Mint.

I owe to Dr. John Morris, of Baltimore, impressions of the gold medal that he received from the Norfolk Association, and to Dr. Herbert M. Nash, of Norfolk, the following history of the medal, which he was so kind as to send me at the request of Professor James L. Cabell, President of the National Board of Health.

"I had no idea that I should have so much difficulty in getting the information desired. The records of the Howard Association were carried off by the Federal troops, who took possession of them. None of the gold medals are now in the city. They were presented by the Howard Association only to volunteer physicians from abroad, who tendered their services, and performed them, during the epidemic. The following physicians received these gold medals: Warren Stone, E. D. Fenner, C. Beard, Thomas Penniston, William P. Williams, J. S. McFarlane, and S. D. Campbell, New Orleans; James B. Read, Thomas J. Charlton, S. T. McFarland, R. J. Nunn, James E. Godfrey, and W. S. Donaldson, Savannah, Ga.; A. F. Bignon, Augusta, Ga.; St. Julien Ravenel, W. H. Huger, T. C. Skrine, J. B. Holmes, and A. B. Williman, Charleston, S. C.; William (John) Morris, Baltimore; William H. Freeman, Philadelphia; W. Horwitz, New York; John T. Hargrove, Richmond, Va., and J. E. Marsh, New Jersey.

"None of these medals were given to the local physicians."

b. Portsmouth, Va. (1854–55).

In the summer of 1854 the French steamship "La Chimère" arrived in the harbor of Portsmouth, Va., with her crew ill with yellow-fever. The sick were removed to the United States Naval Hospital, frequently spoken of as at Norfolk, although upon the Portsmouth side of the Elizabeth River, and were cared for by Surgeon Thomas H. Williamson, U. S. N., and his assistant, Dr. James F. Harrison, now of the University of Virginia. Gold medals were presented to each of these gentlemen by the French Government, in appreciation of their services. Dr. Williamson is now, I believe, dead, but from Dr. Harrison I have received impressions of his medal. Its description is as follows:

1076. Obverse. Head of the Emperor, to left. Inscription: Napoleon III—Empereur Beneath, Caqué, F.

Reverse. Within an oval, flanked by allegorical figures: Ministère | De La Marine | Et Des Colonies | — | Au Dr | Harrison | (James F.) | Médecin A L'Hopal | De Norfolk | = | Soins Donnés | A L'Equipage | De La Chimère | 1855. Gold. 24.

Dr. Harrison writes me that Dr. Williamson's medal was the same as his own, save a trifle larger. The following certificate accompanied the Harrison medal:

The
Imperial
" Marine Coat of Arms et Colonies
of France.

" Le Ministre Secrétaire d'État au département de la Marine et des Colonies,

" Certifie que, par un décret du 17 Janvier 1855 l'Empereur a décerné une Médaille d'honneur en Or à M. le Docteur James Harrison, médecin a l'hopital de la Marine à Norfolk (États Unis) pour les soins qu'il a donnés a l'équipage de l'ariso a vapeur de la marine impériale la Chimère.

" Paris, le 17 Avril 1855.

" Pr Le Ministre de la Marine et des Colonies et par son ordre. Le Conseiller d'État Directeur du Personnel.

" (Signed) Layly.

" (Seal of)
Le Ministere
de la Marine
et des Colonies

" Pr Le Conseiller d'État Directeur du Personnel, Le Chef du Bureau de l'Inscription Maritime. Va Sa C.

" (Signed) A. Hennequin."

The following, known as the " Portsmouth medal," was also struck to commemorate the epidemic of 1855.

1077. Obverse. The naval hospital, facing, surmounted by the United States flag (five stars and two stripes). Legend, upon a band: Palmam Qui Meruit Ferat. Exergue: A trophy; a scrolled escutcheon with oval shield bearing the serpent-staff of Æsculapius. At sides, banners, a mast, cannon, trident, anchor, and dolphins.

Reverse. Oak and laurel boughs tied by ribbon. Field vacant for name of recipient. Inscription : Presented By The Council Of The Town Of Portsmouth Virginia Exergue : F. N. Mitchell Sc. Gold, bronze. 40.

In the catalogue of the Wood sale, February 25th–29th, 1884, No. 1751, the engraver's name was given as Mitchel, and the flag stated to be the Confederate. The latter error was corrected by Dr. William Lee, of Washington, in a note to the *American Journal of Numismatics* (July, 1885, p. 22). Frossard erroneously speaks of the medal having been given for services in 1858 or 1859.

Snowden, *loc. cit.*, p. 188, No. 8.

This is in the United States Mint Collection, that of Dr. Lee, and in my own. I owe my specimen to the kindness of my good friend, Dr. James L. Cabell, of the University of Virginia. Through the courtesy of Dr. Harrison, of whom I have already spoken, I am enabled to complete the inscription of the medal as given to himself. Upon the impressions sent to me by that gentleman, it is as follows: Presented (etc., etc.) To James F. Harrison | Of Virginia | Passed Assistant Surgeon, U. S. Navy, | For His Professional Services, | During The Epidemic | Of Pestilential Yellow Fever | In | 1855.

Through the thoughtfulness of Professor Cabell I have received from Judge Legh R. Watts, of Portsmouth, the following copy of the minutes of the Common Council of that city, giving the full history of this medal.

"At a meeting of the Common Council (of Portsmouth, Va.), held February 5th, 1856, the following resolutions were adopted :

"*Resolved,* That our grateful acknowledgments are tendered to Lewis W. Minor, Surgeon of the United States Naval Hospital, and to his able and humane assistants, Thomas B. Steele, James F. Harrison, Randolph Harrison, John C. Coleman, and F. A. Walke. These excellent men and skilful physicians were, in season and out of season, at the beds of our sick and dying people, ministering to their necessities and smoothing their pillows in the solemn hour of death. Their kindness to the sick, and their urbanity to all, during the trying times when their labors were so accumulated, ennobled their positions and dignified their honorable profession.

"*Resolved,* That as a memorial of them and a testimonial of the public appreciation of their valued services, a committee be appointed, with instructions to have executed six gold medals with suitable inscriptions and devices, and that one be presented to each of these physicians, together with a copy of this and the foregoing resolution.

"At a regular meeting of the Common Council of the Town of Portsmouth, held at Literary Hall on Tuesday evening, March 4th, 1856, G. W. Peete, chairman of the committee appointed to carry out the spirit of the resolution of thanks, adopted at the meeting of the Board, held February 5th, and to devise suitable medals, reported progress, whereupon, on motion of Mr. Niemeyer, it was

"*Resolved,* That the sum of fifteen hundred dollars be, and the same is hereby appropriated out of any moneys in the hands of the Treasurer, to liquidate the expense of having executed six gold medals, to be presented one to each of the aforementioned United States naval surgeons attached to the hospital of this station, during the late epidemic.

"At an adjourned meeting of the Common Council of the Town of Portsmouth, held at the office of the Clerk of the Council, on Wednesday evening, November 5th, 1856;

"The Committee on Medals, appointed under a resolution of the Common Council, adopted February 5th, 1856, submitted the following report, which on motion was received:

"'PORTSMOUTH, VA., October 28, 1856.

"'TO THE COMMON COUNCIL: Gentlemen, under a resolution of the 5th February, 1856, the undersigned were appointed a committee to procure and present to Surgeon L. W. Minor, Assistant Surgeons J. F. and R. Harrison, Coleman, Walke, and Steele suitable medals for services rendered to this community during the pestilence of 1855. We have performed the duties assigned in the following manner: We have made presentation to Surgeon Minor and Assistant Walke, and their letters of acceptance accompany this report. Not knowing where to find Messrs. J. and R. Harrison, Steele, and Coleman, we have forwarded them to the Hon. Secretary of the Navy, and requested him to give them their proper direction. There were struck off twelve bronze medals, five of which we send. We enclose herewith an account of the cost, together with the necessary vouchers, all of which is respectfully submitted.

" '(Signed) George Peete, H. V. Niemeyer, J. H. Porter, Committee.' "

The following was the letter of presentation :

" 'PORTSMOUTH, VA., October 1, 1856.

" 'MY DEAR SIR : You will perceive from the accompanying resolutions, that we are assigned the pleasing duty of presenting to you this medal. We ask that you will accept it in the name of the people of Portsmouth, as an inadequate but willing expression of their gratitude for important services in behalf of her suffering people. We know, sir, that in all the future, wherever the duties of a diversified life may lead you, you can never be called upon to exert more cool heroism and disinterested humanity.

" 'In this memorial Humanity acknowledges her indebtedness to you, and we hope, sir, that you may never cease to enjoy that happiness which ever attends the remembrance of duties well performed, and of virtues strongly illustrated.

" 'Signed : G. W. Peete, H. V. Niemeyer, J. H. Porter, Committee.' "

The Portsmouth medal is extremely rare.

c. By vote of Congress (1857).

1078. Obverse. Bust of the President, with hair erect, to right. Beneath shoulder, Paquet F. Inscription : James Buchanan, President Of The United States.

Reverse. Æsculapius, with patera and serpent, stands between Death, with hour-glass and scythe and two sick men, one of whom clings to his robe. Beneath, to right, Paquet F. Inscription : To Dr. Frederick Rose, Assistant Surgeon, Royal Navy, G. B. Exergue : For Kindness And Humanity | To Officers And Crew | Of The U. S. Steamer | Susquehanna. Gold, bronze. 48. Loubat, " Medallic History of the United States of America," i., p. 362 ; ii., pl. LXXI.

The ship was at Port Royal, Jamaica, completely disabled. Surgeon Rose returned with it to New York. This medal is in the Lee and Fisher collections, and my own.

The following belongs here, though the medal was presented to Surgeon Rose by the survivors upon the infected ship.

1079. Obverse. Presented To Ass^{t} Surg^{n} Frederick Rose, R. N., By The Remnant Of The Crew Of The United States Steam Frigate Susquehanna, Who Returned To The United States In Said Ship In Good Health, As A Mark Of Their Appreciation Of His Generously Volunteered Professional Services Rendered Their Shipmates Who Were Afflicted With Yellow Fever. April. 1857.

Reverse. The Steamship. Bound on edge, as by a cable. Bronze. 47. In the Lee Collection.

d. Chicago (1873).

1080. Obverse. View of Exposition building, surmounted by flags. Beneath, at right, J.S.Weber. Exergue: 1873 | *

Reverse. The face of a watch. Upon it, Elgin Watch, between the two lines, Contribution To 1873 | Yellow Fever Sufferers. Marginal inscription: Made By The National Elgin Watch Co | * In Exposition Building* White metal. 19. In my collection. Very rare.

e. Savannah, Ga. (1876).

1081. Obverse. The Geneva Cross. Savannah Benevolent Association. 1876.

Reverse. The Good Samaritan. Legend: I Was Sick And You Visited Me. Matt. xxv–xxxvi. R. L. Autenheimer. Gold, bronze. 22. Very rare. In collection of the Boston Numismatic Society and that of Dr. Lee.

f. Memphis, Tenn. (1878).

1082. Obverse. Within a heavy laurel wreath: Howard | Medical Corps. | (with flourishes).

Reverse. Awarded | for services | during the Yellow Fever | epidemic in | Memphis | 1878. | A. D. Langstaff | Pres^{t} Howard Assoc^{n} | R. W. Mitchell, | Medical Director. | (with flourishes). Heavy scroll-work above and below, with pin attached above, upon which the name of the recipient. Gold. 21. In the Lee Collection.

For the opportunity of inspecting this very beautiful medal I am indebted to Dr. Mitchell, of Memphis. To this gentleman I also owe a copy of Keating's "Yellow Fever Epidemic of 1878 in Memphis, Tenn.," from which I am enabled to give the following list of the physicians who were entitled to the medal. It was awarded, Dr. Mitchell writes me, only to non-residents. "No resident of the city or its suburbs received one." Drs. J. S. Bankson, Stevenson, Ala.; O. D. Bartholemew, Nashville, Tenn.; Charles Baskerville, Horn Lake, Miss.; W. F. Besancny, Jonestown, Miss.; B. A. Bobo, Thomasville, Ga.; T. W. Bond, Brownsville, Tenn.; Samuel Boyle, Baltimore, Md.; Robert Burcham, Columbus, O.; L. A. Bryan, Houston, Tex.; G. D. Bradford, Longpoint, Tex.; W. A. Carswell, Americus, Ga.; L. A. Chevis, Savannah, Ga.; L. B. Childs, Fisherville, Ky.; W. L. Coleman, San Antonio, Tex.; S. H. Collins, Cincinnati, O.; J. G. Davis, Lincoln, Neb.; J. R. Dale, Arkadelphia, Ark.; E. F. De Graffenried, Columbus, Ga.; P. G. De Saussure, Charleston, S. C.; Gordon De Hulin, New York; William Duncan, Savannah, Ga.; Greenville Dowell, Galveston, Tex.; Thomas Easton, New York; N. J. Fogarty, Columbus, Ga.; H. F. Force, Hot Springs, Ark.; J. G. Forbes, Round Rock, Tex.; T. L. Gilzer, Mobile, Ala.; G. H. Gray, Denison, Tex.; J. G. O. Gorrell, Wayne, Ind.; R. P. Hall, Mobile, Ala.; L. B. Harlan, Hot Springs, Ark.; J. B. Hicks, Murfreesborough, Tenn.; R. R. Hunter, Kansas City, Mo.; August Kenhue, Dayton, O.; M. T. Keating, New York; J. Cecil Legaré, New Orleans, La.; H. T. Lowry, Cincinnati, O.; J. Luppo, Los Angeles, Cal.; W. C. Meade, Hopefield, Ark.; T. W. Menees, Nashville, Tenn.; B. R. Montgomery, Chattanooga, Tenn.; S. H. McCormick, Terre Haute, Ind.; W. A. McCully, Independence, Kan.; T. H. McGregor, Tipton Co., Tenn.; J. W. McKim, St. Louis, Mo.; J. T. McFarland, Savannah, Ga.; P. C. Nugent, St. Louis, Mo.; J. G. Orr, Cincinnati, O.; G. W. Overall, Murfreesborough, Tenn.; J. D. Palmer, Fernandina, Fla.; H. M. Pearce, Cincinnati, O.; Maurice Pritchard, Virginia City, Mo.; J. G. Renner, Indianapolis, Ind.; C. S. Roberts, Sulphur Springs, Ky.;

G. F. Sample, Austin, Miss.; H. C. Sauvé, Hot Springs, Ark.; Benjamin Sheftall, Savannah, Ga.; T. G. Simons, Charleston, S. C.; T. M. Smith, Rockport, Ind.; T. O. Somers, Nashville, Tenn.; A. K. Spencer, Charleston, S. C.; T. C. St. Clair, Vaiden, Miss.; R. H. Tate, Cincinnati, O.; W. A. Tyron, Houston, Tex.; P. Tuerke, Cincinnati, O.; G. W. Tucker, Dallas, Tex.; A. G. Wendall, Minneapolis, Minn.; J. L. Westbrook, Newborn, Tenn.; E. P. White, Detroit, Mich.; R. B. Williams, Woodburn, Ky.; T. E. Williams, Sherman, Tex.; A. B. Wilks, Lebanon, Tenn.; R. F. Woolfolk, Orange Co., Va.; J. Yates, Charleston, S. C.; S. O. Young, Houston, Tex.; Easton Younge, Savannah, Ga.; E. T. Easley, Little Rock, Ark.; F. Heady, Sherman, Tex.; T. D. Manning, Austin, Tex.; J. E. McGrew, Terre Haute, Ind.; J. C. Logan, New Orleans, La.; J. M. White, Atlanta, Ga. Of these eighty-two gentlemen, no less than twenty-four, or nearly one third, died during the epidemic, in the discharge of their self-assumed duty. May they rest in peace. Dr. Mitchell well writes me of the survivors, "Only those who have earned the medal can realize how greatly the little souvenir is valued." Each medal was accompanied by an appropriate diploma, signed by the Medical Director and Secretary of the Howard Association, in additional testimony of its appreciation of the services rendered to the people of Memphis during the epidemic. A copy of this I also owe to the courtesy of Dr. Mitchell.

B. Spain.

a. Barcelona (1870).

1083. Obverse. An urn, upon which : R.I.P. (Requiescat In Pace.) Upon this, a female, representing the city, rests her left arm, and with the other holds on high a wreath. At her feet, a cross, armorial shield, and extinguished torch. Legend : Barcelona Agradecida.

Reverse. Within a laurel wreath : A Los | Eminentes Servicios | Prestados En La Epidemie | De La | Fiebre Amarilla | De 1870. Silver. 45 mm. Memorial Num. Español, 1873, p. 62; P. and R., p. 152, No. 440.

The medal commemorative of the epidemic at Barcelona in 1821 has already been described, No. 1067.

(*To be continued.*)

THE LESSON OF A LONG LIFE.

MICHEL EUGENE CHEVREUL, the distinguished French chemist who died in Paris, April 9th, 1889, at the age of *one hundred and two years, seven months and nine days*, was the child of healthy parents, and appears to have observed and used the means most conducive to old age throughout his long life. He married young, and his conjugal life is said to have been a very happy one, but his wife died twenty-five years ago, leaving but one child, a son, who rose to some distinction and died recently, a retired magistrate.

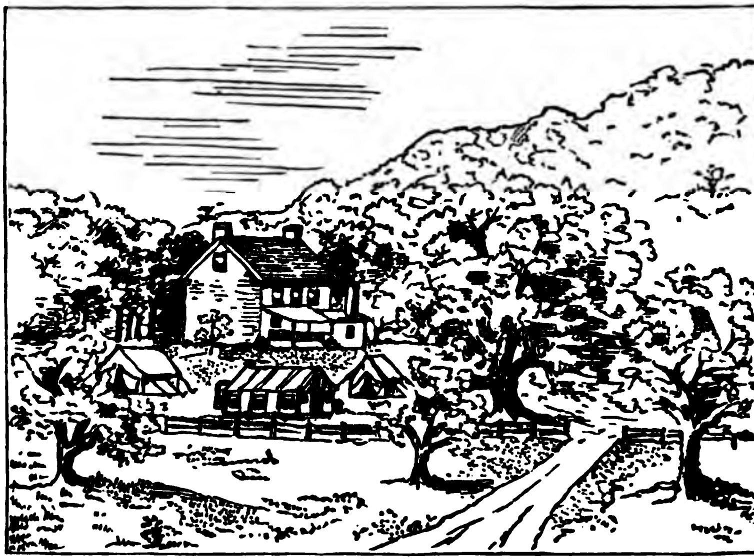
Chevreul devoted himself to science from his earliest manhood. A catalogue, alone, of his public works would be a considerable volume in itself. The two subjects which he above all others did most to develop, are the chemistry of fatty substances, giving the processes of obtaining stearine, glycerine, etc., and the theory of complementary colors; by the application of his methods in the treatment of these subjects alone human industry has been benefited to the amount of many millions.

In an account of him in the *Lancet*, a few years ago, it is said: "He is generally lightly clad, and wears no hat unless under circumstances in which he is obliged to appear in one; indeed, he hardly needs a hat, as he has most luxuriant hair. He is constantly at work, allowing only ten minutes for each of his meals, of which he has but two a day. He breakfasts at seven, the repast consisting of a plate of meat and another of vegetables, which he eats together, the whole being washed down with two tumblers of water. . He is said to have never drunk a glass of wine in his life. He dines at seven in the evening, and takes nothing between the two meals except a small loaf at noon, which he eats standing and by the side of his alembics. The writer who relates this states that on a visit to M. Chevreul he found him in the attitude just described, and on expressing his surprise at the frugal manner in which he lived, M. Chevreul observed, 'I am very old' (this was in 1874), 'and I have yet a great deal to do, so I do not wish to lose my time in eating.' In his work he is said to follow a motto that he has chosen from a maxim by Malebranche, and which is regarded by *Nature* as affording a true key to his life, his works, and his discoveries: 'Chercher toujours l'infaillibilité, sans avoir prétention de l'atteindre jamais' ('Always to seek infallibility, without having the pretension of ever reaching it')."

In a sketch of him at a hundred, in the *Popular Science Monthly* (Vol. XXX., p. 37), it is said: "He drinks nothing but water and beer, except that, by the special request of Minister Goblet, he for the first time in his life departed from his abstinence to drink a glass of champagne in response to the sentiment, 'Vive la France!' at his century banquet; and to his temperance, with his robust constitution and his prudent, regular, and industrious life, he doubtless owes his survival to so high an age. . . .

"The lesson has been drawn from M. Chevreul's life of what one writer styles 'the physical wholesomeness of sustained labor.' Cases of extreme longevity are usually found either among persons who live in almost complete inactivity of mind, and are thus subject to no wear whatever from their nervous and intellectual faculties, or else among those who spend their lives in constant, vigorous thought. Persons of the class between these, who learn and pursue some business which in time becomes largely a matter of routine, and ceases to call out exertion of the powers, usually die early, or at moderate old age. Hence, the wonderful brightness and activity which we sometimes admire among very old persons is not so wonderful, after all, but is a part of their old age, and one of the causes that have enabled them to enjoy it. And the general rule is sustained in the case of M. Chevreul, as in the case of numerous other men who have served the world or are serving it at ages far beyond three score and ten, that 'the harmonious development of all the many-sided aspects of man is the most conducive to the health of the individual, and that the training of the brain may be as valuable as the training of the muscles.'"

CRYSTAL BROOK.



THIS picture represents in part a new summer resort founded on strictly sanitary principles.

The "backbone" of Long Island, the highlands of the north shore, which form the southern boundary of Long Island Sound, has long been known as a region of remarkable salubrity. There are all along it numerous picturesque recesses among the well-shaded hills, reaching down to the placid waters of miniature bays and coves, with the cleanest and safest of shores for still-water bathing. Among them are a considerable number of the most delightful summer retreats of the well-to-do of New York and Brooklyn, who have the best appreciation of healthful conditions. But many still remain, clothed with unsurpassable natural beauty. And of such, in part at least, is the one hitherto known as Mount Sinai, so named by the first European settlers two centuries ago, doubtless from an appreciation of the relative beauty of the situation at that time, without any reference to the laws of health now to be proclaimed therefrom and practised roundabout.

CRYSTAL BROOK is a chosen tract on Mount Sinai, comprising a commodious house and one hundred acres of land, taking in the shore, with a beautiful beach for still-water bathing and a boat landing. About one half of the area is well shaded and at once available for its intended purpose—a Sanitary Resort to meet the needs of nursing mothers and children who would escape the dangers of city life in hot weather and keep well; and equally as a recruiting retreat for the enfeebled by wear and tear, or by protracted illness, who would avail themselves of the best advantages to regain health and strength; and no less for puny children—in short, for all who need and would take *rest* in a pure atmosphere with pure surroundings, and a general utilization of the best natural resources, in conjunction with such artificial arrangements and competent supervision as are best calculated to promote comfort and health.

While the house is commodious and well appointed for the accommodation of guests, it is but a small part of the sanitary arrangements. The beautifully shaded hills are available to an almost unlimited extent for the erection of tents and portable houses. With the advantages of tents, as compared with close dwellings for summer occupancy, all sanitarians are familiar; but knowledge of portable houses is far from being so general. They are built in sections for facility of transportation, and so constructed as to be erected and taken down with great facility, even by unskilled workmen. They are of various sizes, of from one to three rooms, and may be procured at moderate prices by guests, or provided by the proprietor.

The facilities for still salt-water bathing have already been referred to. There is besides an abundance of the purest spring-water, pure fresh milk, eggs, fruits, and vegetables and other edibles suitable alike for capricious or good appetites.

Careful provision has been made for the sanitary administration of the place in all respects.

Dr. Jerome Walker, the proprietor of this institution, is well known in Brooklyn as a medical practitioner, where he has devoted special attention to the needs of children, and as physician-in-chief for ten or twelve years to the Brooklyn Sea-side Home for Children at Coney Island. He may be relied upon as being specially competent to conduct the enterprise which he has undertaken, and it is sincerely to be hoped that those who most need it may be alive to its importance, and the first to avail themselves of its benefits.

No persons are received with contagious diseases. Correspondents should address Dr. Jerome Walker, No. 8 Seventh Avenue, Brooklyn.

A. N. BELL.

MISCHIEF-MAKERS IN MILK.—According to Professor Vaughan, tyrotoxicon does not develop below 60° Fahr., and is anaërobic—grows when air is excluded. Some very simple measures, then, are preventive :

1. Scrupulous cleanliness. A little dry milk on the rim of a can or vessel may breed the germ which will find a culture-ground in fresh milk.

2. A low temperature—below 60° Fahr.

3. Ventilation in an untainted atmosphere.

It is but just to say that these precautions are generally observed by careful dairymen and cream manufacturers. There is grave reason to fear, however, that they are not generally observed after the milk reaches the consumer's hands. Also, the slightest carelessness may affect seriously that class of the community which does not speak for itself—the very youngest.

Statistics prove with increasing testimony that *all* artificial feeding is not only unnatural but hazardous, and to be successful requires the most intelligent attention. However, if all mothers and nurses could learn that milk exposed to foul or warm air for any length of time may not only sour, but become the vehicle of a virulent poison, perhaps the summer months would bear a better health record.

One word of warning may not be amiss. Whenever a young child is fed upon cow's milk, and this causes symptoms of disagreement, the diet should be changed at once either to meat or rice ; for if the chief mischief-maker be at work, the best milk will only furnish it with the medium in which it flourishes, and, deprived of this, it will inevitably perish.—*By Alice B. Tweedy, in the Popular Science Monthly for June.*

THE IDEAL PHYSICIAN.

EXTRACT FROM THE ADDRESS OF DR. LUTHUR SEXTON, PRESIDENT OF MISSISSIPPI STATE MEDICAL ASSOCIATION, JACKSON, MISS., APRIL 17, 1889.

EVERY ideal physician should be a Christian gentleman. It is no compliment to any profession to be the hotbed of infidelity and agnosticism. The principles of immortality and the consolations of religion are beyond the reach of the scalpel, but not beyond human experience. Others as learned as we have found consolation in these doctrines, and no one has greater need of such assistance, or a better opportunity to teach to greater advantage the principles inculcated by the meek and lowly Nazarene.

Leaving now those matters to which I have referred, as being in common with the ideal man of every profession, let us direct our attention to that peculiar characteristic which, in my judgment, will be the crowning glory of the ideal physician of the nineteenth century.

Never before, within the history of our profession, have public hygiene and preventive medicine received the absorbing attention of the profession and the laity which they do in our day.

The superstitious expectation of our forefathers of the discovery of a panacea for all ills, a veritable elixir vitæ, has vanished with other myths of the Dark Ages. And as we grow older and wiser in our profession we realize the fact that the bounds of specific medicine are very restricted. But being thus forced to abandon some of our old routine practice does not leave us empty-handed or with nothing to do.

The want of interest shown by physicians in this branch of medicine has compelled members of other professions to band together into Howard and sanitary associations and boards of health, assuming to a large extent the duties and responsibilities rightfully belonging to our chosen profession.

No one else is so obviously interested in the prevention of disease as the physician himself. This may seem paradoxical to some, who will say that "the treatment of disease is the doctor's legitimate business; that is what he is paid to attend to, and it would be suicidal for him to occupy his time trying to prevent the very thing which gives him employment and maintenance."

Dr. Bowditch estimates that in the United States the annual death-rate from preventable diseases is 250,000. I think this estimate far too low. But if we estimate the actual value of these lives unnecessarily lost at $750 each, as our political economists do, our figures reach the frightful proportions of $187,500,000. To these millions of dollars add the vast array of doctors', nurses', and undertakers' bills, the pain and the anguish of the unfortunate patients, the weary night watches and heartaches of friends and relatives, the homeless widows and destitute orphans, and you have not an overdrawn picture of the result of the criminal negligence of the physicians and citizens of the United States of America.

The painful fact is that we only comprehend or even apprehend these losses when they come as the result of decimating pestilences or in epidemic forms. But day by day, hour by hour, minute by minute, throughout the year, miasmatic or morbific influences are assailing the vitals of the inhabitants of this country, creating an annual loss, as just stated, of almost, if not quite, $200,000,000 by sickness and death, which might have been prevented, if physicians and other citizens had done their duty.

Should some sudden calamity come upon our grain or cotton crop, entailing such financial loss, every avenue of intelligence would be crowded with discussions of expedients to retard the waste or to prevent the recurrence of such destruction. Nevertheless this waste of human life and energy continues steadily as the sand in the hour-glass, and we hear hardly a word of sanitary warning from those who should be sanitary authorities, and insult our Creator by attributing to his mysterious providence, or to his malevolence, evils due to our filthiness and negligence.

It is a matter for which the profession may justly feel proud that in every emergency there have been men in the profession who, "when weighed in the balance, were not found wanting."

As late as 1888, when that dreaded pestilence "that walketh in the darkness and wasteth at noonday, whose muffled footsteps give no warning of approach, and whose mysterious pathway is traced by the desolation it has wrought," swept like some dreaded simoom over our beautiful Southland, and brooded like a nightmare over many lovely cities, knights of the profession stood like faithful sentinels on the outpost of duty, with a firmness and devotion unequalled in the annals of history. Some laid down their lives as the cost, in the presence of the dread demon's "courts of death;" others more fortunate were restored again to home and friends, full of honor, without a single blotch upon their bright escutcheons, and their names are sung by the million of voices of every smitten bower and glen, and from every sun-kissed floral vale.

> He who can buckle on his sword
> To meet the enemy of his land and race,
> Content if but their health shall be restored,
> To end life's journey on the battle place,
> Is worthy of as bright a crown
> As history can jewel for his pallid brow,
> Is worthy of all honor and renown
> The world concedes, and we concede it now.

INFECTION BY BOOKS.—In many of the European cities extensive investigations are making to prove or disprove the infectiousness of books handled by the sick, such as must of necessity frequently occur in large circulating libraries. The editor of the *Christiania* (Norway) *Sanitary Journal*, in commenting on the subject, remarks that it is the universal pastime of invalids and convalescents to read or look over books, which if not procurable at home are brought from some library. Even children are fond of looking at picture books, and the editor relates the following personal experience:

"In 1846 an eight-year-old brother of my wife was taken down with scarlet-fever and died. During his illness he frequently amused himself by looking over a large picture book. This, together with several other of his useful playthings, was packed away in a chest after his death. Twenty-six years afterward, in 1872, a sister-in-law of mine journeyed across the Channel to England, where I was then residing, and with her came the chest and the picture book. On the second day the chest was opened and the book presented to my two-year-old son. Within the next two weeks the little fellow was taken down with scarlet-fever. The doctors who were called in consultation wondered how the disease was contracted, as there had been no scarlet-fever in the town for years. The circumstances of the book were called to mind, and the indications were clearly that the twenty-six-year-old book had retained the poison and communicated it to the child."

The process of disinfection now in use in Denmark and Norway in many of the circulating libraries and book-stores is a good one, and it is claimed to disinfect the books without damaging them in the least. It consists in placing the books fully opened out in a suitable compartment and subjecting them to dry hot steam at a temperature of over 100° C. for several hours.—*Winslow Anderson, M.D., Pacific Medical Journal.*

PARASITES IN ANNATTO PASTE.—In a recent number of the *Pharmaceutische Zeitung* (January 26th, 1889), J. Schirmer gives some further facts in regard to the trichina-like parasitic worms discovered by him in annatto paste. He says: "I have been induced to give this subject further consideration since I have been able to prove the existence of these parasites in greater or smaller numbers in every sample of annatto which I have examined. The worm is colorless, without prominent annular markings, with blunt head and long needle-pointed tail. It is of various sizes and keeps up a lively movement under the microscope. If immersed in glycerine it is at once killed, or at least it becomes motionless.

"This worm belongs to the order of so-called round or thread-like worms (Nematodes). To the same group belong also Vinegar eels (Anguellula aceti), Ascarides (human intestinal worms), and Trichina spiralis. Most of these species live in moist soil and putrefying substances. They undergo in these their full development. The first stage is the embryonic, then, after encysting, the larval, and finally the sexually perfect creature. Almost always these latter begin to migrate after a few days, during which they produce eggs, or living young, which follow their parents, and in turn undergo the same cycle of changes."

Now, since, as is well known, annatto is often moistened with urine in order to prevent drying, and since, further, the pulp of which the annatto is made is prone to ferment, the occurrence of these worms should not astonish us. It would, however, be interesting to determine whether they get into the annatto in the tropics or only after it reaches Europe.

The above observations are of interest in connection with the fact that annatto paste has been in use for the manufacture of "Milkman's Benefit," an article which has had extensive use in the milk trade to impart to skimmed and watered milk the appearance of rich whole milk.—*Boston Medical and Surgical Journal, April 18th*, 1889.

HYPNOTISM EXTRAORDINARY.—M. Clovis Hughes relates in *La France Méd.* a case which is perhaps the most successful example of the application of hypnotism so far recorded. A young lady was attacked six months ago with a nervous ailment which completely deprived her of the use of her voice. Electricity was tried, and with a certain amount of success at first, but it lost its effect after a time, and it was at length abandoned in despair. As a last resource, her friends applied to Dr. Berillon, the hypnotic specialist, and, after a consultation with Charcot, he decided to undertake the case. After having brought on the mesmeric trance by the usual means, he suggested to the patient to say "I am twenty" as soon as she awoke. A minute afterward she opened her eyes, and at once uttered the words without the least trace of an effort; but there her powers of articulation ended. The next day the suggestion was that she should converse with the doctor, and this she did with ease, though she could not exchange a single remark with any one else present. Finally, at the third seance, Dr. Berillon ordered her to speak whenever and with whomsoever she pleased thenceforward. Since that time she has been able to use her tongue freely, and her voice is as clear and distinct as it was before.—*N. Y. Medical Times.*

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

Subscribers will please conform to conditions of detachable order on advertising page.

THE NEW YORK HEALTH DEPARTMENT'S new president, Mr. Charles G. Wilson, is said to be everything that is required of him by the terms of the law creating the office. That is to say, "The Health Department shall consist of the President of the Board of Police, the Health Officer of the Port, and two officers to be called 'Commissioners of Health,' one of whom shall have been a practising physician for not less than five years preceding his appointment. The Commissioner of Health, who is not a physician, shall be the President of the Board, and shall be so designated in his appointment. These several officers shall together constitute a *Board* which shall be the *head* of the Health Department." The italics of this quotation are ours.

The efficiency of the Board depends upon the competency and co-operation of all its members, the president being in no respect superior to his colleagues except in the dignity of being the presiding officer. That Mr. James C. Bayles has been superseded in this office is no reflection upon him; his term had expired. That he has been an accomplished and efficient officer is conceded by all who have watched the progress of the Board during his term of service. The tenement-house laws and regulations have been more strictly enforced, plumbers have been required to use better material and to do better work, the arrangements for dealing with infectious diseases and the process of disinfection have been rendered more complete, and the medical profession is believed to have more heartily co-operated with the purposes of the Board than ever before. These improvements are doubtless measurably due to Mr. Bayles. But his contemporary, Dr. Joseph D. Bryant, the Medical Commissioner, from former service as a sanitary inspector was familiar with the most important department of the practical work—that of *sanitary inspection;* and this department is believed to have undergone a greater improvement than any other, although yet far from being as perfect as it should be in searching out the causes of disease in advance of their reported results.

Mr. Wilson, the new appointee, is favorably known in commercial circles as President of the Consolidated Stock and Petroleum Exchange; has a quick comprehension of measures before him, and a profound appreciation of the importance of the duties of his new office, which are eminently worthy of his best efforts. That the Board will be any less efficient by reason of the change we have no reason to expect.

A PRIZE FOR CLEANLINESS.—Mr. John G. Borden, a winter resident of Florida, has offered a prize of $1000 to the city within that State that shall be found in the most cleanly condition on July 1st. It is sincerely to be hoped that the contestants may be numerous.

PIECES OF TOILET SOAP that have become too small for convenient handling may be utilized by making a small flannel bag, leaving the top open, and into this putting the pieces of soap as they accumulate. When it is full sew it up and you have a nice accessory for your bath-tub.

But for *washing flannels*, of which we are reminded,

PYLE'S PEARLINE is the best of all soap. It is readily and thoroughly soluble in boiling or even warm water, and is consequently no less adaptable to thorough cleansing than of being thoroughly cleansed from the substance to which it has been applied after all dirt is removed.

For cleansing flannels, it should go without saying that they should never be rubbed or rung, but swayed about in a moderately hot solution of Pearline until all the dirt is removed, and subsequently in perfectly clean, warm water. Then squeeze the water out by passing them under the roller of a "clothes ringer" or by other pressure without twisting, which is apt to spoil the texture.

For house-cleaning purposes Pearline is also especially excellent, because after using it in the removal of dirt of every kind, all surfaces to which it has been applied may be thoroughly cleansed with pure water, without leaving behind the sticky, insoluble deposits common to other soaps, some of which leave more dirt than they take away. Indeed, insoluble soap, which deposits the *débris* of the impure and putrid fats of which it is not unfrequently in part composed, is not only in itself filthy, but when used in scrubbing floors, particularly, is a means of accumulating other and additionally dangerous filth. The use of *pure* soap is an essential condition to thorough cleanliness.

OFFENSIVE ODOR OF THE BREATH due to bad teeth or other causes may be overcome, or at the least greatly abated, by the habitual use of *Listerine.* Add a teaspoonful to a tumblerful of water for a mouth-wash and gargle, and if a little is swallowed, so much the better. Indeed, a bad breath is not unfrequently caused by the gaseous eructations of indigestion, and for this also Listerine is an excellent remedy, in doses of twenty to thirty drops in a little water.

ICE IN THE SICK-ROOM.—A saucerful of shaved ice may be preserved for twenty-four hours with the thermometer in the room at 90° F., if the following precautions are observed: Put the saucer containing the ice in a soup plate and cover it with another. Place the soup plates thus arranged on a good, heavy pillow, and cover it with another pillow, pressing the pillows so that the plates are completely embedded in them. An old jack-plane set deep is a most excellent thing with which to shave ice. It should be turned bottom upward, and the ice shoved backward and forward over the cutter.

AMERICAN CLIMATOLOGICAL ASSOCIATION.—The next annual meeting of this Association will be held in Boston, June 24th and 25th, 1889, just prior to the meeting of the American Medical Association at Newport. Dr. V. Y. Bowditch, of Boston, President. An interesting series of papers have been secured, and the meeting promises to be a very successful one.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000: Reports 69 deaths during April, of which 21 were under five years of age. Annual death-rate, 20.7 per 1000. From zymotic diseases, 9, and from consumption, 10.

CALIFORNIA.—For the month of April, 1889, the Secretary's abstract of the reports received from 72 cities and towns, with an aggregate population of 701,950, the number of deaths was 835. Annual rate, 14.16. Deaths from consumption during the month, 138. From zymotic diseases: Diphtheria and croup, 25; typhoid-fever, 23; typho-malarial-fever, 2; cerebro-spinal-fever, 9; diarrhœal diseases, 23; whooping-cough, 6; scarlatina, 4.

San Francisco, 300,000: During the month of April the number of deaths was 478. From zymotic diseases, 39. From consumption, 72.

Los Angeles, 80,000: 46; from zymotic diseases, 8; consumption, 10.

Oakland, 55,000: 61; from zymotic diseases, 11; consumption, 6.

San Diego, 32,000: 12; from zymotic diseases, 3; consumption, 1.

Sacramento, 35,000: 26; from zymotic diseases, 4; consumption, 3.

CONNECTICUT.—The Secretary of the State Board of Health reports for April, 1889, 1073 deaths from 166 towns, comprising a population of 756,522, representing an annual death-rate of 16.9. Deaths under five years of age, 253. Deaths from zymotic diseases, 144. From consumption, 134.

Hartford, 52,000: total deaths, 106. From zymotic diseases, 31; consumption, 12.

Bridgeport, 46,000: total deaths, 61. From zymotic diseases, 10; consumption, 3.

Waterbury, 34,000: total deaths, 52. From zymotic diseases, 7; consumption, 8.

New Haven, 85,000: total deaths, 145. From zymotic diseases, 15; consumption, 20.

Sixteenth Annual Report for 1888: Population, 84,000; marriages, 825; births, 2467; deaths, exclusive of 107 still born, 1594; death-rate, 19.44. Three hundred and ninety-six, or 21.7 per cent of the deaths, were caused by zymotic diseases. Two hundred and seventeen, or 13.6 per cent, were caused by consumption. But Professor William H. Brewer, President of the Board, remarks, in submitting the Report to the Common Council:

"As a member of the Board of Health since its organization in August, 1872, I have watched the great growth and prosperity of the city during that period. The population of the town was then estimated at 55,000, and the death-rate that year was 22.34 per thousand population, or one death to each 44.7 inhabitants.

"The population in 1888 is estimated at 84,000, a gain of 58 per cent during the period, and the death-rate of the year is 19, or one death to each 52.8 inhabitants. This is higher than it has been since 1881, yet there were 279 fewer deaths than would have occurred had the death-rate remained what it was the first year of organization of the board. It is more fair, however, to compare averages of several years, rather than the rate of any two special years. The average death-rate for the three years previous to the organization of the board (1869, 1870, and 1871) was 22.7 per thousand inhabitants; for the last three years (1886, 1887, and 1888) it has been 18. This means a saving of 394 lives per year in a population of 84,000." Such is the result of practical sanitation—of *cleanliness*: the prompt removal of all surface filth, drainage, and sewerage; the prompt notification and isolation of infectious diseases, and the disinfection of things. There is room for still further improvement in New Haven, but few cities have a better record.

FLORIDA.—*Pensacola*, 15,000: Reports 12 deaths in four weeks ending April 27th, 1889, of which 3 were under five years of age. Annual death-rate, 11.26 per 1000. From zymotic diseases there were 5 deaths.

ILLINOIS.—Report on Medical Education, Medical Colleges, and the Regulation of the Practice of Medicine in the United States and Canada, 1765–1889, by John H. Rauch, M.D., Secretary of Illinois State Board of Health, a pamphlet of one hundred and sixty-two pages, is the latest revise of the important subject of which it treats. It embraces an historical sketch of State legislation on the practice of medicine and medical education in the United States and Canada, a Schedule of Minimum Requirements, Summary of Institutions and Students, together with a brief account of the efforts that have been made and the degree of progress attained in improving the standard of medical education and weeding out quackery under the special direction of the author, who has accomplished more in this much-needed reform than any other person.

Chicago, 830,000: Reports 1159 deaths during April, of which 474 were under five years of age. Annual death-rate, 16.76 per 1000. There were 227 deaths from zymotic diseases, and 117 from consumption.

LOUISIANA.—*New Orleans*, 254,000: Reports for four weeks ending April 27th, 422 deaths, 150 of which were among the colored population. There were 100 deaths under five years of age. Annual death-rates per 1000, white, 19.22; colored, 28.65. There were 74 deaths from consumption.

MARYLAND.—*Baltimore*, 500,343: During the four weeks ending April 27th there were 596 deaths, of which 195 were under five years of age. Annual death-rate, 15.49 per 1000. There were 47 deaths from zymotic diseases, and 86 from consumption.

MASSACHUSETTS.—*Boston*, 415,000: There were 874 deaths during April, of which 287 were under five years of age. Annual death-rate, 25.27 per 1000. From zymotic diseases there were 112 deaths, and from consumption, 138.

MICHIGAN.—The Secretary of the State Board of Health has just issued his sixteenth annual report for the fiscal year ending June 30th, 1888. The first part of the report consists of a compilation of meteorological conditions, and a contribution to the study of the causes of sickness, based on weekly reports of sickness by physicians in the State.

The most important article in the report is a paper by Dr. Baker, in which reports of sickness and meteorological conditions are so grouped as to show the relation of certain meteorological conditions to diseases of the lungs and air passages. This paper not only presents evidence concerning these diseases in Michigan, but also in the United States armies, in the native troops of India, and in London, England, for a period of thirty years. These statistics seem to show that influenza, tonsillitis, bronchitis, and pneumonia have one controlling cause—the inhalation of cold, dry air. The paper explains the order of succession of the cold-weather diseases from a simple coryza, or common cold, to pneumonia.

Tables and diagrams are also presented showing that a few of the communicable diseases, which, as a rule, gain access to the body through the air passages, are quantitatively related to the atmospheric temperature, almost invariably rising after the temperature falls and falling after the temperature rises. Dr. Baker's explanation of this is that the albuminous exudations which result from the inhalation of air colder than usual supply a place favorable for the reception and reproduction of the specific germs of these diseases.

Other articles in the report deserving special mention are a document giving rules concerning the prevention and restriction of small-pox, a report on alleged nuisances in Michigan, and especially a paper on communicable diseases in Michigan during the year. The reports compiled in this last article show that in those outbreaks of scarlet-fever and diphtheria in Michigan in which isolation and disinfection (as recommended by the State Board) were neglected there were four to five times as many cases and deaths as in those outbreaks where these precautions were taken. This evidence is all the stronger because it is in harmony with the facts collected during the previous year. Together they indicate a saving during the two years of 11,180 cases and 1685 lives by restrictive measures in these two diseases.

At the regular quarterly meeting of the Board, January 8th, 1889, the Secretary reported his having taken action on 85 outbreaks of diphtheria, 77 of scarlet-fever, 48 of typhoid-fever, and one of typhus-fever during the three months ending with December.

Compared with the preceding quarter (July, August, and September), reports received from all sources show diphtheria to have increased by an average of 15 places per month, scarlet-fever to have increased by an average of 21 places per month, typhoid-fever to have increased by an average of 6 places per month, small-pox to have increased by an average of 4 places per month, and measles to have decreased by an average of 4 places per month.

A comparison of the meteorological conditions of the fourth quarter of 1888 with the average of corresponding quarters in the two years, 1886–87, shows that in 1888 the temperature was slightly higher, the absolute humidity was slightly more, the relative humidity and the day and the night ozone were less in the fourth quarter of 1888.

The Smead System of Disposing of Excreta was the subject of a special communication from G. R. Brandt, principal of the public school at Bancroft, describing the very imperfect and offensive method, even when the greatest care is exercised by keeping a fire in the ventilating shaft heater and opening the basement windows. The rest will go without saying.

A toy called "Kezoo," and designed to be put in the mouth, was exhibited by the Secretary, which had caused sickness in Lansing. The part which came in contact with the mouth was found to be covered with green arsenical paper. The Secretary stated that frequently boxes made of arsenical card-board were received at the office. Poisonous card-board is not unfrequently used for tickets.

Tyrotoxicon in Oysters was reported by Dr. Kellogg. A boy in a printing office in Battle Creek took an oyster stew at a restaurant at eleven o'clock at night. The stew was very slightly warmed. In a few hours he was taken very sick with vomiting and purging, and was sick all the next day. Dr. Kellogg sent for some of the oysters, and obtained a good test for tyrotoxicon. A few days afterward he sent for some more oysters from the same restaurant, from which also he obtained tyrotoxicon. He thought the probable reason why there were not more frequent cases of poisoning by eating oysters was that the tyrotoxicon was destroyed by heat in cooking.

The oysters had been received in kegs and kept open, thus giving a good opportunity for the tyrotoxicon to develop.

For the month of April, 1889, compared with the preceding month, the reports indicate that intermittent-fever, rheumatism, and remittent-fever increased, and that influenza, pleuritis, and pneumonia decreased in prevalence.

Compared with the average for the month of April in the three years, 1886–88, measles and inflammation of kidney were less prevalent in April, 1889.

Including reports by regular observers and others, diphtheria was reported present in Michigan during the month of April, 1889, at 23 places, scarlet-fever at 43 places, typhoid-fever at 5 places, measles at 14 places, and small-pox at one place.

Reports from all sources show diphtheria reported at 6 places less, scarlet-fever at 11 places more, typhoid-fever at 3 places less, measles at 2 places more, and small-pox at 4 places less in the month of April, 1889, than in the preceding month.

Detroit, 230,000: Reports 256 deaths for April, of which 47 were under five years of age. Annual death-rate, 13.54 per 1000. From zymotic causes, 26, and from consumption, 31.

MINNESOTA.—Official report of infectious diseases for the month of April, 1889: Diphtheria, 85 cases, 26 deaths; scarlatina, 138 cases, 14 deaths.

Diseases of animals: Cases of glanders remaining isolated or not accounted for, 12; reported during the month, 9; killed, 2; released, 1; isolated, 6; remaining April 1st, isolated or not accounted for, 18.

Sanitary Organization in Minnesota.—The State contains 76 organized counties, 218 cities, villages, and boroughs, 1298 townships. (These figures are constantly changing by the organization of new villages and towns.) Of the 218 villages, cities, and boroughs, 212 have filed notice of the organization of a local board of health; of 1298 townships, 1181 have filed notice of the Board elected, March 12th, 1889, leaving 117 which, though organized, have yet to make such report. These are reporting daily, so that all will have complied with the law in a few days more.

St. Paul, 180,000: Reports for April 125 deaths, of which 59 were under five years of age. Death-rate, 8.33 per 1000. From zymotic diseases there were 27 deaths, and from consumption, 13.

MISSOURI.—*St. Louis*, 440,000: Reports for April 660 deaths, of which 224 were under five years of age. Annual death-rate, 19.17 per 1000. From zymotic diseases there were 126 deaths, and from consumption, 56.

NEW HAMPSHIRE.—For the month of April diphtheria was reported to the State Board of Health from Portsmouth, Keene, Canaan, Exeter, Laconia, Fremont, Nashua, Claremont, and Manchester. Four cases, with three deaths, in Portsmouth. No epidemic of the disease in the State.

Scarlet-fever was reported from Rochester, Rye, Nashua, Claremont, Wakefield, Pittsfield, Manchester, and Portsmouth, there being six cases in the latter city. No epidemic of the disease reported.

Typhoid-fever was reported from Rye, Amherst, Concord, Nashua, Wakefield, Pittsburg, and Rochester.

Measles were reported from Wakefield, and as epidemic in Walpole.

NEW JERSEY.—Twelfth Annual Report of the Board of Health and Vital Statistics, 1888, pp. 503. "The year has been marked by no special epidemic or endemic, except that in a few instances diphtheria has proved a serious endemic in some localities. Even in these cases the people have seen, when in part too late, how the closing of schools, the prohibition of public funerals and strict isolation, cleanliness, and disinfection would have saved many a life."

A prominent feature of the year has been the more complete organization of local boards of health, and a general increase of interest in the health service; but there is still much lacking in the equipment for dealing with infectious diseases and facilities for their prevention—hospitals for contagious diseases, disinfecting apparatus, facilities for bathing, garbage destructors, etc.

Impure water supplies continue to be urged, as they have been in previous reports, as among the most prolific sources of preventable diseases. And relying upon the statements of the engineers, chemists, and sanitarians of the State, certain restrictions are recommended for the abatement and prevention of all water-supply systems which do not comprehend stated conditions preventive of impurity.

The relation of human and animal diseases is dwelt upon at considerable length, suggestive of more diligent observation in this field of inquiry than has hitherto obtained.

Under "Laws as to Adulteration of Foods and Drugs," the Secretary quotes approvingly a letter from President Bayles, of the New York Board of Health, to Mayor Hewitt, nearly two years ago, that "the adulterations usually encountered are made in the interest of bulk and cheapness, and the materials used for this purpose are seldom in any other respect hurtful than that they are likely to be indigestible. In the case of liquors, even of imitation of wines into which no grape juice enters, it has been found that if the alcohol is eliminated, only the fruit syrups of the soda fountain remain. . . . That it is difficult, if not impossible, to find on sale in New York a sample of confectionery with poisonous coloring or flavoring," notwithstanding the frequent cropping out of such cases, as the one which has occurred within a few weeks in Brooklyn, where about sixty persons were poisoned by eating ice-cream colored with poisonous aniline; and that even toys and paper tickets, liable to being put in the mouth, as just above noticed in the proceeding of the Michigan Board of Health, are colored with arsenical dies. True it is there has been great improvement in the quality of milk by the mere exclusion of water, and that alcohol is undoubtedly the most mischievous ingredient of all fermented liquors; but these truths should in no sense detract from the importance of constant vigilance against the use of dangerous coloring matters by both ignorant and fraudulent users of them in a great variety of ways.

The charitable and penal institutions of the State are reported upon in detail, showing considerable improvement as compared with previous reports, but still, as common in other States, some conditions disgraceful in the extreme—due to such town, board, and political control as is alike devoid of competency and principle. All such institutions should be by the aid, if not, indeed, under the sole control, of the health authorities.

A number of excellent papers read before the State Sanitary Association are added :

The Report on Vital Statistics is unusually full, preceded by chapters on "Perils of Population," "How to Reckon as to the Real or Comparative Healthfulness of Communities," and "Climatology," which summarizes the conditions of the variable health of communities.

Population (census of 1885), 1,278,033 ; marriages, 16,025 ; births, 20,074 ; deaths, 27,173. Ten thousand five hundred and eight (exclusive of 1739 still born), or 38.63 per cent of the deaths, swere of children under five years.

Deaths from consumption, 3358. From zymotic diseases : Remittent-fever, 264 ; typhoid-fever, 620 ; small-pox, 5 ; scarlet-fever, 574 ; measles, 74 ; whooping-cough, 161 ; diphtheria (and "croup"), 2036 ; erysipelas, 128 ; diarrhœal diseases, 3508 ; puerperal diseases, 271 : 8640, or 31.8 per cent.

"Of the 10,508 that died under five years, 7455 died in the larger cities. Total death-rate from consumption for the State, as compared with the total death-rates, 12.44, the deaths being 2236 in cities, 1122 outside. Rates for short periods, or which deal with small numbers, are only approximate, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors which practically disappear in large aggregates. The number of deaths before twenty, in proportion to the rest, is much more informatory as to local causes affecting health than the total deaths.

". . . Valuable contrasts can be drawn between such cities as Jersey City and Plainfield, or Newark and Orange. No one can study these statistics, as recorded from year to year, without seeing how artificial is the shortening of human life. A death-rate of 26.82 in Hudson County and of 11.65 in Sussex County means something more than mere location."

Hudson County, 282,254 : Reports 544 deaths for April, of which 236 were under five years of age. Annual death-rate, 23.1 per 1000. From zymotic diseases there were 101 deaths, and from consumption, 60.

Paterson, 80,000 : Reports 126 deaths during April, of which

49 were under five years of age. Annual death-rate, 18.9 per 1000. There were 13 deaths from zymotic diseases, and 18 from consumption.

Newark, 182,457: Reports 371 deaths during April, of which 146 were under five years of age. Annual death-rate, 24.46 per 1000. From zymotic diseases there were 59 deaths, and from consumption, 39.

NEW YORK.—The reported mortality was considerably less in April than in March, which was also the case in 1888. The rate of infant mortality is less than in March, but still continues higher than that of last year. The differences are mainly due to scarlet-fever, measles, and whooping-cough, the mortality from which is relatively about the same as reported upon in the last issue, both in proportion and distribution. Two deaths occurred from small-pox, both in Geneva; it has been reported from no new locality, and has, probably, ceased to exist in all heretofore reported. The proportion of deaths from all zymotic diseases is a little higher than in March and the average for the preceding quarter. From consumption there were 120 deaths in each 1000 deaths from all causes (twelve per cent), and 183 in each 1000 deaths above five years of age.

New York, 1,571,558: Total deaths, 3593; under five years of age, 1544; annual rate, 27.80. Zymotic, 816; consumption, 426.

Brooklyn, 821,525: Total deaths, 1517; under five years of age, 667; annual rate, 22.47. Zymotic, 301; consumption, 187.

Buffalo, 230,000: Total deaths for four weeks ending April 27th, 344; under five years of age, 134; annual rate, 19.50. Zymotic, 45; consumption, 43.

Rochester, 110,000: Total deaths, 175; under five years of age, 60; annual rate, 19.10. Zymotic, 30; consumption, 17.

Albany, 103,000: Total deaths, 194; under five years of age, 51; annual rate, 22.60. Zymotic, 34; consumption, 23.

Syracuse, 80,000: Total deaths, 124; under five years of age, 30; annual rate, 18.72. Zymotic, 14; consumption, 18.

The five cities or towns reporting the highest mortalities are: New Utrecht, 51.20; Newtown, 42.0; Marbletown, 42.0; Sag Harbor, 36.0; Clyde, 36.0.

The five lowest mortalities are: Phelps, 3.42; Canandaigua, 3.8; Salamanca, 6.0; Lockport, 6.4; Cortland, 6.67.

NORTH CAROLINA.—Second Biennial Report of the Board of Health, 1887–88, is a volume of 191 pages. The work of the Board is still confessedly confined to elementary principles, but by persistent effort much progress has been made during the last year, particularly in securing the co-operation of physicians and educating the people throughout the State on the importance of practical sanitation. The number of counties reporting has increased from 42 in April, 1887, to 58 in January, 1888, and the number is still slowly increasing. No epidemics have prevailed extensively, and such as have, to a limited degree, have been accounted of in our monthly abstracts from the *Bulletin*, as also of the account of the disturbance created in travel and trade created by the Florida epidemic of yellow-fever. The report endorses and urges the importance of prompt notification and isolation of persons and disinfection of premises, as the only safe methods in dealing with all pestilential diseases. Appropriation for the better equipment of the maritime station for the prevention of the introduction of pestilential disease at the mouth of the harbor of Wilmington, especially for the erection of the hospital for the care of the sick and disinfecting apparatus for the treatment of vessels, is urged as a commercial necessity against otherwise needless and dangerous detention of both persons and vessels. Hygienic teaching in the public schools and improvement in the sanitary condition of State and county public buildings, poor-houses, jails, asylums, etc., have engaged the constant attention of the Board, with encouraging results. Considerable attention has been given to the disposal of garbage in the more densely populated districts, and cremation is especially recommended as the best means. A good description, with illustrations, is given of the Engle Crematory, which is said to be in successful use in Des Moines, Minneapolis, and several other places. Appended are several special contributions by members of the Board and others: "Preliminary Inquiry into the Causes of Death in North Carolina, and some Suggestions about the Future of Prevention," by Thomas F. Wood, M.D., Secretary of the Board; "The

Contamination of Foods with Metallic Poisons," by F. P. Venable, Ph. D., F.C.S.; "The Sewerage of Cities and Towns," by J. L. Ludlow, C.E., M.S.

During the month of April, 1889, in fifteen cities and towns, aggregating a population of 83,650, there were 133 deaths, 37 of which were under five years of age. Annual death-rate, 19.07 per 1000. Deaths from typhoid-fever, 2; malarial-fever, 4; diphtheria, 1; measles, 1; diarrhœal, 6; consumption, 10.

Wilmington, 23,000: Reports for April 29 deaths—11 under five years of age. Death-rate, 14.4 per 1000.

Raleigh, 15,000: Reports for April 22 deaths—5 under five years of age. Death-rate, 16.8 per 1000.

OHIO.—Fifty-five cities and towns, with an aggregate population of 1,146,100, report 1577 deaths during the month of March, of which number 497 were under five years of age. Annual death-rate per 1000 was 16.52. From zymotic diseases there were 246 deaths, and from consumption, 200.

Cincinnati, 325,000: Total deaths, 520; under five years of age, 185; annual rate, 19.20. Zymotic, 82; consumption, 66.

Cleveland, 235,000: Total deaths, 383; under five years of age, 145; annual rate, 18.70. Zymotic, 57; consumption, 43.

Columbus, 101,000: Total deaths, 102; under five years of age, 28; annual rate, 12.08. Zymotic, 19; consumption, 16.

Toledo, 80,000: Annual Report for 1888: Total deaths, 1095; death-rate, 13.69. Deaths from zymotic diseases, 238—21.73 per cent of total; from consumption, 126—11 per cent of total. These figures are evidence of excellent practical work.

For the month of March: Total deaths, 100; under five years of age, 29; annual rate, 15.00. Zymotic, 15; consumption, 12.

Dayton, 60,000: Total deaths, 58; under five years of age, 11; annual rate, 11.6. Zymotic, 4; consumption, 12.

PENNSYLVANIA.—*Philadelphia*, 1,040,245: Reports for four weeks ending April 27th, 1611 deaths, of which 389 were under five years of age. Annual death-rate, 20.13 per 1000. From zymotic diseases there were 136 deaths, and from consumption, 218.

RHODE ISLAND.—The number of deaths recorded in the different towns and cities, from which returns have been received, was 465, in an estimated population of 306,263.

The *annual* death-rate upon the estimate given is 17.4 in every thousand of the population. The death-rate is somewhat smaller than for the previous month. The general sickness throughout the State was reported less during April than in March.

Providence.—Annual Report, 1888: Population, 123,000; deaths, 2608; death-rate, 21.48. The number of deaths from consumption, 359, or 13.3 per cent of the whole number. Two hundred and seventy-one, or 10.39 per cent of all deaths, were caused by diarrhœal diseases, though "the number of deaths among children under one year of age was less than for several years--16.71 per cent against an average of 19.61 for an average for thirty-three years. Deaths respectively from diphtheria, 98; scarlet-fever, 80; typhoid-fever, 103. The number of deaths from typhoid-fever in *December* was 47—the largest number in any month since November, 1882, when there were 70. It was attributed to the pollution of the Pawtuxet at Natick, where there had been two or three cases of typhoid-fever in the valley of the river during the autumn months, three and one quarter to three and one half miles above the pumping station. "The city engineer estimates that during high water, when the water is flowing over the dams, the flow must be nearly 600,000,000 gallons daily. It is certain that during the rains of November it must have been fully this amount.

"It has been objected that it is utterly incredible that such a very small amount of infecting material could have contaminated such a large body of water. And it must be confessed that it does not on the face of it look at all probable. It is also objected that if the polluted water was the cause of the fever more persons should have suffered from it, there being, to put it in round numbers, scarcely 300 cases in 100,000 persons. But it seems to me that these objections counterbalance and explain each other. The reason that so few were attacked was owing to the enormous dilution of the poison. The poison, if it had once entered the water, would not be lost, no matter how great the dilution (though it would probably be destroyed after the lapse of a certain time). The more dilute it was the smaller would be the number of persons affected by it."

Newport, 22,000: Reports for the month of April 28 deaths, 9 under five years of age. From zymotic diseases, 3, and from consumption, 3. Annual rate, 15.27. Number of cases of contagious diseases reported, 5.

TENNESSEE.—The State Board *Bulletin* for April reports the principal diseases, named in the order of their greater prevalence, in the State for the month of April were pneumonia, malarial-fever, tonsillitis, catarrhs, rheumatism, bronchitis, consumption, pleurisy, dysentery, and diarrhœa.

Mumps is reported in the counties of Carroll, Gibson, Hardin, Henderson, Madison, Montgomery, Robertson, Shelby, Stewart, Wayne, and Williamson. Typhoid-fever in Davidson, Franklin, Knox, Maury, Pickett, Robertson, Sequatchie, Shelby, and Sullivan. Erysipelas in Carroll, Hamilton, Henry, Houston, Maury, Washington, and Williamson. Measles in Gibson, Henderson, Henry, Madison, Sequatchie, and Wayne. Scarlet-fever in Davidson, Knox, Robertson, Shelby, and Tipton. Whooping-cough in Davidson, Gibson, Houston, and Maury. Diphtheria in Davidson, Hamilton, Shelby, and Williamson. Croup in Knox, Shelby, and Sullivan. Meningitis in Hardeman and Shelby. Chicken-pox in Hamilton. Cerebro-spinal meningitis in Maury.

In the chief cities the respective annual death-rates for the month per 1000 of population are reported as follows:

Chattanooga,	white,	7.11;	colored,	21.23	: 11.70
Clarksville,	"	9.60;	"	16.00	: 12.00
Columbia,	"	20.00;	"	12.00	: 16.80
Knoxville,	"	8.83;	"	22.90	: 11.71
Memphis,	"	17.46;	"	30.39	: 23.34
Nashville,	"	9.46;	"	18.51	: 12.70

Memphis.—Dr. G. B. Thornton, President of the Board of Health, reports for 1888: Population, white, 30,277; colored, 25,267: 55,494. Deaths, white, 745; colored, 795: 1540. Death-rates, white, 24.64; colored, 31.46: 27.75. Three hundred and sixty-nine—175 white and 194 colored, or a little less than 24 per cent of the total, were caused by zymotic diseases; of which there were from diarrhœal diseases, 125; malarial-fever, 93; typhoid-fever, 45; diphtheria, 23. Deaths from consumption, white, 86; colored, 122: 11.54 per cent of the deaths from all causes of the white population, and 15.72 per cent of the deaths from all causes of the colored.

Much gratification is expressed at the recent solution of the long-pending question with regard to the public water supply, by the sufficiency and purity of that which is now obtained from artesian wells. "Secretary Camerôn, of the Water Company, states that there are thirteen wells now in use and six more in process of being sunk. That the daily output of the company is 8,000,000 gallons, with no perceptible impression on these wells. The quality of the water, after analysis made by Dr. Charles Smart, U. S. A., and Professor Mallet, of the University of Virginia. is pronounced exceptionally good, and in every respect suitable for a public water supply."

Important modifications in the sewerage system are urged before additional extensions are made, and if possible before the recurrence of warm weather. The report states that some of the mains and submain lines are too small, and consequently overcharged the year round.

Garbage disposal is now an animated question, but negotiations are in progress for its early solution by the erection of a cremator.

Sanitarians generally will regret to learn that with this report Dr. Thornton retires from the field of sanitary work. He has declined to be any longer the executive, or a member of the Board of Health of Memphis, has resigned from the State Board of Health, and has declared his purpose to devote his time hereafter exclusively to curative medicine. But to him more than to any other one person is due the now comparatively uneventful life of the medical practitioner in Memphis. From 1878 to the close of his work, both as medical practitioner and as practical sanitarian, Dr. Thornton has stood among the foremost in the battle for the redemption of Memphis. In the first place, in his contention against the most devastating and relentless of foes; and, secondly, in persistently urging to a successful issue the application of such sanitary measures as have raised Memphis from a bed of death and placed her in the front rank of progressive cities. It may be truly said that, with such a record, Dr. Thornton can afford to retire. But whether Memphis can afford to do without him depends upon how well those who succeed him may maintain and continue to promote the good works now so full of promise.

WISCONSIN.—*Milwaukee*, 210,000: Reports for the month of April 270 deaths, of which 66 were under five years of age. Annual death-rate per 1000, 15.4. From zymotic diseases there were 43 deaths, and from consumption, 19.

SMALL-POX.—The number of deaths reported from small-pox in foreign cities during the three months ending March 31st, 1889, according to the returns before us, was as follows: Bradford, 1; Paris, 42; Lyons, 38; Marseilles, 34; Bordeaux, 2; Havre, 27; Rouen, 10; Nancy, 8; Nice, 2; Limoges, 5; Besançon, 1; Gand, 3; Liege, 4; Bruges, 4; Tournai, 1; Ostend, 283; Boulers, 9; Ypres, 1; Montigny, 4; Boone, 3; Quaregnon, 11; Iseghem, 1; Boussu, 1; Hornu, 3; Arlon, 44; Furnes, 2; Dixmude, 4; Vienna, 4; Prague, 220; Trieste, 29; St. Petersburg, 3; Warsaw, 11; Odessa, 11; Venice, 31; Bucharest, 31; Jassy, 1; Cairo, 19; Alexandria, 5.

CHOLERA.—During the four weeks ending April 19th, the number of deaths reported from cholera was 7; in Madras, during the three weeks ending March 15th, 19; in Calcutta, during the week ending March 16th, 23.

YELLOW-FEVER.—*Havana:* The number of deaths reported from this disease during the month of April was 18; the number of deaths from all causes was 493.

Rio de Janeiro (from Surgeon-General Hamilton's Weekly Abstract): During the week ending March 31st, 26; the number of deaths from all causes was 423.

Carthagena: During the week ending March 23d, 2.

LITERARY NOTICES.

Transactions of the Congress of American Physicians and Surgeons. First Triennial Session, held at Washington, D. C., September 18th–20th, 1888. 8vo, pp. 432. Published by the Congress. William H. Carmalt, M.D., Secretary. New Haven, Conn.

This is a volume of unusual excellence both in the selection and the treatment of the subjects which it embraces. It opens with a brief historical sketch of the union of the following special associations, as the basis of the organization of the Congress: American Surgical, Ophthalmological, Otological, Neurological, Laryngological, Gynecological, Dermatological, Climatological, and Clinical and Pathological Associations, to meet triennially at the same time and place jointly.

It is gratifying to observe in the introduction that the allegation which was somewhat extensively circulated at about the time the movement for this organization was initiated, that it was antagonistic to another, is wholly disclaimed.

The work of this first Congress was chiefly confined to two comprehensive subjects, as follows:

"The Diagnosis and Medical Treatment of Acute Intestinal Obstruction," by Reginald H. Fitz, M.D., of Boston; "The Surgical Treatment of Intestinal Obstruction," by N. Senn, M.D., Ph.D., of Milwaukee, and the discussions thereon by several of the most distinguished medical and surgical practitioners of the United States and from abroad, comprising about half the volume, in which is presented the most complete analysis and treatment of this important subject hitherto published.

"Cerebral Localization and its Practical Relation," by Charles K. Mills, M.D., of Philadelphia; "Surgery of the Brain, Based on the Principles of Cerebral Localization," by Roswell Park, A.M., M.D., of Buffalo, and the discussions thereon, which take up most of the remainder of the volume, of scarcely less importance than the preceding. Next follows the Address of the President, John S. Billings, M.D., Surgeon U. S. A., "On Medical Museums, with Special Reference to the Army Medical Museum at Washington," with which the volume concludes—an admirable historical and descriptive sketch, particularly appropriate to the proceedings of this first meeting of the Congress.

LECTURES ON NERVOUS DISEASES, FROM THE STANDPOINT OF CEREBRAL AND SPINAL LOCALIZATION, AND THE LATER METHODS EMPLOYED IN THE DIAGNOSIS AND TREATMENT OF THESE AFFECTIONS. By AMBROSE L. RANNEY, A.M., M.D., Professor of Anatomy and Physiology of the Nervous System in the New York Post-graduate Medical School and Hospital; of Nervous and Mental Diseases in the Medical Department of the University of Vermont; late Adjunct-professor of Anatomy in the Medical Department of the University of the City of New York; Member of the New York County Medical Society; author of the "Applied Anatomy of the Nervous System," "Practical Medical Anatomy," "Electricity in Medicine," etc., etc. Profusely illustrated. 8vo, pp. 792. Price, $5.50. Philadelphia, Pa.: F. A. Davis.

The author of this work has long been known as a contributor to the subject of which it treats, herein systematized and fortified by a liberal use of that which has been written upon it by other observers; but in the arrangement of the subject it radically differs from any other work that has fallen under our observation. It takes up, firstly, the anatomical, physiological, and pathological conditions, as the essential basis of all that is known of cerebral and spinal localization. Secondly, there is given a *résumé* of the practical conclusions deducible from the facts elicited by the foregoing descriptions, and, thirdly, treats of individual diseases of the brain and spinal cord from a clinical standpoint—the localization of the lesions described. "Functional" nervous diseases follow, with special reference to the researches of Dr. George T. Stevens respecting the bearings of "eye-defect," etc. Electricity is fully treated of as a special agent in neurotherapeutics, and very fully illustrated, as, indeed, is all the rest. The illustrations are numerous and excellent, and the work altogether is well gotten up.

FASCICULUS XIII. : ATLAS OF VENEREAL AND SKIN DISEASES, WITH ORIGINAL TEXT by PRINCE A. MORROW, A.M., M.D., and others, maintains the same degree of excellence as the preceding numbers before reviewed. This number contains five plates true to nature, as follows : Elephantiasis of the Leg and Scrotum ; Leucoderma, Alopecia Areata ; Keloid, Fibroma ; Xanthelasma, Rhinolascleroma ; Xeroderma Picmentosa, and a lucid descriptive context. Complete in fifteen parts—two more only to appear—each containing five folio chromo-lithographic plates, many of them containing numerous figures, all printed in flesh tints and colors, together with descriptive text for each plate. Subscription price, $2 a part. New York : William Wood & Co.

DIPHTHERIA : its Nature and Treatment, by C. E. BILLINGTON, M.D., and INTUBATION IN CROUP, and other Acute and Chronic Forms of Stenosis of the Larynx, by JOSEPH O'DWYER, M.D. 8vo, 326 pp. Price, muslin, $2.50. New York : William Wood & Co.

This is a work of much importance, summing up the most recent practical knowledge on the, at present, most universally prevalent of infectious diseases. The recent progress made by Loeffler, Roux, Yersin, Prudden, and others into the true etiological nature of the disease by their biological researches and experiments as here given, show that we are, at the least, on the eve of a clear recognition of *the* bacillus against which all sanitarians will be called upon to make war. But meanwhile the author would not have it forgotten that the introduction and prevalence of the disease is closely related to unsanitary conditions—to filth of every kind—and the more during cold and damp weather. Notwithstanding, from its well-known contagiousness, when once introduced, it is liable to prevail independently of all local and climatic conditions. Its greater prevalence among children than adults is attributed by the author " mainly to the softness and delicacy of their mucous membranes, which are consequently especially susceptible to irritating influences, penetrable by morbific poisons, and liable to inflammatory affections in general." This explanation is illogical when applied to the same degree of excessive liability of children to several other diseases against which, in common with diphtheria, the power of resistance by children, compared with adults, is alike feeble—probably on account of physiological conditions. Moreover, the increased proneness of children enfeebled by other diseases to contract diphtheria, which the author recognizes, strengthens this view. The results of bacteriological investigations are briefly stated, from which the author concludes that diphtheria is caused by a parasite, of which he gives a description, but "no bacterium thus far discovered in connection with diphtheria can furnish by its presence or its absence a reliable criterion for diagnosis." Primarily, he believes the disease to be local in its attack, occurring first, in the great majority of cases, upon the outer avenues of entrance of inspired air and of food and drink, and with the greatest relative frequency in exactly those positions where particles of matter introduced by them would most naturally be deposited, which fact suggests a probability that the disease is directly and locally caused by such contact or implantation; the constitutional affection is consecutive. A good deal of space is taken up under several heads with an endeavor to show the difference between diphtheria and croup, contrary to the more general conclusion of other observers, but it appears to be a distinction without a difference, in either pathological conditions or results of treatment. Prophylaxis, treatment, and disinfection are well summed up in relation with the best results.

The chapter on Intubation, by Dr. O'Dwyer, gives a very complete history and description of this operation, which he has done more than any one else to introduce and perfect. The work is well illustrated, gotten up in the excellent manner common to the publishers, and eminently worthy the attention of all medical practitioners and sanitarians.

THE MEDICAL STUDENT AS PICTURED IN "PUNCH." Smith. The London Medical Student. By ALBERT SMITH. 12mo, cloth, 50 cents. New York: John B. Alden. This is a very entertaining book for doctors, as a pillow-soother at the end of a hard day's work, reminding them of the joyful anticipations of professional life. It follows the career of a student in a London medical college in a broadly humorous manner, from his outset to the appearance of the "new man," when he comes up from the country to continue his medical studies; and the zeal with which he enters upon his new duties is delineated in a laughable manner. His subsequent course, his dodging of recitations, the letters home for money with which, ostensibly, to purchase books, his examination, and the various "Curiosities of Medical Experience," follow in a similar strain. The work is reprinted from *Punch*, in which it appeared as a serial.

ALDEN'S MANIFOLD CYCLOPÆDIA OF KNOWLEDGE AND LANGUAGE. Vols. V., VI., and VII., from Bilbilis to Cevennes, with numerous illustrations, fully sustain our previous comments on its excellence. Along with its manifold number of words and topics treated briefly, there are many extended articles, as for instance, Book-trade, twenty-one pages; Boston, ten pages; Brazil, seven pages; Breech-loading Guns, eleven pages; Bridge, eleven pages; British Museum, ten pages; Brooklyn, five pages; Buddhism, fifteen pages; California, sixteen pages; Cattle-plague, eleven pages; Cell Theory, eleven pages. While so full, its exceeding handiness gives it very great advantage as compared with the bulky volumes of other cyclopædias, and greatly adds to its usefulness. The publisher sends specimen pages free to any applicant, or specimen volumes, which may be returned if not wanted, for 60 cents for cloth binding, 75 cents for half Morocco, postpaid; the better binding is particularly commended. John B. Alden, Publisher, 393 Pearl Street, New York, 218 Clark Street, Chicago.

ELECTRICITY IN FACIAL BLEMISHES. By PLYM. S. HAYES, A.M., M.D., late Professor of Chemistry and Toxicology, Woman's Medical College; Professor of Analytical Chemistry, Chicago College of Pharmacy; of Gynecology and of Electro-Therapeutics, Chicago Polyclinic, etc., 12mo, pp. 128, is a monograph on a subject well calculated to interest physicians on the practicability of electrolysis for the removal of superfluous hair and other superficial blemishes. It describes the anatomy of the skin, the electrical apparatus, and its mode of application with clearness, illustrated with numerous cuts. Chicago: W. T. Keener.

MEDICAL EXCERPT.

SACCHARIN AS AN ANTISEPTIC.—Dr. Constantin Paul thinks that if saccharin should be interdicted as an aliment, it might, on the contrary, be utilized as a medicament, and principally as an antiseptic. In this last point of view, it is susceptible of preventing the ammoniacal fermentation of the urine, as well as the development of the micro-organisms of pus or of puerperal-fever. It may be utilized, for example, as a dentifrice or antiseptic for the mouth. A teaspoonful of an alkaline solution with six per cent of saccharin in half a glass of water constitutes a good dentifrice. It may be utilized also for the washing of the stomach, and it may be advantageously substituted for boric acid for washing out the bladder.—*Paris Letter, Boston Medical and Surgical Journal, May 2d,* 1889.

BETA-NAPHTHOL has recently been administered in three one-fourth grain doses, repeated every two hours, to some patients suffering with typhoid-fever. The results obtained appear to have been, almost without exception, extremely satisfactory—this internally applied antiseptic reducing the temperature, rendering the breath, skin, and excreta comparatively sweet, and, generally speaking, lessening fetor and otherwise promoting recovery. Even the period of the disease seems to have been shortened in those instances where the drug was given, as compared with others where it was not used. Only in two cases, some gastric irritation occurring, it was found expedient to alter the treatment, and in each instance a relapse took place on the intermission of the beta-naphthol. The alpha modification, which is now said by some inquirers to be less liable to cause irritation of the mucous membrane of sensitive patients, does not appear to have been tried.—*London Letter, American Practitioner.*

DERMATOSES FOLLOWING MENTAL SHOCK.—A lady, after witnessing a violent assault upon her husband, was much prostrated by the fright, and three weeks later a bullous eruption, having the characteristics of foliaceous pemphigus and accompanied by incessant pruritus, made its appearance. Another case was a little girl who was rescued from burning, and remained for some time in a condition of prostration from fright. A month afterward a pemphigoid eruption made its appearance on the body, disappeared under treatment, but reappeared again several times. A third case was that of a woman who became very much excited in a quarrel with her husband. A few days afterward an exudative erythema made its appearance on the arms, hands, and feet; and vesicles on the lips. E. de Smet has recorded cases of purpura hæmorrhagica from the same cause.—*Progrès médicale.*

CARDIAC MEDICAMENTS.—Various experiments having been performed with certain cardiac medicaments, the following results have been attained with three of the principal—viz., digitaline, strophanthin, and sparteine. In some cases, which are rare, where a strong impulse is necessary to excite the functions of the heart, strophanthin will be employed with success. Sparteine is the stimulant *par excellence* of the contraction of the heart, only it does not modify the arterial pressure. But neither the one nor the other of these medicaments will surpass digitaline, which acts distinctly, although very moderately, on the sanguineous pressure, while at the same time it regulates the contractions of the heart. The recent works of Dr. Laborde, the eminent physiologist, give support to this assertion.—*Paris Letter, American Practitioner.*

PHENIC ACID IN MALIGNANT PUSTULE.—Contento recommends very warmly the treatment of malignant pustule by means of hypodermic injections of a three per cent solution of carbolic acid, from the very good results he obtained. This method has also been tried by Maffuci, Raimbert, Gallozzi, and others. He employed this treatment in six very grave cases of malignant pustule, of which he gives a full history. He injects the solution round about the centre of the pustule about one centimetre removed from the line of demarkation at about one and a half centimetre from each other. Besides that, he injects a couple of syringefuls directly into its centre.

The number of injections made at one sitting varies, according to the size of the pustule, from six to twenty-five. Usually after twenty-four hours such a striking improvement takes place that repetition of the injections is rarely necessary.—*Dr. Contento, Gazzetta degli ospitali*, xxviii., 1888.

ACUTE PANCREATITIS.—Dr. Reginald H. Fitz lately delivered an interesting lecture upon this subject, and his conclusions are as follows, he believing that the evidence he has presented is intended to establish the fact that acute inflammation of the pancreas is both a well-characterized disease, and one which is much more frequent than is generally thought. It is of great consequence that it should be recognized, for the following reasons. It represents a serious complication of what, by itself, is a relatively simple affection—viz., gastroduodenitis. It is an important cause of peritonitis, and one readily overlooked. It has been repeatedly confounded with acute intestinal obstruction, and has thus led, in several instances, to an ineffective laparotomy ; an operation which, in the early stages of this disease, is extremely hazardous.—*Cincinnati Medical News.*

REED & CARNRICK'S SOLUBLE FOOD.

NEW YORK CITY, November 9, 1888.

Messrs. Reed & Carnrick.

GENTLEMEN : In recognition of the courtesy shown us by your invitation to visit your laboratory at Goshen and personally observe the several successive steps in the process of preparing your *Soluble Food*, we desire to express our thanks. We were very forcibly impressed with the precaution exercised in obtaining practically sterilized and partly digested milk, and the absolute cleanliness observed throughout the entire process. We unhesitatingly endorse your *Soluble Food*, and shall continue prescribing it for our babies. Edward Molitor, M.D., Somonauk, Ill. ; J. Gill. Allan, M.D., Shelbyville, Ky. ; J. D. Herrmann, M.D., Eastman, Ga. ; S. T. Turner, M.D., El Paso, Tex. ; J. I. McConnell, M.D., Chattanooga, Tenn. ; J. C. B. Justice, M.D., Ashville, N. C. ; B. Z. Henslee, M.D., Dickson, Tenn. ; W. G. Ferguson, M.D., Hughesville, Mo. ; J. H. McDuffee, M.D., Keyser, N. C. ; W. H. Hudson, M.D., La Fayette, Ala.—*From New York Polyclinic School.*

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