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ON THE IMPORTANCE OF STUDYING TEMPERA- MENTS.

By SAMUEL WILKS, M.D., F.R.S., Physician and Lecturer on Medicine,
Guy's Hospital. Read before the National Health Society, June 7, 1876.

(Continued from page 233.)

We are now by this time agreed that the mere administering to temporary troubles, or those which to the patient appear to be seated in one organ or the other, is not the highest aim of medicine; it is essentially born of ignorance. The laws of disease are discoverable by ascertaining the different causes in operation which influence the body for ill, and by ascertaining the different susceptibilities of each particular body. Now the first or exciting causes are better known than the latter, or the predisposing. We are, for example, constantly speaking of the effects of cold, of heat, of vitiated air, of alcohol, but it is very remarkable how variously susceptible are different persons or constitutions to the influence of these agencies. The predisposition to different ailments, that is, the temperament idiosyncrasy must be taken into account, and in attempting to ascertain this we have to meet with a difficulty of a most formidable kind, and for this reason, that we are often by no means assisted by the patient or his friends in the enquiry, but have to judge as well as we can for ourselves. In the case of consumption, I find at my insurance office that hereditary tendency is never allowed by the applicant, for if a member of a family have died of phthisis, it is said to be due to some accidental cause, or exposure to cold, to dissipation, to grief, or any other fanciful reason. The public require instruction in this view of the case, and to be taught that it is to their interests to unfold or expose their peculiarities to themselves and to those of whom they take advice, so that they may guard themselves and their belongings from all those influences which may be

injurious to them. I am sorry to say that most people attempt to hide their weaknesses, and the medical man is often obliged to form a judgment for himself. If, for example a mother be so unfortunate as to have a half-witted child, she feels bound to defend it against the ill-natured criticism of her neighbours, and by so doing she has gained the habit of extolling her child's merits to such a degree that, when in the presence of a strange medical man, she dilates on its remarkable qualities, of which quickness and cleverness constitute the principal features. The doctor is so accustomed to this that when the story is ended he generally concludes that the child is an idiot. The fondness of the mother makes her conduct explicable, but does not render it less foolish, for nothing is really so important in considering the question of health, and the prevention of disease, as the peculiar characteristics of each person, and the class of agents which are likely to affect him injuriously. The predisposition is vastly more important than many think. One of the most striking examples of this is seen in the case of twins. In a very interesting paper by Mr. Galton, he mentions some remarkable instances of twins living in different countries, and exposed therefore to different influences, yet having similar diseases break out upon them at the same moment, and even dying of the same complaint at the same age. And yet these diseases, had it not been for this remarkable coincidence would never have been regarded as having a constitutional origin. Even mental changes and insane delusions occurred exactly at the same period of age. The influence of sex in the transmission of peculiarities is also very important. Medical authors speak of some which descend on boys and others on girls. A case is related by an ophthalmic surgeon where all the children of a family squinted, the boys with the right eye and the girls with the left. Amongst horses, I am told, the fact of hereditary transmission of disease is most marked.

The reason why parents are often blind to the peculiarities of their children is owing to the fact that they themselves partake so much of the characters of their offspring. This is one great cause of evil training, whether it be mental, moral, or physical. A peculiarity or tendency to any remarkable characteristic is apt to be propagated to the offspring, and in them may even be exaggerated. The child not only is inclined to follow its instincts by pursuing a peculiar path, but is assisted on the way by the parent, who also instinctively regards the peculiarity as a merit or a virtue. If what I say is true, it is a fact of the utmost importance in considering the moral and

physical training of the young. The question is this : given a particular propensity inherited by a child, will his instincts direct him to acts which shall counterbalance that propensity, or will they not rather lead him on in the direction of its further development? Now this question cannot be answered by any theoretical considerations ; it can only be solved by observation. I have often heard it maintained that the instinct will rightly prompt in the cause of health, but my own experience has shown this to be far from correct. If a child be fond of exercise, or of a sedentary habit, it may be thought to be pursuing a plan best suited for its organization ; or if it has a liking for a particular article of food its instincts will guide it right. This, I say, is a question to be solved. Perhaps if we take mental peculiarities, and ask ourselves whether most persons endeavour to counteract them or foster them, we shall arrive at a correct answer respecting analogous physical characteristics. Does a shy child instinctively know its weakness, and court society until he or she has lost the peculiarity, or does he not rather yield to it and develop it? Does not a highly sentimental and dreamy girl pursue a life which encourages her characteristics. In fact we know that a child's inclination is involuntarily directed towards any pursuit from tendencies implanted in its nature ; and we may also observe, and this is a very important fact in the matter of training, that the person's idiosyncrasies running in the same direction, the peculiarities may be fostered by either the father or the mother. Now, although it is not so self-evident, the same law, I believe, is followed in our physical nature. A child is born with certain inherited peculiarities which tend to increase by the continuance of those same influences which set them going in the parent. A drunkard begets children of weak mind, and with a strong propensity to drink ; their children continue in the habit, become epileptic, idiotic, or markedly deformed, and in this way happily the family become extinct. What we first want to ascertain, in considering the large question of national health, is, what do we mean by the normal Englishman, and what are the varieties of him? Now, probably, the more highly civilized a country is the greater the diversity of form, of temperament, and of character ; different however, as these are, there must be national peculiarities. An hotel-keeper abroad, for example, knows his Englishman at once. Whatever opinion we may hold as to the origin of man we must regard his surrounding of climate and food as having been mainly instrumental in producing his modifications. In the orthodox view, as originating from a single pair, no other con-

clusion can be framed than that climate was instrumental in producing the different races. Now these races, when of the lowest kind, as in uncivilized nations, show no peculiarities amongst individuals ; these seem as much alike as the sheep in a flock ; they are all employed in the same manner, they eat the same simple food, and their mode of life is remarkably uniform. There seem to be no especial temperaments amongst the African tribes, who live on vegetables, or in some savage islands where the inhabitants subsist on fish. If it be true that a perfect uniformity of character exists where the food is of one kind, we may gain a clue to the diversity of temperament from the variety of food used in civilized life. The nature of the soil implying different occupations will also have its effects, also the influence of light and the density of the atmosphere. Thus it has been thought that bilious temperaments prevail in hot, and phlegmatic in cold climates. The soil and the occupations of its inhabitants necessarily dependent on it will produce in our own small island different types, as the agriculturists along the eastern border, the manufacturers in the centre, and the miners amongst the western hills.

It is remarkable how few have studied the different temperaments of Englishmen. Most medical writers have been content to take the different varieties as described by Hippocrates as existing amongst the Greeks, and with him divide all persons into the sanguineous, the bilious, the melancholic, and the phlegmatic, according as each possessed a superfluity of blood, of yellow bile, of black bile, or of phlegm. Now although these terms are to a certain extent applicable at the present day, and are still in use, yet better ones, no doubt, could be found suited to the English soil and its inhabitants. Climatic influences are seen in such well-marked cases as the negro drooping in this country, and the want of proper development in the English child if brought up in India. Medical men of late years, when speaking of temperaments, have distinguished them in reference to certain tendencies to disease, as for example, the gouty, consumptive or nervous. This nomenclature has been very useful, but it would be preferable to have a division framed after the Greek model, on a healthy basis, for then we could speak of the different types of man, which would include at the same time their proclivities to special forms of disease. What we really want in studying the health of the community is the variety of type amongst our countrymen, then to discover what are the tendencies in different families and individuals, how these have come about, and by what means we can best avert the development of any morbid

susceptibilities. I cannot do more here than touch upon this question, to show its importance. For example, gouty persons are apt to have a variety of complaints, and the diseases of which they die are of a particular kind; now it is important to know why England, before all other countries, is apt to produce this disease called gout, and what are the circumstances which favour its development in any individual; in the same way, why consumption is so common a disorder, and what are the circumstances which favour its development in particular cases. You will see that the person who is inclined to the one affection or the other inherits with the disposition a peculiar frame of body, so that observation will show to what temperament every one belongs; not only is there a tendency to certain morbid changes, but the whole character of the man in health possesses its own features. Now, in all probability, the same causes which we see constantly in operation, ready to induce certain phenomena in these individuals, are really the same which, operating through several generations, have produced the very constitution which he inherits.

For example, take a model man, put him on our island, feed him well with a large amount of animal diet, malt liquors, and wines, subject him to certain atmospheric conditions, etc., and you would probably produce an individual of the sanguineous and gouty type—a well-made man with plenty of vigour, both animal and mental, good tempered, and social, given to generous impulses, as well as to generous living. This class of man is produced under certain favouring circumstances, and the tendencies of his life are to perpetuate his characteristics and peculiarities. These may be averted in later generations by judicious marriages, otherwise the worst parts of the constitution are propagated from father to son, and, the strong tendencies remaining, the younger generations become a prey to the vices of their inheritance. Any peculiarity is likely to be fostered until it reaches a morbid degree, and then an actual malady is set up. In considering, therefore, the question of 'prevention better than cure,' it is absolutely necessary that a study of these temperaments should be made. Suppose you had influence in some part of the country where you may be residing, and you see a young family growing up with the peculiarities of the gouty or arthritic temperament which I have mentioned. Place those children in a position where all their propensities will be fostered, where, surrounded by society, their inclinations toward free living are favoured, a rapid development of their inherent evils takes place; on the other hand, let the young man be placed in a position where activity

and temperance are encouraged, their morbid proclivities may all be counteracted. The children of this type, you may remark, are robust and healthy-looking, and always, in my experience, have an early liking for wines and strong drinks.

But England strangely enough produces another tendency—that to consumption. Circumstance of climate, I apprehend, have given a start to this proclivity, and the tendency is developed into a diathesis in the course of generations. The child born of consumptive parents is generally well formed, but not robust, the frame is well proportioned, and the whole organism shows great activity. There is a quick circulation, and the brain and every other organ of the body is working at high pressure. The child is highly intelligent, and he continues so when grown to a young man; he is fond of exercise, and boasts of his walking feats. At the same time that the body appears over-oxygenated and all the functions are performed with great activity, the digestive powers are not strong, the appetite is small; and there is a dislike to fat, alcohol, and all hydrocarbons on which his oxygen may feed. The chances are that he signs the pledge, and being a good young man, has deceived himself into the conviction that he has done it for a moral object. A youth of this kind always appears to me like a high-bred horse, very active, capable of remarkable performances, but at the same time highly susceptible to surrounding influences which may soon light up disease in the system. He is living at this high tension, a slight exposure to cold sets up an inflammation of the lungs, rapid disintegration occurs, and consumption soon brings the precocious youth to an end. Now you who intend to take charge of the public health, seeing the young people with these proclivities, may render them good service by timely advice; they are not to work all day at their books and consume midnight oil in hours which ought to be devoted to sleep; they are to be well fed, and if there is a class of persons who require alcoholic drinks, it is this; you will notice their aversion to them, but their feelings are leading them to evil; give them beer wine, and fat foods, to counteract the over oxygenation, and diminish the amount of labour; let them be well clothed and protected from those atmospheric causes which are likely to set up morbid processes in their delicate air passages. Should an unfortunate marriage engender on both sides these peculiarities, the children are all apt to die out young. In these different temperaments there are features both physical and mental of so good a kind that I by no means would say that if mixed with others the best results might not obtain; and therefore

the time has not yet come when we can follow the suggestion of one of the characters in *Lothair*, that the vigour of the race concerns too much the welfare of the commonwealth to be entrusted to individual arrangement.

Take another example; there is what we call the nervous temperament, and in connection with it I will just mention this fact, that I have known several instances of medical students who have had peculiar sensitive dispositions and fantastic minds, who have been prone to leave ordinary every day work and discuss obscure metaphysical questions which have been more congenial to their disposition. These young men have instinctively found their way to take charge of lunatic asylums, and they themselves have finally gone mad. I merely mention this as another instance of the proclivity for persons to follow their inclinations, and by this means any peculiarity is fostered and developed. If what I say is true, and I firmly believe it is, and you wish to prevent disease, the method is certainly what is not too often followed, to let each child follow its instinct.

I might say, as regards the nervous temperament, it is one which especially should be protected from those agencies which may be constantly tending to develop its peculiarities. Persons of this temperament, being anxious, are often thought to be suffering from overwork. This is a great mistake; they will undertake much and perform much, but it must be cheerful work, and that in which they take an interest. It is not work, but worry, which injures the nerves; therefore it is that some of our oldest livers have been tremendous workers, but they have not been sensitive men; they have not shrunk from annoyances, but have rather courted them, feeling exhilarated by opposition and contention. Take, for example, Lord Palmerston, Lord Brougham, the late Bishop of Exeter, Lord Leonards, and a host of others. Such men show in the first place, their origin from a good stock, and then that they have not very sensitive nervous systems, but by no means that hard work is injurious. There can be no doubt that for happiness and long life a highly sensitive and sympathetic nature is not the most conducive. A French physiologist said that, if you want long life you must have a bad heart and a good stomach.

I think we may safely say that our gouty Englishman is a counterpart of the man of sanguineous temperament of Hippocrates; but the Greek physician did not seem to have any condition corresponding to our very important tuberculous temperament, nor does his choleric exactly answer to our nervous temperament. We may, however, speak with the father

of medicine of bilious or melancholic temperament, that which is seen in the dark-complexioned person, with muddy skin, and who always takes a gloomy view of affairs, whether domestic or social. And we also agree about the leucophlegmatic temperament, that in which the individual is a large, white, flabby person, very lethargic and apathetic, both in mind and body.

I am afraid that some may be disappointed in my not having offered them a little more accurate knowledge to guide them in these matters; but I confess, when consenting to appear before you, it at once occurred to me that little was known to the community in general of the matter of temperaments, and yet that this was all important in connection with your great object in preserving the national health. In thinking it over, however, I conceived that many might be scarcely prepared for this idea of its importance, and therefore I found it necessary to introduce my more general remarks. My theme has been this. Mankind is struck down by pestilence or by diseases we call specific. The causes of these it is your duty to remove as far as possible. Then, again, mankind succumbs much more frequently to internal diseases; these are brought on by various agencies which are removable, and these your Society will consider; at the same time the susceptibilities to these influences, are vastly different in different persons, and the production of disease is so often due to inheritance rather than any special cause, that those different characters of people deserve your utmost consideration. If any member of this Society were living in a country village, and he or she were able to exert any influence over the community, it would be found most essential to study the peculiarities of families. A young man or young woman of ability, and who required a stimulus to develop, you would send away where competition was ready for them. On the other hand, you would keep at home the young man or young woman who you were sure from their idiosyncrasy would be at once led into temptation.

The whole subject of hereditary disposition is much too large to be fully considered in the time at my disposal, especially when that has been curtailed by dwelling upon the general object which your Society has in view. I confess that the latter mainly occupied my thoughts when sitting down to write this paper, for I felt how you might be made the means of assisting in some of the larger inquiries which are at the present time highly necessary with regard to the nation's moral, social, and bodily health.

Now, in attempting to carry out the objects which this Society has in view, and one of them must be the studying the character of the people, and the causes which tend to deteriorate their health, a true method must be adopted. We must be inspired by a feeling to investigate closely and in detail all the circumstances of man's nature and surroundings, without the slightest bias to gain a given result for the fulfilment of some presumed beneficial end. A bias of this kind existing in the mind is entirely subversive of the purer and truer instincts which should stimulate one to exertion. If you work for the love of truth only, you will find that, however apparently small or trifling is your discovery, a practical good will follow ; this has always been and must necessarily continue to be so.

And now I will conclude with a quotation from one of Robertson's sermons:—'We are fearfully and wonderfully made. Of that constitution which we, in our ignorance, call union of soul and body, we know little of what is cause and what effect. We would fain believe that the mind has power over the body, but it is just as true that the body rules the mind. Causes apparently the most trivial, a heated room, want of exercise, a sunless day, a northern aspect, will make all the difference between happiness and unhappiness, between faith and doubt, between courage and indecision. To our fancy there is something humiliating in being thus at the mercy of our animal organism. We would fain find nobler causes for our emotions, as well as for our sublimest sorrows. It is a duty, therefore, to keep the body in temperance, soberness, and chastity ; to guard it from pernicious influence, and to obey the laws of health are just as much religious as moral duties.' I wish the Society all prosperity. 'Salus populi suprema lex.'

PRACTICAL NOTES AND EXTRACTS ON HYGIENE.

(Continued.)

ON COOKING—MEATS.

The purpose of cookery is, or should be, to render foods more digestible, and at the same time to develop their flavor and make them more palatable and acceptable to the stomach. Bad cookery is one cause of disease. It produces for our table, hard, dry, tasteless masses of flesh as undigestible as unpalatable. Foods otherwise wholesome, nutritious, and digestible, are by it not unfrequently rendered

unwholesome, innutritious, and almost unmanageable in the stomach. It mingles together almost indiscriminately, foods, which taken alone, are valuable and harmless, and creates hot piquant stimulating dishes, utterly unfit to be received into the system. Too frequently, the chief aim in preparing and cooking foods is the gratification of a morbid palate, to the entire disregard of the unfortunate stomach. Dishes are prepared and served containing a large number of entirely different sorts of foods—incompatible substances—that form compounds little short of poisonous. The worst result probably of this fancy cookery is, that by the constant preparation of new and variegated dishes, the palate is so tickled that people are thereby induced to *eat too much*.

It would not be desirable to have the number of studies increased in our girl's schools, but the art of cookery might very advantageously take the place of one or more of those now taught. It now forms one of the 'branches' in many village schools in Great Britain and in Ireland.

The following on the cooking of meat is from Parkes' Practical Hygiene:—*Boiling*.—The loss of weight is about 20 or 30 per cent.; sometimes as much as 40. If it is wished to retain as much as possible of the salts and soluble substances in the meat, the piece should be left large, and should be plunged into boiling water for five minutes to coagulate the albumen. After this the heat can scarcely be too low. The temperature of coagulation of the albuminoid substances differs in the different constituents, one kind of albumen coagulates at as low a heat as 86° if the muscle serum be very acid; another albumen coagulates at 113° Fahr.; a large quantity of albumen coagulates at 167°, the hæmatoglobulin coagulates at 158° to 162°, below which temperature the meat will be underdone. If the temperature is kept above 170°, the muscular tissue shrinks, and becomes hard and indigestible. Liebig recommends a temperature of 158° to 160°. Most military cooks employ too great a heat: the meat is shrunken and hard. In boiling, sulphohydrate of ammonium is evolved, with odoriferous compounds, and an acid like acetic acid.

If it is desired to make good broth, the meat is cut small, and put into cold water, and then warmed to 150°; beef gives the weakest broth. In a pint there are about 150 grains of organic matter, and 90 grains of salts. Mutton broth is a little stronger, and chicken broth strongest of all. About 82 per cent. of the salts of beef pass into the broth, viz., all of the chlorides and most of the phosphates.

Broth made without heat, by the addition of four drops of

hydrochloric acid to a pint of water, and a half pound of beef is richer in soluble albumen. Lactic acid and chloride of potassium added together have the same effect. If rather more hydrochloric acid be used, but no salt, heat can be applied, and, if not higher than 130° Fahr., nearly 50 per cent. of the meat can be obtained in the broth.

Roasting.—The loss varies from 20 to 35 per cent. ; in beef, it is rather less than in mutton (Oesterlen). This loss is chiefly water ; the proportion of carbon, hydrogen, nitrogen, and oxygen remaining the same (Playfair). Roasting should be slowly done ; to retain the juices, the meat must be first subjected to an intense heat, and afterwards cooked very slowly ; the dry distillation forms aromatic products, which are in part volatilized ; the fat is in part melted, and flows out with gelatine and altered extractive matters. The fat often, improperly, becomes the perquisite of the cook, and may be lost to the soldier. The loss in baking is nearly the same, or a little less.

Stewing.—This is virtually the same as roasting, only the meat is cut up, is continually moistened with its own juices, and is often mixed with vegetables. Like boiling and roasting it should be done slowly at a low heat ; the loss then is about 20 per cent., and chiefly water.

In all cases, there is one grand rule, viz., to cook the meat slowly, and with little heat, and, as far as possible, to let the loss be water only. The fault in military kitchens has been, that excessive heat is used. I have frequently seen the water boiling, and the men have told me that, in order to boil the vegetables, and yet not overdo the meat, they are obliged to remove the meat for a time from the water. The meat is then often a sodden, tasteless mass, with hard, shrunken, and indigestible fibres. The thermometer will be found very useful, especially in shewing cooks that the temperature is often much higher than they think. In the cooking of salt meat, the heat should be very slowly applied, and long continued ; it is said that the addition of a little vinegar, softens the hard sarcolemma, and it is certain that vinegar is an agreeable condiment to take with salt meat, and is probably very useful.

A MODEL CITY OF HEALTH.—Dr. B. W. Richardson's proposal for a "A City of Health," mooted by him last year, and noticed in the January number of this journal, is about to be tried practically. A site has been secured in Sussex, where the sanitary city will be laid out, and in due time erected. Dr. Richardson has given his countenance to the scheme, and will supervise the sanitary arrangements.

REPRODUCTION OF DISEASE GERMS.

Read before the Michigan State Board of Health, by H. B. BAKER, M.D.,
Secretary of the Board.

At the late meeting of the British Medical Association, held at Edinburgh, Aug. 5, 1875, Dr. Lyon Playfair, President of the Public Health Department, is reported to have said that he thought modern research has given little support to the *chemical* theory of contagion, and that the "power of reproduction" is an argument in favor of the "germ theory." He is reported to have said. They were as certain that whatever produced scarlet fever would produce scarlet fever as that a dog would produce a puppy, or a rose tree would produce a rose tree." I believe this last proposition is true, but in a sufficiently saturated solution of glauber's salt, a crystal of glauber's salt is as certain to produce a vast number of crystals of glauber's salt, as a dog is to produce a puppy, and more so, for it takes two dogs to produce a puppy, while only one crystal will suffice to produce a large number of others. It has been abundantly proved, too, that without the entrance of a crystal or of something which will act as a nucleus, saturated solutions of crystallizable substances may be kept for a long period of time without the formation of crystals. There is, then, a mode of reproduction which may as certainly be stated of crystals as of living organisms, and unless crystals are considered as not only organized but living, then reproduction of bodies having similar forms and properties is not proof of the presence of life. Chemical solutions may be prepared in which the character of the crystals which form shall be determined by the character of the crystal which is placed therein. I see no reason to doubt, indeed it has been proved, that the blood in a living person may under certain circumstances be so constituted as to permit the reproduction of definitely constituted particles of matter, in vast numbers; and these particles may not be endowed with a much higher grade of life than a crystal of glauber's salt; or they may be, as Dr. Cohn states of the active virus of vaccine, "living and independent organisms which multiply by cell-division," being "single cells of a spherical form, and forming chains and groups of associated articulations." Whether these particles are living or not, their reproduction must cease as soon as sufficient material for their formation is, through their rapid reproduction, withdrawn from the blood or particular tissue involved, unless the body is capable of maintaining the supply, in which case the disease is continuous, otherwise it must be self-limited as well as contagious, and protective

against another attack until the body returns to its previous condition. The destruction of disease germs by exposure to the atmosphere, or by dilution with water, is not proof of life as ordinarily understood, for the same may be said of crystals or of definitely constituted colloid substances.

In the present state of science it does not seem proper to affirm that one minute microscopic collection of definitely constituted albumen is a living organism, and that another speck of definitely constituted matter, which placed in a proper solution will develop a crystal, is non-living matter. The limit of life is differently placed by different observers.

Undoubtedly there are substances which cause diseases, and each of which appears to have a different definite constitution, and is capable of re-producing its kind. The question whether they are living or non-living,—that is, whether the “chemical” or “germ theory” of disease is true, is interesting, but, if the foregoing is correct, not important. The facts which seem to me of importance are: 1, the existence of such disease germs or substances; 2, the possibility of sometimes preventing their entrance into the body, as in antiseptic surgery; 3, the phenomena which attend their introduction into the body, and especially the extremely gratifying fact, that as regards small-pox the phenomena may be materially modified by vaccination; 4, and finally the fact, which seems to apply to all of them, that they may be destroyed outside the body by such means as heat, disinfection, dilution with water, or exposure to free action of air. In my opinion these are facts of prime importance in preventive medicine, and should not be allowed to be overlooked by being too closely connected with questions relative to the origin of life, and its lowest forms, however much we may be indebted to the study of such questions for increasing our knowledge of the causes of disease.

DEATH FROM OLD AGE.—There is a death, no doubt, by natural old age—a death perfectly simple and sudden, which carries off old people usually at night and in cold weather; thus removing, perhaps in sleep, persons who had gone to bed apparently as well as usual. No single lesion may be found to explain this death, although no organ of the body but has undergone the pathology of blocking up and wearing out. The individual eventually dies then because his heart ceases to beat. But King Death thus stepping in as a thief in the night is a very rare event. Old persons die more often after due

care at the hands of their medical advisers by natural pathological process. There is death approached by the bladder road under the ablest surgical charioteering: enlarged prostrate, thickened bladder, retained urine, catheterism, cystitis, catarrhal nephritis, typhoid, uræmic symptoms. There is death approached by the narrowed pathway of the degenerate and obstructed arteries, by paralysis, by apoplexy, by peripheral embolism, by senile gangrene. Lastly, and in my own experience most frequently, death is approached by diarrhoea in summer, and broncho-pneumonia in winter; in either case the final illness is short enough—a few days or a week at most. This broncho-pneumonia of advanced years is clinically very important for you to recognize. When some old person eighty and upwards, the habitual subject of bronchial catarrh, says to his ordinary attendant one morning that he is tired and will lie in bed, a thing he has never done before, take heed if his cheek is flushed, his eye a little brighter than usual, and his inclination to talk and tell you tales of his childhood greater than usual—beware, towards night-time he will “babble o’ green fields,” talk of those long since dead as if they were living and ought to come home, just wander in his mind a little, but be easily roused to think and answer correctly. Watch him carefully; he is near that heaven where he would be, where he shortly will be, for his tongue is dry, and he has an eager thirst, and he is drowsy but sleeps little, and awake but not all, and he has short quick breathing, and little fits of coughing, but not his old, long, suffocating cough; and he expectorates but little, and that little with difficulty: the end is not far off, and you had better inform his relations that you recognize the danger.—Dr. Reginald Southey, in Lectures on “Individual Hygiene,” Lond. Eng.

FAILURE TO PREVENT DEATHS.—The tendency of the people to wait until a probable evil actually proves injurious before attempting to avoid it, is stronger than it at first thought appears to be. At the late meeting of the British Medical Association, at Edinburgh, Dr. A. Stewart “narrated the case of a friend of his who went to inspect a boarding-school previous to sending his two daughters there. Everything he liked well but the drain, which passed within three feet and a half of the well. When he spoke of this, he was informed that the water of the well had been drunk for years, and that no disease had ever occurred. To satisfy himself, he twice had samples of the water taken and analyzed, and it was found to be perfectly pure. He sent his daughters to the school but in two or three weeks typhoid

fever broke out, and of four deaths which occurred, one was that of his youngest daughter. The water of the well was then found to be putrid from the sewage which had found its way into it." One would think that a person who had sufficient knowledge of the proper sanitary conditions, and sufficient forethought to make such a preliminary inspection as that described, would not wait to see the actual demonstration of the danger from a drain in close proximity to the well. Although most people freely admit in a general way that prevention is better than cure, few have the habit of thought relative to cause and effect which leads them to exercise what Tyndall might style the "scientific use of the imagination" sufficiently to appreciate the probabilities of danger from a study of the conditions precedent thereto. In consequence of this apathy, cases like the foregoing are constantly occurring, and a few are being recorded. If the few which are recorded are sufficiently brought to the notice of the people, they will in time tend towards the prevention of such occurrences.—Dr. H. B. Baker, in *Report of State Board of Health, Mich., U.S.*

THE NATURAL HISTORY OF A SCOLD.—I had not seen Mrs. — for a week, and supposed her either sick or away from home, when she drove up to my gate one morning with all her children in the carriage, and stopped to exchange salutations. She really looked less bright and blooming than usual, and I said, "You have been ill." "There it is again," exclaimed she, laughing; "everybody sees the want of oxygen in my blood. The truth is, I have been sewing steadily for a week upon the children's dresses, and have not allowed myself a breath of fresh air, which I have always deemed essential to my health, and on which I am now convinced my good nature depends entirely. At the end of three days of unbroken sedentary employment I begin always to falter, and can hardly eat or sleep; but on this occasion I held on to my work, and finished article after article, till my head was in such a whirl I could hardly count the garments as I laid them away. But yesterday I became desperate: I scolded poor Bridget for some slight mistake, till she looked at me in unutterable amazement. I ordered every child out of the house, even baby Benny here, because I couldn't bear the sound of a footfall within it; and when my husband came at night and told me I looked really ill and nervous, it was the last feather that broke the camel's back—I was sure it was only a courteous way of saying I looked cross and ugly, and I burst into a fit of uncontrollable sobbing, and went to bed like a naughty child at eight o'clock. This morning I locked up the unfinished pile of sewing. We

have a dinner basket there in the carriage, and are off for the woods. The children say they are in pursuit of fun, but I am after oxygen."—*Exchange*.

SANITARY REFORMS.—The evidence of the earnestness with which sanitary reform is pushed in all parts of the country, has been recently very great, and shows that much may be done to ensure the health and comfort of the community.

A few days ago a deputation from the Papermakers Association waited upon Mr. Sclater-Booth for the purpose of suggesting several amendments in the Rivers Pollution Bill, (which has now become law) more particularly affecting the paper manufacturing trade.

Again, we hear of a public meeting held at St. James's Hall for the purpose of forming a Society, to be called the Sanitary Institute of Great Britain. The Duke of Northumberland presided, and there was a numerous attendance of gentlemen throughout the country. The noble duke remarked that everybody was aware that the conditions of existence in this country had of late become very different from what they were in former times. The springing up of new communities in various districts and the enormous development of manufactories had produced a state of things unknown since the creation of the world.

We might also notice, if space permitted, other instances of the sanitary movement that is now gaining ground in all parts of the country; and it is evident that all classes of society are becoming more alive to the necessity of maintaining around them wholesome hygienic conditions, and are anxious to advance the reforms which the medical profession can fairly claim to have commenced.—*Med. Press & Circular*.

VACCINATION.—In referring to one death and several cases of severe erysipelatous disease which resulted apparently from vaccination with human lymph, recently in a German village the *Medical & Surgical Reporter* says: It would not take many such examples to confirm the prejudice which already exists too generally in the popular mind against vaccinating at all; and this would bring disastrous results to public health. The real alternative is to use *bovine* virus only, that which has never passed through the human subject, and which is derived from healthy heifers, on whom the genuine vaccine disease has been produced. And to shun the *lymph tubes*, and the *crusta*, and employ only *quills* and *ivory points*. These are far surer, neater and more permanent than any other forms. These are surplanting all other forms of bovine virus.

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Communications solicited from Medical Men and others on all subjects pertaining to
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A PROVINCIAL BOARD OF HEALTH.

The foundation of the power and vigor of a nation—the very root from which springs the happiness and prosperity of a people, is health. For increase in population, growth, a nation must mainly rely upon natural increase by births, upon excess of births over deaths. Almost invariably, it seems, it is found that a low death-rate and a high birth-rate accompany each other; both being found in the highest degree where most attention is paid to the laws of health, where insanitary conditions least prevail. What statesmen, who that feels an interest in the progress of his country, would not rejoice to find statistics show a low death-rate and a high birth-rate? Mental ability, intelligence, the will, the power to govern, all depend on physical health. Hence this subject of health is of the utmost importance. A recent report of the “Joint Committee on State Medicine of the British Medical and Social Science Associations” states that, the care of Public Health “touched so many interests; proposed for solution so many problems—scientific, economical, financial, moral, and judicial—of acknowledged difficulty, yet of the greatest importance; and promised, in its satisfactory adjustment, so many advantages to all classes of the community, as to entitle it to rank among the foremost of great national questions.”

We believe it not only “ranks *among* the foremost,” but that it is *the most* important subject that can possibly engage the attention of a people, since their very life and growth, physically, and even their mental and moral development depend upon it. The natural resources of a country, however great, commercial advantages, however great, cannot and will

not compensate for inattention to public health; neither can the former be developed without the latter. Every body is ready to admit that a large proportion, probably one-third, at least, of the usual cases of sickness and death are readily enough preventible; and not any body probably will doubt that the removable causes of this large proportion of sickness and death must necessarily produce an evil and decidedly depreciating effect upon the vigor and usefulness of those who are living and apparently healthy. Every one will concede that sickness and the usual precursors of death are very costly, that in the aggregate the cost is enormous, to say nothing of the loss to the community and the state in the final extinction of life; while not one perhaps will deny that crime, in all its forms, is not only the congener of filth, but is often the direct and positive outgrowth of insanitary conditions. It is undoubtedly in the nature of man to be largely influenced by the physical conditions by which he is surrounded. Indeed, it seems that he cannot, if he would, long resist their influence. In the proceedings of the New York State Medical Society, in the Report of Committee on Hygiene, on Relations of Unsanitary Conditions to Pauperism, Vice, and Crime, we find the following: "It is almost too patent for remark, that the filthiest parts of towns are inhabited by the most unhealthy and the poorest people; that unhealthy surroundings are scarcely less potent in blunting the sensibilities and lowering the standard of morals than in diminishing the strength of the physical system, and to such a degree that even new comers, as there are always likely to be some in unhealthy neighborhoods, lose both moral and physical stamina, have their sensibilities deadened by the vitiated elements around them, and not unfrequently become debased to the level of the polluted sinks and gutters amidst which they live."

Notwithstanding all this, what has been done or is being done in this country, in this matter of such vast and far reaching importance; what, to improve the present condition of Public Health, which is only, at most, say one-third, perhaps half, what it might, and what it ought to be. In England and in India much has been done to improve the condition of the

masses in the way of health, though the people think much yet remains to be done. On the continent of Europe almost every nation is employing active measures to the same end. In the United States much interest is awakening in the matter. At least nine of the states have established State Boards of Health; others are moving towards the same. While there is a general desire and an apparent determination to have established at Washington a Central Bureau, with a Minister of Public Health and Vital Statistics; such as is required at Ottawa, and as Dr. Brouse is most laudably endeavoring to have carried out.

But besides a Central Bureau at Ottawa, the Provinces require local or provincial Boards of Health, like the State Boards of Massachusetts and Michigan, with power to act and work. These latter are comparatively inexpensive bodies, the amount of work they accomplish is surprising, and the amount of good that must follow cannot but be very great. Compulsory measures for promoting health and preserving life are carried out, and the people are instructed, by means of the liberal circulation of sheets with health rules, &c., how to help care for themselves in this way.

Is there not in the Ontario Legislature a medical man, who, feeling the importance of this subject, could prepare and carry through a measure providing for the establishment of such a Board; giving it power to act? A very small appropriation, comparatively, would suffice for expenses, and we cannot conceive that there would be much opposition to such a Bill. Why delay? Why wait for further precedents? Why be the last body of people in the civilized world to take such action? And this at the expense of hundreds of thousands of dollars, and the loss of thousands of lives.

Two years ago Georgia had no State Board. Dr. J. G. Thomas, of Savannah, entered the legislature, evidently with a purpose. He carried through the first year a measure for the establishment of a State Board; and the second year a measure, or an "amendment," for the establishment of County Boards in every county in the state, to "advise the ordinaries with regard to registration, and to supervise sanitary affairs

in their counties." He encountered much opposition at both sessions, and from medical men. We cannot believe there would be a word of it from that class in Ontario. Dr. Thomas having carried his measures, accomplished his purpose, withdrew from the legislature. There is, no doubt, more than one medical man in the local legislature, who, if he set about it, could do as much for Ontario. It would certainly be a fitting movement for a Reform Government to recognize and support. Again we ask, why delay? Are we of Ontario so backward in appreciating what is for the general welfare of the people? The younger states of California and Minnesota are in advance of us in this matter, let us not be left too far behind.

If the daily and weekly press would take up the matter and "press" it, it would give encouragement to some one in the House to act. It has been said that the power to legislate on public health rests with the Dominion Government. But it can hardly be doubted that it comes within the province of the Local Legislatures. If it does not, it should.

VENTILATION.

In previous numbers of this JOURNAL we have given considerable space to the important subject of ventilation. During the past warm season almost every door and window has been kept open in order to obtain, if possible, drafts of cool air, and hence all necessary ventilation was obtained. Now, however, as the weather is becoming colder the tendency is and will be to close such means of securing a free circulation of fresh air, and the consequences will be many will suffer during the next few months from breathing foul air and from want of oxygen. We desire to call the attention of heads of families, school teachers, employers of men and women in factories and shops &c., &c., to the necessity of some sort of ventilation for all occupied buildings and apartments under their control. Where special means for ventilation are not provided, and few indeed are the cases in which there are such, the upper sash of a window might be lowered, and on opposite sides of th

apartment when possible. The size of any openings should correspond with the number of occupants in the apartment. It has been estimated that about twenty-four square inches of inlet is required for each individual in ordinary states of the atmosphere, when the wind is not strong, and when the difference between internal and external temperature is not great. With a strong wind, or when the outer air is very cold, the area of inlet and outlet may be much less. When openings are provided in this way for fresh air, of course, in cold weather, more fuel must be consumed to warm the air. This often prevents openings being made. But it is a matter of choice between a little more fuel and disease of some sort; for without pure air and plenty of oxygen it is impossible to continue in good health.

By free ventilation, ill health and its constantly attendant costs may be avoided. Employers may be reminded that the amount of labor, mental or physical, performed by the employed will be in exact proportion to the amount of fresh air supplied below a certain limit. Extensive observations have shown that in order to keep up the greatest energy of working men in confined places, a liberal supply of fresh air must be provided. It has been found that in mines if the usual quantity of fresh air supplied to the men is reduced to one-half there is a decided diminution in the amount of work performed.

INCREASE OF CRIME.—There can not be any doubt as to the truth of the remarks made by Dr. Workman, in his able and interesting paper on Insanity and Crime, read recently before the Canadian Medical Association, that the “publicity given to the details of terrible crimes in the public press was undoubtedly a frightful source of crime.” This source then should in some way be put an end to. Publishers would surely not continue to treat their readers to such horrible details if they really believed in the probable consequences. At best they are but as piquant, palatable, but poisonous food.

Annotations.

DR. ALFRED CARPENTER ON PUBLIC MEDICINE.

Dr. Carpenter recently delivered an address in public medicine before the members of the British Medical Association. We have no doubt our readers would find it highly interesting and instructive, but it is very lengthy and space will not permit us to give it in full, we give however, below, lengthy extracts. Dr. Carpenter reminded us that "it is scarcely more than forty years since the first national platform was established upon which satisfactory observations could be made, and successful operations carried on, in the cause of preventive medicine." The statistics prepared by Dr. Farr had been the true pioneers of sanitary work. He acknowledged the excellence and greatness of the work done by the older sanitarians. But gradually "the facts brought to light by Farr's tables," the knowledge gained of excessive mortality obtaining "in defined districts, among defined classes, and at particular epochs of their lives," and the invaluable papers "prepared by, or at the suggestion of, one who deserves as much of his country as any living man—viz., John Simon," led to numerous legislative measures, of varying value and efficiency, but culminating in the passing of a measure making the appointment of medical officers of health compulsory upon all local sanitary authorities. "We have now, a sanitary organization established by law for the repression of disease, which, however, is still imperfect in this most important respect—that the only information which a medical officer of health receives officially at present is, that disease of an infectious character has been fatal in a given place some time previously. This information is conveyed to him many days or even weeks after the events, and he finds, on inquiry, that the *materies morbi* has already been spread far and wide; that the contagia which have been produced by that case have been passed into the public sewer, the nearest watercourse, or other receptacle for human excreta, and, as a consequence, have most likely multiplied indefinitely. It is also probable that many cases of the same kind occurred before one was fatal, and that no efficient steps were taken to localise or circumscribe the effects of the disease in that locality. It is more than probable that if the proper officer could have had information of the first appearance of that disease in the locality the general distribution of its contagious particles would have been prevented, and the people saved some of the consequences

of that distribution. A natural sequence to the registration of death is the registration of these forms of disease, for the repression of which a sanitary organization is by law established. That registration will be effected in due course. It is a coming wave of legislation waiting for the time when the natural history of those diseases which it is intended to encounter is more fully understood by the public, and more perfect knowledge obtained by ourselves as to the way in which preventative measures are to be used." After referring to the class of diseases which should be registered and the class of persons who should give the information to the registrar, and also to the obstacles that impede the work of the sanitarian, Dr. Carpenter says: "Fortunately for science, physiology is taught in some of our elementary schools, whilst honours are taken at our universities in natural science by men who do not intend to enter the medical profession. The youth of both sexes are learning more and more the laws of nature and imbibing the first principles of physics. A portion of the public believe that it is the duty of the physician to give a reason for the line of treatment he is pursuing; they will not be satisfied with an evasive answer, whilst the more sensible portion will not be led astray by a false one. Our explanation must be either strictly correct or so framed as to apply to a possible hypothesis, and not be contrary to the laws of natural science. To the medical profession the country owes in a great measure the knowledge which has been obtained of the laws which apply to disease-prevention. As a profession we must continue in advance of laymen, and we must not allow the idea to gain ground that prevention and cure are different studies and may be entirely separated from each other. It may be even that one will supersede the other, and become the more noble study, but to give currency to the proposal that medical men should not be called upon to consider the means to be used for the prevention of disease, and that they may ignore the operations of the engineer, would be suicidal. We must know how to prevent disease if we would retain the confidence of the public. We require a clear insight into the conditions which give rise to disease, to reduce the principles of preventive medicine to the plainest lines, and to bring it into formulæ which may be at once assented to; perspicuity being the basis of all true knowledge in every branch of study."

The first principle of sanitary work, says Dr. Carpenter, is *motion*. "Any plan which entails stagnation as a part of its scheme must have the cause for that stagnation very clearly

expressed, and a sound reason given for it, or the scheme is bad in design and not calculated to effect the object for which it is proposed. This is a canon law with reference to the first great purpose of the sanitary officer. From the moment of excretion until it is utilized, motion of the excreta is the first sanitary law. If the excreta of carnivorous animals are kept moving, these combinations which produce epidemic disease are not forthcoming. For this purpose sewers are required in crowded localities. They are the necessary evils which follow upon the aggregation of individuals into crowded communities, though they are quite out of place in the village and the isolated mansion. Any sewer so constituted as to allow of stagnation of any of its contents in any part of its course is wrongly made. If arrangements are introduced which necessarily produce stagnation in the air, if only for a few feet of house-drain, a manufactory or vineyard is allowed to exist in which contagious particles may vegetate, and may be the starting-point of a fresh epidemic. Any trap or a sewer which is not accompanied by a corresponding ventilator may become a trap to catch men. Any sewer so constructed as to allow of deposit of solid matter, or which allows sewage to stagnate in any part of its course, in a similar condition. Sewers must contain a current of sewage constantly passing down, with a corresponding current of air always passing one way or the other, if they are to be kept free from the power of manufacturing mischief. Ventilation must be free and absolute, ingress being allowed as well as egress, in a way which cannot be counteracted. For every house in connexion with a public sewer there should be at least two free openings provided in the house-drain, an inlet as well as an outlet. If this arrangement is carried out, and the openings contrived so as to effect the object in view, and not for the purpose of defeating it, the natural forces will more effectually ventilate the sewers than any artificial aids. The diffusion of gases, the tension of vapour, the differences of temperature in the sewer as compared with the outer air, the constant movement of external air, together with the movement of sewage in the sewer, will suffice to produce a free ventilation at all times. If this be done, no contagium particle will have a chance of reproduction in the contents of sewers, and no sewer-gas will be discharged which will convey elements of mischief."

Sewers must flush clean under all circumstances; and no sewer ought to stink, as "fresh sewage does not smell." The sewage having been successfully carried away from the point of production, it ought to be utilized without delay, by irri-

gation or some other process ; and Dr. Carpenter naturally, and effectively, illustrates this part of his teaching by relating what has been done by irrigation on the Croydon Sewage Farm at Beddington.* The farm of 460 acres utilizes the sewage of 50,000 persons. It has been in action sixteen years ; it is close to a dense population, and is immediately surrounded by residential property of the most valuable kind. The results may be shortly stated thus : the death-rate, which averaged 20 in the 1000 before the establishment of the farm, has not risen above 17 since it has been in operation ; while the birth-rate is high, tending to rise the death-rate higher than it otherwise would be. The land has increased immensely in value. "The landowners have become rich men, the wages paid have more than trebled, the produce raised has increased by five times ; there has been no depreciation of value of the neighboring property, no production of infectious disease or miasmatic influences, but there has been a complete destruction of the contagium-particles, which a large population necessarily produces, whilst the effluent water discharged into the river after it has passed over the land has seldom been less pure than that supplied to many places as portable water.

"This result is brought about by continuous movement ; from the time the sewage is discharged into the house-drain until the time when the effluent leaves the farm is from six to twelve hours. The most important operation which takes place on a sewage farm is the destruction of contagium-particles.

"The utilization of sewage by agriculture is one of the most important actions which the political economist, as well as the sanitary officer, can promote. It is a large field for the investment of superabundant capital, which must bring a handsome return to the inhabitants of the land in which it is invested, even if the investor fails to get a large premium. If one-tenth part of the sum which has been lost in Turkish, Egyptian, Honduras, and other worthless securities, had been invested in sewage utilisation, tens of thousands of acres of land which are now comparatively useless might be bringing in a yearly revenue of five pounds an acre to the present owners, whilst the produce raised upon them would assist to reduce the famine price of butchers' meat, and be a boon to the country. It is proposed to spend ten to fifteen millions of pounds in the formation of a channel tunnel, which by a slight accident may be entirely lost. A similar sum expended for the purpose of utilising the sewage of London would make 10,000 acres of

* For a history of the Croydon Sewage Farm, see Sanitary Journal, vol. 1, pg. 267.

barren land as fruitful as the Beddington fields, and could not be lost."

Two other canon laws must be absolutely observed in dealing with sewage: "No sewer should ever have any direct communication between it and the interior of a house. Such communications should always be by indirect channels only"; and no water-pipe conveying potable water for use into any house should ever come into contact with a sewer or house-drain in any part of its course, especially at the orifice of discharge." This is constantly disregarded, and "sewer air from imperfectly constructed sewers is laid on to our bedrooms dressing-rooms, kitchen departments, and lavatories as regularly as if it were a necessary of life, whilst the waterpipe is in a thousand instances so placed as to render it perfectly impossible to be used without the contingency of air finding its way to the water from the impurest of impure sources."

The latter part of the doctor's address is exceedingly interesting and suggests the importance of paying special attention to personal hygiene. "I much doubt," he says, "if this potent force or living organism, (referring to the specific poison or contagium) take it as we please, could have any effect upon the body *if the recipient were perfectly healthy; if no impurity existed in the fluids of the body*; if the blood contained nothing foreign to a healthy and natural state. If this be so, a question arises, as from whence these impurities proceed, and how their effects are to be guarded against. I venture to put forth an hypothesis for consideration, which will explain much which is difficult to understand on any other view. Some impurities must exist; they are the used-up matter, the result of the act of life, or they may be inherited tendencies, which have resulted from former neglect of sanitary law, and which have depreciated the quality of the stock, and rendered it more susceptible to bad influences. The impurities naturally increase if there are any defects in the sanitary arrangement of the individual corpus. Their presence is of no moment if they are not in excess, and if they are removed from the body as fast as they are formed, or in the course which they naturally follow. Let us represent them by x , in an equation in which the factors x , Y , Z (as a total) represent any form of epidemic disease. The problem is to assess the value of each factor in the equation. Divide the factors into two parts—centric elements, or those which are proper to the body; and excentric, or those which act upon it from without; x , Y , Z may equal zymotic disease of any kind. Let $x=U$ and E ; U being the used-up material, the formed material of Beale, always in the

act of formation, is not foreign matter, and is not in ordinary proportions injurious to life. It is always being diminished as fast as it is formed, by one or other of the excretory organs which exist for the purpose of removing it. If all the excretory organs and all functions are healthy, and all doing their work properly, the body is in good health, there is no excess of used-up material no *debris* of combustion. If, however, one or other of the excretory organs fails to do its duty, from either overwork or inertness, something is left in the humoral system, and E is added. It becomes a positive quantity, and represents the excess of matter which should have been removed, $U + E = X$. They have a common origin, being the *debris* of the act of living; E will differ in quantity as well as in quality. It will be modified by personal character, by actions, by non-actions, and even by attainments, but especially by attention to, or neglect of, sanitary and moral laws. Still more will it vary according to the circumstances of the community among whom the person resides, the moral and the sanitary state, or the habitual neglect of sanitary law in which that community may indulge. Thus, a municipal authority who allows overcrowding, foul air, immoral acts on the part of the people, impure water, or bad food, is providing an excess of E, and increasing the danger which may arise from the introduction of the potent principle of infectious disease. If E is absent, x is not complete, and x, y, z cannot arise; x even may be complete from the circumstance I have detailed, but y, z are still required to establish an epidemic. If z is made to correspond to an atom of potent matter, a germ or living organism, the particulate contagium of any kind of zymotic disease, the multiplying focus of infectious disorder, and one of the excentric elements in the equation, it has to be introduced from without, and is capable of modification according to the character of the soil into which it may happen to be transplanted. Like the *Torula cerevisiæ* or the *Penicillum glaucum*, upon which fermentation depends, and without which alcohol is not produced, if z does not gain admission to some part of the humoral system, the entity, zymotic disease cannot arise. Just as *Penicillum glaucum* requires the sugar and the temperature to produce alcohol, so z, the contagium-particle, requires the food upon which it increases and multiplies, as well as certain meteorological states, for its proper development. These latter conditions are represented by y. The severity of the disease will depend upon the quantity of E which exists in the factor x. The epidemic will be more or less general and fatal according to the quantity of E in each individual, not according to the character

of z ; z will be reproduced according to the quantity of food in the recipient upon which it can increase and multiply. If E be absent, the effect of z will be nothing, and there is nothing for it to feed upon. If, therefore, personal cleanliness be attended to, if all the excretory organs of the body are properly exercised, if the municipal authority has insisted upon obedience to sanitary law, if moral laws are obeyed in each unit of sanitary work, the effect of z , whenever it happens to be introduced, will be reduced to a minimum, and z may be so dwarfed as to be unable to effect a lodgment, or it may die out entirely. It will be by directing attention to the necessity of diminishing the growth of E that we shall prevent epidemics from spreading, rather than by useless attempts to keep out z ; by correct sanitary administration, rather than by trying to establish an all but impossible quarantine. If E in the factor x abounds, and quarantine is not effectual; if z once passes through the cordon, the power of the latter is lost, and all our work in that direction has come to nought. The equation stands thus: $x = U + E$, and represents the used-up material, the result of the act of life; $Y =$ the meteorological conditions, such as temperature, moisture, and certain atmospheric states which are required for the rapid increase of epidemics; $z =$ the contagium particle upon which the nature of the disease depends. The fatality of the disease will depend upon the quantity of E in the factor x . The rapidity of growth will depend upon certain meteorological states represented by Y ; but the character of the disease itself will depend upon z . We can diminish x to a minimum by personal, municipal, and sanitary arrangements. We cannot alter Y , but we can impede the introduction of z , and prevent epidemic disease, unless it can be shown that zymotic diseases may arise *sua sponte*.



THE MILK SUPPLY AGAIN.—We hear a good deal of complaining about the inferior quality of the milk supplied in this city. The past dry weather even has not prevented pretty thorough dilution it seems. When will the city rulers provide for inspection of milch cows, byres, and milk. In England the vendors of bad milk are summoned before the authorities and fined heavily. Frequent notices of such summary proceedings are in our exchanges. Why are persons permitted here to starve or poison infants with diluted, adulterated, or "diseased" stuff and escape punishment? And how long is this state of matters to be continued?

MEETING OF THE CANADIAN MEDICAL ASSOCIATION.—The ninth annual meeting of this Association was held in Toronto on Aug. 2nd, Dr. Hodder, President. We have not space for the proceedings of the Association. Many new members were elected. The President concluded an interesting address with Dr. Rochester's sentiments :—" Medical Fraternity—limited to no nation, creed or clime, may its bonds increase in strength and usefulness as long as the world endures."

As relating to Sanitary Science, Dr. Canniff moved, seconded by Dr. Trenholme, that the following committee be appointed to prepare a memorial to the Dominion Government, with respect to vital statistics and public hygiene: the President, Drs. Hingston, Workman, Clarke, Playter, Canniff and Oldright.

The Committee recommended the following as the substance of the memoria :—" That this Association is of opinion that the sanitary laws at present in existence in the Dominion are insufficient to meet the requirements of public health ; that a system of public hygiene must embrace an acquaintance with vital statistics ; that the importance of that knowledge is recognized elsewhere ; that in countries not more favorably situated than Canada, systems more or less complete of vital statistics obtain, and sanitary laws have been enforced ; therefore this Association pray that if it be within the scope and function of the Dominion Parliament such a comprehensive scheme may be introduced as shall supply a much-felt want, afford to the members of the profession throughout the Dominion, and other scientific persons, additional means of acquiring a more extended knowledge of the more prevalent diseases in the different parts of the Dominion, and establish comprehensive laws relating to public health."

INSURING THE LIVES OF CHILDREN.—This has led to so many abuses that it is largely discountenanced. In England no insurance of more than £10 is allowed on a child under five years of age. This is held to be a judicious provision, on the ground that the general insurance of children would be certain to increase their mortality. The *Medical and Surgical Reporter* recommends "the reverse plan," as "well calculated to diminish the infantile mortality, which remains so alarming a problem in sanitary legislation. Suppose that a company was organized somewhat on the endowment plan, admitting the insurance of children of all ages, the principal to revert to their parents or themselves, as provided, *when they reach adult life*, there would be an extra stimulus to parental care and affection. Such a

plan is said to have been in operation in Chili for many years with good results."

DUBLIN SANITARY ASSOCIATION.—The fourth annual meeting of this non-political, non-sectarian, philanthropic body took place on June 19. The chair was taken by Mr. Pim, ex-member of Parliament for Dublin, and President of the Association. A large number of ladies and gentlemen attended. The Association now numbers 289 members, being an increase of seventeen on the roll for 1875. The income for the year ending May 31, 1876, had been £143 odd; the expenditure £142 odd. The Executive Committee had forwarded 266 complaints, comprising 416 distinct nuisances, to the various sanitary authorities, with apparently, however, but scanty results. The report referred in detail to several special investigations of defects in the city; and to the delivery of a course of lectures on sanitary science in Bathmines—one of the largest suburbs of Dublin.

SEA-SICKNESS.—A remedy for this distressing affection, equal to that of "staying at home," is recommended by a correspondent in the *English Mechanic*. It is to make the respirations coincide punctually with the heave and fall of the vessel. He says: "as she rose I in-spired slowly and regularly, and as she fell I ex-pired, and the effect was completely successful. My inference is that sea-sickness is caused by the heavings and falls of the vessel crossing the motions and operations of the diaphragm, which unseasonably presses on the upper stomach and liver and so disorders their functions." It is easily tried.

TEMPERATURE OF ROASTED MEATS.—While the temperature at the surface of roasted meats (Prof. Vallin, *Gaz. Heb.*) rises to from 245° F. to 260° F. the sheltered portions and those most distant from the fire may not attain a sufficient temperature to secure the destruction of any parasites that may be accidentally present. He has found that small thermometers, introduced into the centre of a roasting joint, indicated temperatures varying between 152° F. and 120° F. The temperature of 140° F. does not always kill the trichina.

THE TOWN COUNCIL OF LIVERPOOL are discussing the project of increasing their water supply by an aqueduct from Lake Windermere, more than sixty miles distant, at an estimated cost of seven and a half millions of dollars. Glasgow is supplied with water from Loch Katrine forty miles off.

COURSES of practical lessons on cookery have been given in the educational department of the South Kensington Museum, which have been well attended and apparently very successful; and cookery has become one of the 'branches' in many parochial and village schools in various parts of Great Britain.

PROFESSOR GUY, of London, it was, it is said, who made the distinction between medical and sanitary science, that "while cure or palliation is the aim of medicine, prevention is the aim of hygiene; while the one studies the good of the unit, the other looks to the welfare of the mass."

NOTES, QUERIES AND REPLIES.

In 1336 an Act of Parliament was passed which recited that no man shall cause himself to be served at dinner meal, or supper, or at any other time, with more than two courses, and each mess of two sorts of victuals at the utmost, be it of flesh or fish, with the common sorts of pottages, without sauce, or any other sort of victuals. Exceptions were made on the principal feasts of the year.

A member of the Town Council of Salford, in reference to purchasing or leasing baths, said, "The people at present had compulsory education, compulsory vaccination, and he did not see why they should not have compulsory 'bathation,' followed up with compulsory cremation."

DR. PEASLEE, (*N. Y. Medical Record*,) while examining recruits in New York during the war found a large number whose pulse ranged from 40 to 50, and all of this class were cigar smokers, whose ages ranged from 25 to 35.

AQUA.—Dr. Parkes estimates 35 gallons per head of population, per day, as being necessary for health. Glasgow and Edinburgh receive this amount. The London water companies supply from 12 to 34 gallons per head per day.

ALPHABETA wants to know what would be the prospects for getting a supply of water from Artesian wells in this province.

G. S.—We will answer your questions regarding ozone in our next number.

AUTHORSHIP.—Cowper remarks—"There are very few things of my own composition that I can endure to read when they have been written a month, though at first they seem to me to be all perfection."

BOOK NOTICES.

SEVENTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS. January, 1876. Boston: Wright & Potter.

This is a large volume, with a large number of plates and maps which assist in the understanding of the text. All the papers, like those of its predecessors, are highly instructive, and cannot fail to exert a great influence in effecting Sanitary Reform. From the very lengthy article on "Disposal of Sewage," by the Secretary, Dr. Folsom, we give below very brief extracts. Sewage irrigation, in sewage farming, is regarded as being the best method of sewage disposal:—"Careful investigations in France, Germany, and England have failed to bring to light a single case of injury to health, or of offence arising from sewage-irrigation properly conducted. The First Rivers Pollution Commission say in their final report: "When foul smells are complained of as coming from sewage-irrigated lands, the causes are in the state of the sewage, or the rude way of using it."

ON THE EFFECT OF CLIMATE, "In England, Scotland and France, no difficulty is found in irrigating through the winter. In the colder climate of Berlin, where the ground freezes to a depth of three feet, some difficulty was expected; but experiments have shown that irrigation will be successful the year through. In winter the sewage keeps warm enough under ice and snow to soak into the ground and become purified. Its purification is not as complete as in summer, but sufficient to allow it to be discharged into the rivers. At Dantzic, where the climate is quite similar to that of Massachusetts, sewage irrigation has been interrupted only one winter by the cold, and then only for a few days at a time. In dry climates, of course, sewage-irrigation is more successful than in moist.

AS TO COST OR PROFIT, "Sewage-farms have been usually managed by local boards. If an ordinary farm were to be managed by them, the result would, undoubtedly, be the same. The Earl of Warwick has, at Leamington, an admirably-conducted sewage-farm, one of the few in England which are carried on by private enterprise. He pays £450 a year for the sewage from a population of 20,000; and it is generally agreed his investment has proved a good one."

THIRD ANNUAL REPORT of the Secretary of the State Board of Health of Michigan. Lansing: W. S. George & Co. This is a nicely bound volume containing a large amount of instructive matter. We give extracts from it elsewhere.

REPORT of the Medical Officers of Health of the City of Montreal. This contains many useful suggestions. One, that a "great need exists for the inspection by a competent and reliable man of all the internal drainage of houses, and no drains should be laid and covered without inspection and permission given by such officer."

NINTH ANNUAL REPORT of the marriages, births and deaths, registered in Nova Scotia. This is a good sized volume, containing much information of an instructive and of a highly interesting character. Nova Scotia seems to be a good deal in advance of Ontario in the completeness of the Returns.

MICRO-PHOTOGRAPHS IN HISTOLOGY; By Carl Seiler, Philadelphia; H. H. Coates & Co. This admirable publication is highly spoken of by our exchanges, as it certainly deserves to be. The third number we did not receive. The fourth is to hand, and is very fine indeed, containing photos of liver, blood, and fat cells.

WESTERN NORTH CAROLINA AS A HEALTH RESORT, by W. Glitsmann, M.D.,

CLINATOTHERAPY OF, AND THE AMERICAN MOUNTAIN, Sanitarium for Consumption, by Sanford A. Chaille, A. M., M. D., &c., &c., Baltimore Sherwood & Co,

These are two instructive contributions to Climatological Science.

SUBSCRIPTIONS RECEIVED.—Dr. Jas. Ross, Dr. Geikie, Toronto; Dr. J. D. McDonald, J. M. Williams, F. J. Rastrick, Hamilton; Thos. Workman, Ed. Stark, Montreal; Dr. O. C. Wood, Rec. Gen. Dept., Customs Dept., Ottawa; Dr. T. Mack, G. P. M. Ball, St. Catharines; Dr. Henwood, A. Robertson, Brantford; Wm. Robinson, London; Dr. A. Armstrong, Arnprior; Dr. J. Murphy, Mildmay; Dr. S. Cowan, Harriston; Dr. W. Bettridge, Strathroy; Dr. F. Elkington, Brockville; H. Corby, Bellville; J. McQueen, Fergus; J. Haggart, Brampton; J. G. Cooper, Walkerton; J. S. Snetsinger, Moulinette; Edward Morris, Guelph; David Mills, M.P. Palmyra.

SPECIAL NOTICE.—On several occasions, month after month, we have sent memoranda of accounts to several hundreds of the receivers of this JOURNAL, and it appears to be of but little use; few comparatively respond. We take this opportunity to thank the few who have remitted; and to those few who have been kind and thoughtful enough to pay in advance for next year, we feel under obligations. Of the large number who take no notice of our appeals we would ask, and let us put it to *each one* individually, how do you suppose the printer is to be paid a large sum of money every month for printing and publishing the Journal. We are about tired of paying a large portion of it out of our private pocket. Again we respectfully urge those who have not yet, from the beginning, some over one year, some over two years, paid anything on account, to remit the, to each, small amount of indebtedness. We are entitled to it and really cannot do without it. Once more, please attend to this little matter at once, do not put it off for another day.

LEARNED CHEMISTS now maintain that there is but one true element in the universe—Hydrogen; all other others being molecular multiples of it.

Don't fail to look over the Advertisements in this Journal.

COMMENDATORY LETTERS TO THE EDITOR.

The following are copies of, and extracts from, a few of the many letters to the Editor, received from time to time, from medical men and others, regarding the SANITARY JOURNAL, unsolicited, of course, and, with two or three exceptions, the writers being personally quite unknown to the Editor :

TORONTO, December 7th, 1875.

DEAR DR. PLAYTER :— . . . Please send me your receipt for the enclosed two dollars, for your valuable Journal. I wish all in the profession valued it as I do. . . .

Very truly,
JOSEPH WORKMAN, M.D.
(Late Supt. Toronto Lunatic Asylum.)

TORONTO, February 9th, 1876.

To E. PLAYTER, ESQ., M.D.

DEAR SIR :—I am much obliged to you for sending me your very useful, much needed, and thoroughly practical Journal. I gladly enclose you my subscription.
Truly yours,
S. H. BLAKE.

(Vice-Chancellor.)

BOWMANVILLE, June, 1875.

DEAR SIR :—I am much pleased with your Journal . . . I look upon it as one of the most useful periodicals with which I am acquainted, and especially to the medical practitioner, who wishes to keep pace with the advancements of science.
Yours truly,
W. ALLISON, M.D.

(Member Medical Council, Ont.)

GLANFORD, ONT., November 22nd, 1875.

DEAR SIR :—Enclosed you will find \$2, to be applied to SANITARY JOURNAL. . . . I think your journal is doing a good work, and that such a magazine was much needed in Ontario. Wishing it every success,

I remain, yours truly,
ALEX. BETHUNE, M.D.
(Member Medical Council, Ontario.)

OAKVILLE, March 18th, 1875.

MY DEAR DOCTOR :—Enclosed please find one dollar for your really valuable Journal. . . . Accept my best wishes for the success of your new enterprise.
Yours faithfully,
D. D. WRIGHT, M.D.

DUNDAS, September 10th, 1875.

MY DEAR SIR :—Please receive the enclosed \$2 for the SANITARY JOURNAL. Your moderately-priced monthly contains much that is of interest to the reading public of all classes. . . . Much valuable information as well fitted for the general reader as for the professional student. It ought to receive a large measure of support, and I heartily wish it every success.

I am, my dear sir, yours truly,
JAMES HAMILTON, M.D.,
(Late Member Medical Council, Ont.)

LANSING, MICH., August, 12th, 1875.

DEAR DOCTOR :—I am much pleased with your Journal. . . . I read it with interest, and satisfaction, and sincerely hope its circulation may be increased, believing, as I do, that the interests of public health will be advanced thereby.

Very respectfully,
H. B. BAKER, M.D.
(Sec'y Michigan State Board of Health.)

TORONTO, December 13th, 1875.

Dr. PLAYTER,—Dear Sir :—Enclosed find amount of subscription to the SANITARY JOURNAL. I am much pleased with it, and feel that I cannot say too much in its behalf. . . . I hope the publication will receive the support its merits deserve ; it should be carefully studied by every man, woman and child.

Yours very truly,
DONALD McDONALD.
(Senator Dom. Can.)