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ON THE CAUSATION OF TYPHOID FEVER.

By "MUCOR," of Melbourne, Victoria.*

How long will etiologists continue to resist the conclusion that the infective agent of typhoid is derived from a specific mildew occurring on fæcal matter? Must this truth, which may be arrived at inferentially, lie unheeded and unproductive until it shall be demonstrated experimentally? Is it an absolute requirement that every step in the inquiry into typhoid causation should be slowly dragged through the whole field of positive proof? Is there no possibility of determining from available data the nature of the typhoid poison—at all events, with an approximation sufficiently near to serve all practical purposes in the matter of prevention?

These questions have been before me for years, but they press themselves with greater force now that the world has been supplied with further definite and important knowledge in the paper of Dr. Klein, "On Enteric or Typhoid Fever" in Mr. Simon's Report to the Privy Council (New Series, No. 6). The substance of Dr. Klein's observations has been foreshadowed by Mr. Simon. The results of his researches have been before etiologists for these twelve months. Ample time therefore has been given to scientific men to form their views as to the general nature, scope, and bearing of his paper. From the first announcement of the discovery of the fungus in the parts concerned in typhoid up to the present date, I have gone through the comments of the principal English medical journals upon it with a curious and lively interest. In all quarters I have perceived that the most implicit trust is reposed in Dr. Klein. Not the least doubt appears to exist anywhere either

*From the *Medical Times & Gazette.*

as to his perfect fitness for the work, or as to the thorough faithfulness of his performance. Even his drawings are acknowledged to be *veræ effigies* of the things seen. In short, Dr. Klein's facts are universally accepted as truths.

All things considered, this accord is marvellous. The unanimity is so wonderful that it is to be feared it cannot last. When, indeed, it is borne in mind that the fundamental doctrines of certain schools must be hopelessly upset by the confirmation of Dr. Klein's observations, it is incomprehensible how those attached to these schools should have remained quiescent for so long. Is it possible that the speakers who took a particular line in the discussion on the germ theory should have failed to perceive the full significance of this fungus described by Dr. Klein? Have they not yet realized the fact that, if it be established as the specific cause of typhoid, their views, of necessity, fall to the ground? Let it be determined that a specific vegetable organism is the efficient agent, and it follows that the etiological views of Dr. Murchison will be destroyed as utterly as will those of Dr. Budd, and that the argument of Dr. Bastian will be as untenable as will that of Dr. Beale. In fine, all schools in which it is taught that the cause of typhoid is, or may be, other than a living reproductive vegetable germ, must inevitably perish. But the end of inquiry is truth. It is doubtless this consideration which has brought all sections of etiologists to receive Dr. Klein's paper with such philosophical serenity.

It may be fairly assumed that Dr. Klein has demonstrated the existence of low vegetable forms in the tissues, vessels, glands, follicles, lymphatics, and other parts of the organs implicated in typhoid fever. This being granted, the following questions suggest themselves:—1. Are these vegetable forms accidental or incidental? 2. If incidental, is the vegetation the cause of the disintegration? 3. Are these organisms infective agents or "carriers of infection"? Or will they induce typhoid when transplanted into the healthy human body? 4. What is the precise nature of these low vegetable organisms? 5. What is their habitat, or the soil on which these parasites last occur before their reception by man?

1. *Are these vegetable forms accidental or incidental?* This question Dr. Klein has answered—whether conclusively or not, I will leave. Of course, there is the obvious objection that his observations are too few in number for safe generalisation. Whatever weight this consideration may have with some inquirers, I would observe that any doubt I might have had upon the point is overcome by evidence extrinsic to Dr.

Klein's paper. This collateral evidence is open to those who search, and I shall merely say that I conceive it to be sufficient to affirm the proposition that vegetation is a constant factor in the characteristic necrosis of typhoid.

2. *If incidental, is the vegetation the cause of the disintegration?* That the masses of micrococci found by Dr. Klein in the mucosa, the bloodvessels, and elsewhere, cause the retrograde changes of the tissues ending in sloughing and ulceration, is shown, nearly to demonstration, in the text of his paper, and by the plates. That is to say, "the deposition, probably by exudation from the vessels, of a peculiar dark-colored material" (micrococci), "in connexion with and around which the tissue undergoes necrotic changes," is almost to a certainty the potential cause of the changes. For all rough purposes it is a certainty that the necrosis is the effect of the deposition of the micrococci; but the subtle distinctions drawn by controversalists in dealing with infection may be brought in here to show that the vegetation in question does not play the important part assigned to it by Dr. Klein. It is admitted that microzymes exist in vaccine lymph and in the fluids from certain infective inflammations. It is further admitted that those portions—and those portions only—of the fluids containing the microzymes have specificity. From this (and from other data) it was inferred that the microzymes are the infective agents. The opponents of the view, however, met it with the argument that, granting the facts, yet the microzymes may be merely the "carriers of infection," and not the infection itself. And this kind of argument undoubtedly admits of extension to the fungus found by Dr. Klein. Though its mycelium, gonidia, and micrococci apparently destroy the tissues, yet they may in reality be the coarse, visible sub-agents of unknown, intangible agents behind. If discussion should enter these or parallel grooves, it may run on endlessly, with exceeding gratification to men of a certain order of mind, and possibly with ultimate benefit to science. Those on a lower plain will probably content themselves with looking at what is more immediately before them. Taking this contracted view, I conceive that, so far as many present purposes are concerned, it comes very nearly to the same thing whether the vegetation described by Dr. Klein is the prime mover of the typhoid changes, or the subsidiary factor—the "base second means." For if *ubi fungus ibi disintegratio* be conceded—if the true agent in the necrosis invariably select the same vegetation as its sub-agent, and if the sub-agent be never found apart from

the agent—if the two be inseparable—it would seem a tolerably fair conclusion that if you can destroy or preclude the one, you will infallibly get rid of the other. This is admittedly rule of thumb, but it may serve perhaps until the occult powers that employ these ancillary microzymes and micrococci shall be revealed. I submit that (subject to the point reserved) it is shown by Dr. Klein that the vegetable forms he found caused the disintegration of the tissues.

3. *Are these organisms infective agents, or "carriers of infection"? Or will they induce typhoid when transplanted into the healthy human body?* The experiments made by Dr. Klein in this direction were of a negative character. He failed to induce typhoid in certain animals by the introduction of the fungus into their systems. The experiments which have been made on man himself by means of the stools of patients, which are shown by Dr. Klein to contain the fungus, are, however, sufficiently numerous to enable us to correct the negative result with animals. I apprehend that the facts connected with water pollution leave very little room for doubt that the poison in the water is particulate, insoluble, indiffusible, living, and reproductive. The inference that it is identical with the fungus in the bowel-tissues of the typhoid patient, or that the two are *ejusdem generis*, is easily reached.

4. *What is the precise nature of these low vegetable organisms?* Without intending to be ungracious, I confess to some disappointment at finding that Dr. Klein had done so little on this head. He tells us "that we have to do here with a fungus which possesses mycelium threads of very unequal joints"; "that in some parts of these threads, probably the terminal parts, their contents split into macrogonidia," "or microgonidia"; "that the gonidia become discharged, the thread having been broken"; and that these gonidia end in micrococci, etc. He adds that this vegetation corresponds closely with the *Crenothrix polyspora* found by Cohn in some well-water at Breslau, famous for typhoid. The interesting question as to the indentity of these two forms must here be set aside. With regard to that found by Dr. Klein, it is to be regretted this observer had not time to learn something more of the life-history of the plant. This break in the continuity of his investigation reduces the value of his paper incalculably. It occurs to me, as a possibility, that as Professor Cohn seemingly did not cultivate the *Crenothrix*, so Dr. Klein may have thought it unproductive to endeavour to develope the fungus he discovered into higher forms. If this be so, I venture to suggest he was in error; for in order to substantiate the claim of the fungus

to be the specific cause of typhoid, it is an imperative necessity to connect it with aerial typhoid poison. There are not, probably, any two specific causes for any one specific disease, and if there were there is no room for the assumption in the case of typhoid, because it is well established that patients who catch the disease by way of the air may communicate it through the medium of water. The converse, too, of this phenomenon has frequently been observed. It follows that the typhoid poison, whatever it is, is, under certain conditions, convertible or reconvertible from an air-poison to a water-poison. As a sequence, Dr. Klein is called upon to show that the aquatic plants he has described may under some circumstances enter the air in such numbers as to create an efficient air-poison. If this were impossible it would weaken the claim of the fungus to the title of the typhoid fungus most considerably. But only do I suspect it to be possible, but even to be feasible.

Most phytologists would, I think, infer from the description and from the drawings of the vegetation figured by Dr. Klein, that it is the water phase of the plant, and that by proper cultivation on the surface of a fit substrate, it would revert to its original or mildew form. It is highly probable that the gonidia and their descendants are the modified representatives of the sporules of some mould. Nothing is clearer than that most of these low terrestial organisms will not only sustain themselves when they are accidetally immersed in fluids containing nitrogenous matters, but will multiply rapidly under the abnormal conditions, owing to the facility with which their organs of fructification will accommodate themselves to the new medium. It is, then, a warrantable scientific inference that the vegetation in the typhoid tissues is in a casual and degenerate stage of its existence, and that its true, or highest, or original form is that of a mildew growing on a free substrate. If this inference be verified experimentally, the key to the whole position will be obtained. With it the enquirer may see at once how the transition from an air-poison to a water-poison, or the converse, is effected; and with it Dr. Klein would have advanced the fungus he had made out a long way towards taking rank as the typhoid plant. Although other sets of observations must be undertaken to determine the issue raised, as well as to clear up other points too numerous to refer to, yet I confidently anticipate the verdict of the etiological world, and accept Dr. Klein's fungus as the specific cause of typhoid. I may say I am led to this conviction principally because the outcome of Dr. Klein's inquiry

squares with purely hypothetical views I published a few years ago. Those views, unsupported by original experiment, and depending solely upon work done by others, or upon the well-known facts in the history of typhoid were, naturally perhaps, looked upon as too speculative to have any value. Nevertheless they are, I perceive, slowly shown to be correct. I submitted, and I submit now with firmer reliance on the soundness of the proposition, that there is no natural or artificial thing, or condition of a thing or things, capable of poisoning both air and water precisely as the typhoid poison does—except vegetation; and that nothing that can be presumed or conceived possesses this double property or qualification of the poison but a mildew.

5. *What is their habitat, or the soil on which these parasites last occur before their reception by man?* The reply is not far to seek. Granted the (at present hypothetical) mildew, and the conclusion that fæcal matter is the principal substrate on which it flourishes immediately before its reception into the organism is well-nigh forced. The elimination of all other substances is so simple and easy that I need not detain the reader by detail. Regard being had to the phenomena connected with "sewer-gas," and with the atmosphere surrounding privies, middens, and other collections of excrement, there is hardly any room for doubt as to the substrate from which these parasites are given off to pass into the human substrate. When once the mildew nature of the typhoid poison is ascertained, its sources is a certainty. Of course, other animal and vegetable matters may occasionally be overrun by this specific mildew of typhoid, and may thus cause the surrounding atmosphere to be charged with particles of the mildew. The toxical properties of these particles may be modified by the qualities of the substrate; but it is probable they will, if imbibed, cause some one or more of the typical symptoms and lesions of typhoid. Hence, possibly, febriculæ, and bastard or obscure forms of typhoid. The one great substrate, however, which has supplied the typhoid mildew in all ages and in all countries is fæcal matter.

Let me add, briefly, that the supposition of a mildew grown on fæcal matter is, as I submit, the only possible exegesis of typhoid causation. No other explanation has been, or can be sufficient. By this hypothesis every phenomen which has been observed in every epidemic, and in all isolated cases of the disease, may be clearly interpreted. For instance, the celebrated Munich problem, which has exercised Professor von Pettenkofer for so many years, admits of the readiest solution

by this mildew or fæcal matter. Granted that the rise and fall of the ground-water governs the Munich epidemics, and that typhoid rages most when the water is lowest, I submit that, as the water falls in the privy-shafts, the excrement surface for the mildew increases, and, as a consequence, the air is poisoned to a greater extent. When the water rises, the substrate adhering to the sides of the excavations is covered, and the mildew swamped. The thing is in a nutshell. Every question raised by every author upon the subject of causation may be resolved by a mildew. If, indeed, any one fact can be shown to be utterly irreconcilable with mildew causation, the mildew hypothesis is unsound. I should be glad to see it submitted to this test.

ON DIETARY.

By Professor C. VOIT, Munich.

We have one additional and ultimate condition to establish for human dietary, the importance of which has hitherto been scarcely appreciated. It has been supposed that when alimentary principles are supplied in sufficiency that the food must be nutritious. This is not true; there must also be a supply of other substances which do not themselves contribute anything to the maintenance of the material of the body—the so-called condiments. "Genussmittell." If the requisite alimentary principles were supplied to us in sufficient quantity in the form of a mixture of albumen, fat, starch, water, and ash, we would eat it only in case of the most extreme need, and under ordinary circumstances reject it because it is tasteless. Condiments have been compared to oil in a machine, which neither makes good the waste of material, nor supplies motor power, yet makes it work better. Similarly, condiments render essential service in the process of nutrition and other bodily functions although they are not able to prevent the waste of any substance in the body.

Under the term "condiments" ("Genussmittell") are to be comprehended not only such substances as tea, coffee, tobacco, alcohol, but also and especially all those substances which impart the peculiar taste and smell to our food. In this sense there is no kind of food which does not contain condiment. Frequently it is in the process of preparation that the condiments are produced, as in the case of the savoury substances which arise during the roasting of meat.

Condiments are usually regarded in contradistinction to food, as being non-essential, seeing that they only add to the agreeability of our food. This way of regarding them is only correct when the term only includes the above named vegetable drinks, or alcohol. Hence it is that the true significance of condiments has been overlooked, which is really as important as the food itself. *For a dietary deprived of condiments, a mere mixture of alimentary principles without taste or smell is unendurable, and causes nausea and vomiting.* The alimentary principles become food on the addition of condiments. Only intense hunger enables us to overlook the condiments, and even devour what at other times would be disgusting.

These condiments have a great significance for the process of digestion and nutrition. The mere idea or sight of a nice dish makes, as is said, our mouths water, *i.e.*, makes the salivary glands pour out their secretions copiously, which transforms certain articles of food, and prepares them for absorption. The same is true of the gastric secretion, as can be plainly seen in dogs by a suitable experiment. On the other hand, unappetising and disagreeable food produces no such effects, and leads to digestive derangement.

Hence all our food contains substances which render it agreeable and excite our appetite. Loss of the sense of taste would produce most serious effects, and we find people actually expend more on these necessary adjuncts than on the food itself. The very smell of food may do us good, just as the smell of various substances will restore the faint.

When some kind of food, which was at first palatable, is supplied in too large quantities or too often, it ceases to please, and may even become disgusting. The more pronounced the flavour of an article is, the more quickly does it begin to pall on the appetite. Hence there are only few things which we can eat every day and in any day, as, *e.g.*, our daily bread. Sweet cake, though supplying albumen and carbo-hydrates in the same quantity, could not replace bread.

Herein lies the secret of the long misunderstood significance of the change of food, implying a change of the condiments consumed.

Hence, from the same alimentary principles and articles of food we prepare a variety of dishes. There are classes of men who live chiefly on meal of cereals, but they do not eat it exclusively in the form of bread, but use it to make dumplings, pastry, &c.

In the following considerations the supply of water is

neglected, because it is usually to be had in abundance; the supply of ash is almost neglected, because our ordinary food contains sufficient, and it is only in rare cases that special attention need to be devoted to that point. The non-nitrogenous substances, too, are not taken into consideration, except fats and carbo-hydrates, because they occur in too small quantities in our food, and also the other nitrogenous substances, except albumen, as, *e.g.*, gluten, they usually form but a small fraction of our food. We confine ourselves, therefore, to the question how much albumen, fat, and carbo-hydrates are required for each case.

Dietary for a Workman.—If we ascertain the quantity of albumen, fat, and carbo-hydrates which a workman requires for his daily maintenance, we will have a sort of standard for the average man, from which variations can easily be made.

The healthy workman examined by Von Pettenkofer and Voit used up daily—

	During Rest.	During Work.
Albumen	137	137
Fat	72	173
Carbo-hydrates	352	352
Carbon	283	356

Dr. J. Forster found in the food consumed the following quantities of the alimentary principles :—

	Albumen.	Fat.	Carbohydrate.
Workman	133	65	422
Workman	131	68	494
Young Doctor	127	89	362
Young Doctor	134	102	292

As a mean from a large number of observations, Voit adopts 118 grammes of albumen and 328 of carbon as requisite for a workman, therefore, as 118 grammes of albumen contain 63 of carbon, 265 grains of carbon are still required to be supplied in fat or carbo-hydrates. If this quantity of carbon were to be given exclusively in carbo-hydrates, it would be necessary to take 597 grammes of starch, of fat, on the other hand, 346. As the question is not exclusively as to the quantity of carbon, these figures are not precisely accurate. But it is evident that the addition of fat or starch alone to albumen would be irrational, because, as already mentioned, only very few could recoil the requisite quantity of either substance.

Over 500 grammes of starch should not be eaten by a workman, as a large quantity is with difficulty utilised by the in-

testines, and other conveniences may arise. The remaining quantity of carbon is covered by fat, and if 500 of starch are taken, only 56 of fat will be required. This is the maximum of starch and the minimum of fat which, according to Voit, should be consumed by a workman.

He regards it as better to give only about 350 of carbo-hydrates, and to supply the remainder of the carbon in fat.

Formerly it was erroneously supposed that the more work was done the more muscle was destroyed, and that therefore more albumen was required in the food, proportionately to the work done. Voit has however shown that a man living always on the same dietary does not use up more albumen during the hardest work than in perfect rest, though he does decompose much more fat.

It has been supposed that these conclusions are opposed to the fact that certain classes of workmen who accomplish great tasks consume large quantities of albumen. However the opposition is only apparent. The quantity of albumen decomposed in the case of a certain individual is not correlated to the quantity of work he performs, but the converse is true, viz., the possible amount of his work is proportional to the amount of his albumen decomposition, in so far as a strong and hard-working man has a larger amount of organs (chiefly muscles) rich in albumen to maintain in condition, and therefore needs more albumen in his food. But he would require the same quantity on a day when he did no work. If on Sunday he took less albumen, his organs would lose albumen, and on the next day be unable to do as much work as before. Only powerful muscular men can do heavy labour, and they must consume large quantities of albumen to maintain the mass of muscle; weak-muscle men cannot do the same work however large the quantity of albumen they may consume. Playfair's figures do not prove, as has been often supposed, that more albumen is used up by the same individual at work than at rest. From his compilation it does appear that the amount of muscle determines the amount of work, and that men with large masses of muscle (*i.e.*, those who do large amounts of work) require large quantities of albumen.

A heavy draught horse takes more albumen in his food than a little pony. But no one would therefore conclude that it did so because it worked harder, and that at rest it would only eat the same quantity as the animal with less muscle. Everyone knows that the strong horse must eat more albumen on account of its great masses of muscles, and because it has more work to do with them.

Similarly, workmen must not be supplied with albumen proportionately to the work they have to do for the moment, but rather proportionately to the mass of the muscle and the possible maximum of work in them. The maximum amount of work to be got out of a man corresponds therefore to the decomposition of albumen and the quantity of it required.

The decomposition of albumen depends therefore on the mass of muscle to be nourished, and not directly from the work which is rather determined by the quantity of muscle. But in the same individual the decomposition of non-nitrogenous matter is dependent on the temporary amount of work doing. The man experimented on by Von Pettenkofer and Voit used up, with the same dietary, 101 grammes more fat at work than at rest.

The figures given above refer to moderate work. With excessive work the albumen may rise to 150 grammes, and the quantity of non-nitrogenous food called for still more.—*The Doctor.*

IS ENTERIC FEVER SPONTANEOUSLY GENERATED.

By R. Bruce Low, M.D., Medical Officer of Health.

In answer to this query, and acting on the advice given by Sir William Jenner, quoted by Dr. Fox in the *Journal* of March 25th, that "the best mode of settling this question is to thoroughly scrutinize every isolated case that occurs in out-of-the-way country places." I submit two groups of isolated cases which occurred in my out-of-the-way country district. The first group consisted of four cases, all occurring in the same house, about the same time. The house itself was a moderately large one for a cottager, consisting of four fair-sized rooms. The family consisted of four persons, three adults and a boy of four years. The situation of the house was most peculiar. It was built on a hill-side, facing the junction of four wide valleys; a more exposed situation could hardly be imagined. Above the house were miles of moorland; the house was some distance from any high road, and altogether so far out-of-the-way, that it was impossible that any tramp infected with enteric fever could have found out the house, far less the privy which turned out to be the source of the mischief. The father of the family was the first victim; within a week his wife was taken ill; in another week the daughter; and, finally, a married daughter, who had come to nurse them,

also took the disease. All the four persons were ill at the same time; the little boy escaped (not having used the privy). Two sons came to help to nurse their relatives, and, by my advice, did not go near the privy; also a trained nurse, who also took care of them. The father and the married daughter died. The other two recovered. The water-supply was examined and found pure; the house was clean and commodious. The privy was found running over, and so full of filth that the seat could not be used The fact that all the sufferers had used this privy, and that those who were afterwards exposed to the same conditions (with the exception of the foul privy), as well as the double danger of the typhoid stools from the four individuals, never took the disease—all this points to some local exciting cause, viz., the privy. In addition to this, when we consider the exposed situation of the house, its isolated position, to which a person (a tramp, for instance, who is the vehicle for carrying about the disease, according to the belief of some), suffering from enteric fever, could not have climbed, the road being both steep and difficult to find; when we consider the pureness and abundance of the water-supply, and the entire absence of enteric fever from that district, which is very thinly populated; combining these facts with the circumstance that neither the father nor any of the others had been out of the district for a very long time, nor had they any visitors, we were driven to the conclusion that the disease was generated *de novo*, and that there could have been no exposure to a specific contagion. I may state that the privy was disinfected and cleaned out, and, although a new family has occupied the house since the outbreak, no fresh cases have occurred.

The second group also consisted of four cases. Two little boys, attending a day school, had an attack of diarrhœa. One of the boys passed his evacuations in bed during the night, but was able to go to school next morning. The mother of the boys employed a charwoman to assist her in washing the soiled bedclothes. An aunt of the boys resident in the house also assisted. Within a week these three persons were seized with symptoms of enteric fever, which developed rapidly, and proved fatal to the mother and to the aunt. All three, when engaged in the cleaning of the soiled linen, were nauseated by the foul smell of the evacuations. The house was a fairly built one, and contained twelve inmates (six adults and six children). The drainage was perfect, the water-supply pure and constant. No cases of enteric fever existed in the district. None of the family had been from home; they had no visitors.

The privy was clean, and as wholesome as could be expected. The two boys attended school all the time they were ill (a few days); their appetite and general health were not affected. The school was airy and well ventilated; none of the other scholars were ill. No source of contagion could be traced. Was the diarrhœa of the boys the manifestation of enteric fever in a mild form? If so, then the infection of the three persons is at once accounted for; but it is open to doubt if this diarrhœa was that of enteric fever, for in no way could any source of infection be found which would account for their having taken the disease. In the absence of any proof to the contrary, we must admit that the disease began from the inhalation of the fœtid stools of the boys; that the emanations from these stools poisoned the systems of the three individuals who inhaled them, and the "filth-fever" was thus generated. I have omitted to mention that one of the children, who remained in the sick room with its mother during her long illness, also took the disease and died from it, the mother clearly infecting the child; but none of the other children or the other inmates of the house suffered from the disease. In conclusion, I may state that the privy in the garden of the house was quite inaccessable to any tramps, who might have left in it their infested stools, so that this theory, which meets many of the obscure cases, is not tenable in this instance.—*British Medical Journal.*

THE CRANIOSCOPY OF CRIMINALS.

In noticing the last meeting of the German Association of Naturalists and Physicians, we referred to a paper by Professor Moritz Benedikt, on the physical psychology of criminals, and its bearing on their legal status. This remarkable paper has been translated in an English contemporary, and we extract from it some of its results.

The aim of its study is to show that a deficient organization of the brain lies at the foundation of the criminal propensity of brigands, habitual thieves, relapsing forgers, and other criminals; that the changes in the brains are, in such cases, of a very gross and palpable nature, so as to admit of easy demonstrations in the *post-mortem* room; and, what is more remarkable, that these peculiarities of cerebral organization may be recognized during life by a careful examination of the criminal's head.

The former principally consisted in the unsymmetrical development of certain portions of the brain. These peculiarities he claims may be recognized in life. To convince himself of this, Dr. Benedikt, in conjunction with his former pupil, Dr. Badik, physician to the Illawa prison, hastened to examine the heads of 365 murderers in that establishment. The result was that both these physicians were struck with the peculiar cranial conformation of a large number of the criminals, especially with the want of prominence of the external occipital protuberance, with the flatness of the occiput, the marked shortening of the occipital part of the sagittal diameter of the skull, and a want of symmetry in the two halves of the skull, which far exceeded that which is usually observed. If, in the normal skull, in a straight line from before backward, the distance is measured from the fossa behind the auditory foramen to the most posterior eminence of the occiput, it will be found to amount to two-fifths and more of the straight line drawn from before backward, in the middle line between the forehead and the summit of the occiput (the sagittal diameter.) Now in the skulls of some criminals examined, this is not the case, inasmuch as the first line reaches one-third, or one-fourth, or less, of the second. This deviation Dr. Benedikt calls "Brachycephalia occipitalis."

Another "very characteristic" form of the skull, noticed in 56 per cent. of the habitual thieves in Leopoldstadt, is a condition which the author of the paper calls vertex-steepness (Seheitelsteilheit) or rising up from before backward." While, for example, the highest point of the crown generally stands a little higher ($\frac{1}{2}$ centimetres) than the boundry line between the part of the forehead covered with hair, and that which is uncovered, this proportion is altered in habitual thieves; and there are differences amounting to seven centimetres. But not only have the above abnormities been observed in criminals generally, but they are spoken of as varying in character and in frequency according to the class of criminals in which they were noticed. Thus the vertex-steepness just described is said to be peculiar to habitual thieves. The occipital deviations appeared in the highest degree chiefly in robber-murderers, next in murderers from premeditation, and lastly in habitual thieves, whilst in normal persons the highest degree is very rarely found. On the other hand, the lateral symmetry mentioned above existed in a high degree in 37 per cent. of habitual thieves, but in only 26 per cent. of common murderers.

This looks very much like a revival of the exploded pseudo-

science of phrenology. But Dr. Benedikt forsees this criticism, and makes the following distinctions: The fundamental idea of Gall, that the physical functions are localized in the brain, is in a certain degree undoubtedly correct, but the chief defect in Gall's theory is that the latter imagined complicated psychical processes to take place in a definite part of the brain. Murder, thieving, forgery, etc., are complicated psychical functions. There is not only often a defect of intellect which is unable to foresee the consequences of the deed to be perpetrated, but the factors of such acts are composed of motor and sensory impulses also. It is, therefore, erroneous to assume for murder, for instance, a definite typographical change in the brain, since that crime is the product of different qualitative and quantitative factors.

Another fundamental idea of Gall is that the skull is a model of the brain, and although it has been objected that there are in the skull many accidental prominences which have no counterparts in the brain, his fundamental idea is not shaken, inasmuch as "no scientific man may, even if he does not altogether agree with Gall, dispute the doctrine that the construction of the skull is remarkably proportionate to the whole anthropological organization in brutes and in man." Therefore, the most that the present state of science warrants us in saying is, that the anterior part of the brain is the seat of the life of ideas (*Vorstellungsleben*), the middle part the seat of psychical action in a motor sense, and the most posterior part the seat of sensations and feelings; and that any marked deviations in the general conformation of those parts may be attended by a corresponding amount of deviation in the conformation of the skull.—*Med. & Surg. Reporter.*

SMALL-POX, VACCINATION, RE-VACCINATION, &c.

A few extracts from an article by H. GIBBONS, M.D., in Pacific *Med. & Sur. Jour.*

In the year 1868, during the prevalence of a variolous epidemic which pursued nearly the same course as that of the present season, thus far, I published in this journal, a series of propositions relating to this subject, embodying the general experience of the profession, with some shading of my own personal experience. Under present circumstances I have thought proper to re-produce them, with such amendments as are authorized by six years of additional observation.

During an epidemic aggravation, *recent* vaccination is the only safeguard. Persons who have had small-pox, or who have been exposed to it in former years with impunity as nurses and the like, are not secure from attack. The mortality of the disease in the unprotected, varies from 20 to 50 per cent.; in the protected, from 2 to 5 per cent. During an epidemic of small-pox other diseases are more frequent and more fatal. Foul emanations from sewers and so forth have little to do with it. They affect the general health, but do not promote in a marked degree, the spread or duration of the epidemic.

Disinfectants, such as chlorine, carbolic acid, the fumes of sulphur, etc., will not destroy the germs of small-pox, unless they are strong enough to destroy human life. Sunlight, air and heat are the best disinfectants. Clothing is perfectly disinfected by baking in an oven, or exposure for a short time to a heat above that of boiling water.

The period of most active contagion is after the appearance of the eruption, and during the process of scabbing. It is questioned by some good authorities whether the disease is contagious at all prior to the formation of pustules.

Whenever small-pox shows a tendency to become epidemic in a city or neighbourhood, every individual should be speedily vaccinated, no matter what may be his previous history or experience relative to the disease. The only exceptions are children who have been vaccinated within a year or two: and even these should be re-vaccinated if the disorder break out in their dwelling or in a neighboring house. Vaccination will not take *perfectly* a second time, in more than two or three out of every 100 persons. A large scar is no evidence of genuine vaccination, nor is a large and painful sore. These may result from a common ulcer or a poisoned wound. A spurious pustule is apt to be worse than the genuine vaccinia.

A few individuals will take the vaccination again and again, while a few are entirely vulnerable. The latter are considered to enjoy a like immunity from small-pox. When re-vaccination is not followed by itching or any other effect, it should be repeated. The virus may not have been active. It is well to vaccinate in as many as two places. No other matter should be employed than the lymph or crust from the first vaccination of a healthy child; or that taken from the cow. There is less uncertainty in the former than the latter. The crust should never be kept long after mixing it with water. It developes a virulent poison. There is no ground for the dread of constitutional disease, as the result of vaccination. The extreme cases of inflammation and sloughing which occasion-

ally follow vaccination, are to be referred to the condition of the patient, rather than to the nature of the virus employed. History tells of deaths resulting from the scratch of a pin.

Physicians exposed to the disease should adopt some means for their own protection, and also to avoid carrying the infection in their clothing. The following rules, which are applicable to others as well as physicians, should be observed:—Avoid exposure when the stomach is empty or the strength exhausted. Do not enter the room in a perspiration and remain there till cold. Avoid uncomfortable exposure to cold on leaving the room. Do not swallow the saliva in the room or immediately on leaving it. It is possible that the germs of disease enter the blood partly through the stomach. After leaving a patient with small-pox, avoid entering another dwelling without free ventilation in the open air—say for a quarter or half an hour. Do not, under any circumstances, practice midwifery or visit families where there are children or others, unvaccinated, whilst in attendance on small-pox patients.

PRACTICAL NOTES AND EXTRACTS ON HYGIENE

(Continued).

EXAMINATION OF FLOUR, BREAD, AND MEAT.

A good practical knowledge of the qualities and appearances presented by the various articles of ordinary diet, in their wholesome or unadulterated state, is an indispensable qualification for detecting those which are unwholesome or adulterated. The physical qualities of milk have been already given in this JOURNAL. Those of flour, bread, and flesh, are given below.

WHEATEN FLOUR ought not to be very white, but should have the faintest tinge of yellow; nor should it be lumpy, or, if so, the lumps ought readily to give way under the slightest pressure. When compressed in the hand, good flour will adhere together in a lump, and retain the impression of the fingers longer than that which is inferior; or, if thrown against a wall, a portion of it will adhere, and remain there. It should give no acidity or musty flavor to the taste, nor any odor of mouldiness. If flour is in the slightest degree gritty, it is evidence that a portion of the starch has undergone change, and bread made with it will most probably be sour. Inferior

flour which has undergone putrefactive change, is not infrequently contaminated with *fungi, vibriones,* and *acarus farinæ.*

Dough made with good flour is elastic and may be rolled out very thin, or drawn into long strips, without breaking, which cannot be done with that made with inferior flour. The process of baking is the surest means by which to determine the quality of flour.

While it is better not to use flour when it is very new, if it be long kept it loses its flavour and sweetness, and also its nutritive value, though it becomes whiter. The greater the amount of gluten it contains the sooner it will deteriorate.

Wilson says, the amount of gluten in flour can be ascertained "by washing carefully a known quantity of flour, made first into a rather stiff dough, until the water comes off quite clear. The gluten, when baked or dried, should be clean-looking, and should weigh at least 8 per cent. of the quantity of flour taken for examination. A good flour will yield 10 to 12 per cent. Bad flour gives a dirty-looking gluten, which is deficient in cohesion, and cannot be drawn out into long threads."

BREAD.—"The crust should be well baked, not burnt. The crumb should not be flaky or sodden, but regularly permeated with small cavities. The taste and smell should both be agreeable, and free from acidity. Unless there is a considerable quantity of bran in the flour, the colour should be white, not dark or dirty-looking. Good flour, well baked, yields about 136 lbs. of bread per 100 lbs. of flour, and adulteration is chiefly directed to increase this ratio by making the gluten hard, and the bread more retentive of water. This the dishonest tradesman effects by adding alum, copper sulphate, or a gummy mixture of ground rice. The bread may be recognized by its becoming sodden and doughy at the base after standing for some time."

MEAT.—The characters of good meat Wilson enumerates as follows:—On section, it should present a marbled appearance from intermixture of streaks of fat with muscle. This shows that the animal has been well fed. The colour of the muscle should neither be too pale nor too dark. If pale and moist, it indicates that the animal was young or diseased; and if dark and livid, it shows that in all probability the animal was not slaughtered, but died with the blood in it. Both muscle and fat should be firm to the touch, not moist or sodden, and the latter should be free from hæmorrhagic points. Any juice exuding from the meat should be small in quantity, be of a red-

dish tint, and give a distinct acid reaction to test-paper. Good meat should dry on the surface after standing a day or two. The juice of bad meat is alkaline or neutral. The muscular fasciculi should not be large and coarse, nor should there be any mucilaginous or purulent-looking fluid to be detected in the intermuscular cellular tissue. The odor should be slight, and not by any means disagreeable. An unpleasant odour indicates commencing putrefactive change, or that the meat is diseased. By chopping a portion of the meat into small pieces, and afterwards drenching it with warm water, any unpleasantness of odour will be more readily detected. Another good plan is to thrust a long clean knife into the flesh, and smell it after withdrawal.

If the meat is at all suspicious, the muscular fibre should be examined under the microscope. The smaller *cysticerci* and *trichinæ* can only be detected in this way. The brain and liver should also be examined for hydatids, the lungs for multiple abscesses, and the ribs for pleuritic adhesions.

Bad meat is usually sodden and flabby, with the fat dirty or gelatinous-looking, and the smell unpleasant or sickly.

PROPHYLAXIS OF APOPLEXY.

Dr. I.C. Walker (*Amer. Practitioner*) quotes "from Virchow to show that the starting point of atheromatous degeneration is an inflammation of the inner arterial coat similar to that which occurs in endocarditis. He is led to infer that this inflammation is also dependent on an acid condition of the blood, and looks to a correction of this condition for the prevention of apoplexy. In the history furnished us by Sir Thomas Watson, of Dr. Adam Ferguson, we find an example from which much may be learned. He says: "The doctor experienced several attacks of temporary blindness before he had an attack of palsy, and he did not take these hints as readily as he should have done. He was a man of full habit, at one time corpulent and very ruddy, though by no means intemperate, he lived freely. I say he did not attend to these admonitions, and at length, in the sixtieth year of his age, he suffered a decided shock of paralysis. He recovered however, and from that period under the advice of his friend Dr. Black, he became a strict pythagorean in his diet, eating nothing but vegetables and drinking nothing but water or milk. He got rid of his paralytic symptoms became even robust and muscular

for a man of his time of life, and died in full possession of his mental faculties at the advanced age of ninety-three, upwards of thirty years after his attack."

The *Peninsular Journal of Medicine*, observes, "If we learn anything from this case, it is that cerebral arteries may be so frangible as to rupture under great pressure, and that additional ruptures may be prevented, and possibly the tendency to arterial degeneration stayed, and the already weakened walls strengthened, by the regulation of the nutrition. * * * If the doctrine advanced by Virchow be true, that an acid state of the blood favors fatty metamorphisis and atheromatous degeneration, and that the condition of the blood is the same as in endocarditis, it would appear that the way is open to prevent endarteritis and its consequences, by preventing the accumulation of the supposed *materies morbi* in the blood, by the use of agents, the tendency of which would be to maintain its normal alkilinity. Then in the management of cases in which we have cause to believe there is an inherited predisposition to arterial degeneration, from an acid condition of the blood—and it matters not whether it be uric or lactic—we have but to maintain its alkalinity by interdicting the use of nitrogenous articles of food, and insisting upon the example of the old Pythagorean," 'Eat nothing but vegetables, and drink only water or milk.'

DETECTING LEAKS IN DRAINS.—E. Slade-King, M.D., L.R.C.P., &c., &c., suggests *(Medical Times & Gazette)* the following easy, practical method of detecting flaws or leaks in drains and drain-fittings within dwelling-houses: "Unfortunately the smell of sewer-gas in dwellings is so slight as to be all but absent, and its intensity forms no index of the quantity or of the danger of the gases; those of foul smell not necessarily proving most dangerous, but resulting from the accidental presence of certain decomposing substances. The smell of carbolic acid is easily recognized, and, when used as a disinfectant may become also a detector of defects in traps and other fittings connected with drains. With this purpose in view, I am in the habit of directing a branch sewer, serving, say, a terrace or a group of cottages, to be well flushed overnight; then early the next morning the local ventilators to be closed, and common impure carbolic acid to be poured into the sewer, followed by a few gallons of boiling water. In the course of the day the inspector of nuisances calls at all the houses in the particular section, and inquires if the inmates have lately smelt anything of a peculiar odor. If they answer 'Yes'—

and in every group of houses there will be some affirmative replies—the chances are ten to one that they refer to the vapour from the carbolic acid, which has attracted attention by escaping from the drains. If in these suspected houses an effective search be made, some defect will come to light which has allowed the leakage of sewer-gas from the drain in the house. There are many other methods of detecting flaws in house-drains and sewers; but as a ready and practical way, I believe carbolic acid volatilised by steam to be the most generally applicable. And it must also be remembered that if the process were carried out methodically, and at regular intervals, it would insure a periodical disinfection of the sewer-channels, as well as a detection of their structural imperfections."

DISINFECTANTS.—The sixth of the new series of Reports of the Medical Officers of the Privy Council and Local Government Board contains an article on the study of disinfectants by Dr. Baxter. A great number of very careful experiments were made with a view to test the disinfecting properties of the so-called disinfectants commonly used. Evidence was adduced to show that carbolic acid, sulphur, permanganate of potash, and chlorine are all endowed with true disinfectant properties though in very varying degress. The effectual disinfectant operation of chlorine and permanganate of potash appears to depend far more on the nature of the medium through which the particles of the infective matter are distributed than on the specific character of the particles themselves. Aerial disinfection as commonly practised in the sick-room, is either useless or positively objectionable, owing to the false sense of security it is calculated to produce. To make the air of a room smell strongly of carbolic acid by scattering carbolic powder about the floor, or of chlorine, by placing a tray of chloriae of lime in a corner, is, so far as the destruction of specific contagion is concerned, an utterly futile proceeding. The practical result of these experiments goes to prove (1) that dry heat, when it can besupplied, is probably the most efficient of all disinfectants; (2) that the old plan of stopping up crevices and fumigating with sulphur and charcoal is more efficacious than any other proceeding with more modern disinfectants; (3) that the use of carbolic vapour for disinfecting purposes should be abandoned, owing to the relative feebleness and uncertainty of its action.—*Med. Times & Gaz.*

Each full grown man in effect deposits his own dead, effete putrescible body in the vault of the privy once every forty days.—*Segur.*

COST OF SICKNESS AND DEATH.—The more closely unsanitary conditions are examined the more extensive do their ramifications appear; average short life is but a very small part of the evil. To whatever extent the duration of life is diminished so much more productive power is lost, and every community is poor and powerless in the inverse ratio to the average duration of human life. Every death under the age of twelve years carries with it a positive loss to the community in which the individual has lived, because previous to twelve years of age sustenance involves cost—a direct outlay—and if the life of the individual is preserved a productive member of society is added and remuneration rendered. If the probabilities of life in any community are so low as to make the average adult age young, the proportion of widowhood and orphanage is increased, and the productive members of society proportionately burdened. If a husband dies in the early years of his married life, he leaves as burdens on the community a widow or children whom, in all probability, if he had lived, he would have supported. And thus it is that burdens are created and costs entailed upon the industrious survivors of every community in direct ratio with a high mortality. Besides, a high mortality always involves a large sickness rate, and sickness is always costly.—*Rept. of Com. on Hygiene, of N. Y. State Med. Soc.*

CRUELTY A CHARACTERISTIC OF MAN.—At a meeting of the Oxford branch of the Royal Society for the Prevention of Cruelty to Animals, the Bishop of Oxford in moving the adoption of the report referred to the prevention of cruelty to animals as influencing the social life of man. "Cruelty," he said, "was a character, a state of mind and habit of acting, and although now and then a cruel thing might be done in thoughtlessness, the general commission of acts of cruelty indicated a temperament of which cruelty was the characteristic, and it was quite certain where there was a cruelty it would not be confined to animals. The temper and character which produces these acts were just as dangerous to man and woman as to the animals whose cases they had in view; and when they had succeeded in repressing acts of cruelty to animals, they should keep under control and in check that temper and character which made homes miserable and led to acts of fatal violence.—*Med. Press & Cir.*

SIGNS OF DEATH.—As the result of the prize of $500 offered by the Marquis d' Ourches, for a simple and certain sign of death, the four following are deemed the most impor-

tant suggested :—(1) Cauterization of the pulp of the fingers during life causes blisters containing serocity, after death they contain steam ; (2) after death a grayish or dusty spot shows itself, first at the external portion of the sclerotic, prior to its fatal invasion ; (3) general discoloration of the fundus of the eye ; (4) Livid patches which appear shortly after death—they were found in every case on fifteen thousand cadavers.—*Medical and Surgical Report.*

A NOTED FRENCHMAN calls statistics "the science of natural, social, and political facts expressed in numerical terms." A German says that "history is statistics in movement, statistics are history at rest." A Scotchman describes them as "the means of determining and augmenting the sum of happiness which a nation enjoys." Napoleon proclaimed that they are "the art of making the inventory of a country," while Goethe said of them, that "if figures do not govern the world, at all events they show us how it is governed."—*Med. Times & Gaz.*

A PRETTY EXPERIMENT.—Put into a large glass jar a solution of sodium silicate (1 : 15) and drop in crystals of various metallic salts, as sulphates of iron and copper. The chemical reaction which ensues results in the formation of a miniature forest, or a growth resembling sea weeds. The semblance of vegetable growth is so striking that it is difficult to believe that the forces at work are simply those which belong to inert dead matter. One cannot help asking the question whether, after all, the difference is an absolute one between the so-called chemical and the vital formative processes.—*Detroit Rev.*

Harvey, the discoverer of circulation, said that "to maintain friendship there shall be once in every year a general feast, and on the day of such feast there shall be an oration." The oration is to be "an exhortation to the members to study and search out the secrets of nature by way of experiment and for the honor of the profession, and to continue mutually in love." He left funds to provide such an annual feast and oration. The above is very suggestive to medical societies, and if practiced in its real spirit, it would be of incalculable benefit to those participating in it.—*Detroit Rev. of Med.*

BERLIN BOARD OF HEALTH.—"We learn from the *Augsborg Gazette* that the Reichsgesundheistamt (State Board of Health) recently installed in Lowsenstrasse, Berlin, has already undertaken its official duties. The general direction of the offices has been given to Dr. Filkenberg, former professor in Bonn, who intends to go to London to study the organization and the management of the Department of Medical Statistics, in the Office of the Registrar General."—*Journal d' Hygiene.*

THE SANITARY JOURNAL.

Communications solicited from Medical Men and others on all subjects pertaining to Public Health.

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MEDICAL EDUCATION.

It was Lord Bacon, we believe, who said that the science of medicine had been "more professed than labored and yet more labored than advanced, the labor having been rather in circles than in progression, with much repetition and but small addition." While the long and earnest labors of great and good men for the advancement of the science of medicine have unquestionably been attended with a large measure of success so far as relates to most of its branches or departments—as anatomy, physiology, surgery, chemistry, and pathology, and much has been done in the way of *alleviating* human suffering—pain, as in the employment of anodynes and anæsthetics, yet as regards that part of the science belonging to the materia medica and the practice of medicine, the treatment of diseases, the action, or perhaps more properly the effects, of medicines, there is undoubtedly considerable truth in Lord Bacon's pungent remarks.

The chief cause of the little progress in this part of the science of medicine we will not now discuss, but purpose making it the subject of a few remarks on a future occasion. We now desire to draw the attention of the thoughtful to three points, all intimately connected and bearing upon medical education, and which seem particularly to demand the attention of the thoughtful.

As to the first: It refers to *teaching* and *practicing*. Students are taught that certain drugs have certain actions, and to give certain medicines in certain diseases, but they are not long practitioners before they find medicines will not even usually produce the effects on the human organization they

had been taught to expect. Experience, sometimes dearly purchased, so shakes the faith of some that they almost discard drugs in general practice; while others try different or new remedies and combinations, and to this may be partly attributed the almost endless and puzzling variety of preparations and compounds for the sick. How many after twenty or even ten years practice carry out the teachings of the schools, of their alma maters, as regards this part of the science? And this default, if the word may be so applied, is not on account of progress being made in it, for the hoped-for effects of remedies are still quite as unsatisfactory. It may be observed here that a knowledge of the unsatisfactory effects of medicines is not the private property of medical men. The public possess it. The former do not conceal the fact. It is public property, discussed in the public press. Some change, some "reform," seems to be required here, in teaching, as regards therapeutics and materia medica especially, before satisfactory progress can be possible. The strongholds of the materia medica if it has any, must be brought down. The vis medicatrix natura must receive greater and just recognition. In this way will be razed the strongholds, the foundation, of quackery.

As to the next point: Preventive medicine or sanitary science is now admitted by all medical men to be a most important branch of the science of medicine, yet in the schools it receives the least attention of all the departments, and a knowledge of it is not required it seems by any known examining body, either for a degree in medicine or for a license to practice. There is surely inconsistency here which must prevent healthful, satisfactory progress. Why cannot the Ontario Medical Council set an example which all other medical examining bodies may follow, and demand from all students evidence of a comprehensive and thorough knowledge of this subject before being entitled to registration. The schools would then give it that attention to which it is entitled. It is to be hoped some one of the medical fathers of Ontario will bring this matter before the Council at its next meeting.

The third matter to which we desire to draw attention more directly concerns the education of the public. Our views upon it

so nearly accord with those of Dr. H. B. Baker, Secretary of the Michigan State Board of Health, as given in a paper read in June last before the Lansing City Medical Society, and published in the *Detroit Review of Medicine*, that we take the liberty of quoting some of his words:

"It is plain," he says, "that the best support will be given to that class of physicians who best suit the people. "The people determine what class of physicians they will support; and it is absurd to expect those who have no conception of the essentials in the special culture of experts to judge accurately or well of their qualifications, and that as a rule the physicians chosen are those whose views most nearly correspond with those of the people who employ them." "It seems to follow that whenever a physician goes much beyond the average, he becomes less popular with the masses; he is not so well supported. It also follows that there can be no great progress of the profession except the people consent, and that so long as they can secure persons of that comparatively low culture which they can appreciate, there is no probability of raising the standard of qualifications of physicians." "The only possible way in which the standard of medical education and the qualifications of practitioners can be advanced, is through such education of the people as will enable them to appreciate the need and the possibility of such progress. Is it not clearly the duty of the profession to take greater care not only that their light be not hid 'under a bushel,' but that in all proper and practicable ways the knowledge gained by the physician, and which consists so largely of that which is most valuable to the people, because it teaches them how to live healthful and natural lives, shall be imparted to the people? This, in my opinion, is the solution of the great problem of how to advance the standard of medical education. It is a movement which requires that some shall advance, and that others shall support them in so doing. The conditions are such that unless the support keeps within easy reach, no progress can be made. The profession is now so far in advance of the people, that further progress is difficult, if not absolutely impossible."

The masses have a better knowledge of law and also of divi-

nity, and indeed of every profession and calling than of medicine; hence in the latter abound more than in any other profession or calling humbuggery and quackery.

HEREDITY.

While many do not accept in its entirety Darwin's theory of "Pangenesis," there are but few who doubt the influence of heredity on the human organization, that man is made up of his own and ancestral peculiarities. It is well known that constitutional defects may be and frequently are transmitted from parent to offspring; that all chronic diseases, as phthisis, scrofula, gout, syphilis, and insanity, either as a morbid tendency or in their general manifest form appear to be transmissible. Acquired accidental deformities, or the resulting symptoms, may be transmitted. Experiments have shown that animals with artificial epilepsy (produced by dividing the ischiatic nerve) give birth to young that also frequently have epilepsy. Hence it is esay to believe that the effects of dissipation on an originally good constitution for example will descend to the offspring. The qualities of the mind are subject to the same law of heredity.

It is a difficult matter to estimate the amount of evil, the suffering, the number of deaths, produced by hereditary influence. According to Dr. Bowditch, President of the Massachusetts State Board of Health, there are "200,000 human beings now annually slaughtered by hereditary diseases."

But the subject of heredity has a brighter side. Perverted processes, deviations, disease, are subject to limitation in transmission, and there is a tendency to revert to natural perfect type under improved and favorable conditions. Furthermore, the type may be improved. Who can know of the limit to which man's physical and mental organization may be developed under proper culture yet partly to be learned? The influence, for good or for evil, of one generation over the next which is to follow, and the next, is not considered as it should be. We, of this generation hold in our hands, as it were, the

well-being of those that follow. It rests with those of the present one whether future generations of Canadians shall be effeminate, diseased, deformed, manifesting want of intellect, and a superabundance of insane, or, physically and mentally vigorous, well developed, healthy and progressive. Let the people think of this and commence to act upon it.

Annotations.

THE INTERNATIONAL MEDICAL CONGRESS.

The meeting of this body in Philadelphia in the early part of September, was an important centennial event. A large number of eminent men were present, among whom were delegates from many different countries; Canada was well represented. Papers were read and discussions took place upon the different branches in medicine. It is gratifying to find Sanitary science receiving a fair share of attention, as indeed it does receive at nearly all the meetings of medical men in the United States.

Dr. Bowditch, President of the State Board of Health of Massachussets, in an address on Hygiene and Preventive Medicine, said, not a state in the Union has made a sanitary survey of the State, and they would probably think it an unnecessary expense, but in a few years it will be demanded. He gave an instance of a neighborhood which was rendered unbearable by the presence of a number of slaughter-houses, but the State Board of Health was given such authority, and swept them away, with the result that now the heighborhood is the most beautiful in Massachusetts. He much approved of public abottoirs. In regard to irrigation Salt Lake City is the most notable, they having thousands of miles of ditches; and in regard to bringing water into cities he has in his eye several large cities which, on account of defective systems, will bring upon themselves some disease. We shall never be free from contagious diseases until not only ourselves but all foreign nations shall have adopted a health code on the subject.

The dwelling-houses in which the poor in some of our cities are obliged to live are a disgrace. Their abodes are moral pests, and it is impossible for human people to grow up in them except in crime and disease. The only remedy for this is by public law and an authority making regulations for these people, or by philanthropic societies.

Our present duty is organization, National, State and municipal. From the highest place in the National Council

down to the smallest village Board of Health we need organization. This great and beneficent object, the prevention of disease appeals to all. I appeal to the young men of the present hour. Can there be anything more inspiring to a generous hearted intelligent youth than the thought that by the research into the causes of disease, by the discovery of means for its prevention, and by the teaching of these various causes and means to the people, he may help to save a few of the 200,000 human beings now annually slaughtered by hereditary disease. Although public hygiene has made but few advances hitherto, it is founded upon natural law. Modern science greets and brings it within its domains as one of its most precious objects for thorough investigation.

The following is the report of the Section on Sanitary Science. First.—Every plan for the laying out or extension of a town or city should have, as an indispensable part of it, a corresponding and co-extensive plan for the continuation or the substitution of the natural drainage of the locality and for the proper construction of a system of sewers. Second.—The question in regard to the removal of waste and impurities from towns is not as to the maintenance of sewers, but as to whether they should be depended upon alone, or should be supplemented, more or less largely, by other measures of conservancy. Third.—Every sewer not supplied with a sufficient flow of water to secure the transportation of its contents is a nuisance, intensifying the evils it ought to remove. Ventilation of sewers will mitigate, but not entirely correct such evils.

In accordance with a resolution passed at the meeting of the Canadian Medical Association in 1874, a meeting of the Joint Committees of the Conference appointed by the Canada Medical Association and American Medical Association was held. Present, Drs. J. A. Grant, F. W. Campbell, E. Robillard, E. H. Trenholme, of Canada. On motion of Professor Gross, Dr. J. A. Grant was requested to preside.

TYPHOID AND THE FUNGUS.—Apropos to the first article in this number, on "The causation of Typhoid fever," a writer in the *Sanitarian*, on the "Impurities of drinking water," observes: "Neither micrococci nor any micropic plants (*outside of fungi,*) can produce fermentation or any action on the living organism, except as carriers." And again, "a diligent investigation should set all doubts at rest in regard to the presence of infusoria or microscopic plants *(fungi excepted,)* in disease. They are, in our judgment, more likely to be beneficial than hurtful."

OBJECTS OF BOARD OF HEALTH, MASSACHUSETTS.—The Board was established in 1869, by an act of the Legislature, which clearly sets forth its objects as follows: "The Board shall take cognizance of the interests of health and life among the citizens of the Commonwealth. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics, and the sources of mortality and the effects of localities, employments, conditions and circumstances on the public health, and they shall gather such information in respect to those matters as they may deem proper for diffusion among the people. They shall advise the government in regard to the location of any public institutions."

The Legislature also passed a law requiring that: "The State Board of Health shall investigate, by themselves or by agents employed by them, the subject of the correct method of drainage and sewerage of the cities and towns of the Commonwealth, especially with regard to the pollution of rivers, estuaries and ponds by such drainage or sewage; and to devise and report a system or method by which said cities or towns may be properly drained, and said rivers estuaries and ponds may be protected against pollution, so far as possible, with the view of the preservation of the health of the inhabitants of this Commonwealth, and the securing to the several cities and towns thereof a proper system of *drainage* and *sewage*, without injury to the rights and health of others; also, to report how far said sewage may be utilised and disposed of."

DIET FOR GOUT.—Dr. John Malcolm in the *British Medical Journal* writes on this subject as follows: My attention has been given for many years to the cause and cure of gout, to which I have a hereditary tendency, my father and grandfather having suffered greatly from this disorder. I soon ascertained that, by attention to diet alone, I could prevent the disease, and for more than thirty years I have steadily adhered to a diet consisting of farinaceous food and fruit, with milk and cream, by which means I have escaped any illness. Among my patients, I have found that (when I could not induce them to give up animal food), by partaking only of fish, fowl, and rabbit—white meats—their attacks of gout have been of a milder and less frequent character; but in no case have I been able to cure the disease unless I could induce a total abstinence from all flesh-food.

FACTS having proven that in schools lighted by windows on both sides children suffer more or less from injured vision, a law has been passed in Germany forbidding such windows in schools.

IMPORTANCE OF FORESTS.—A convention is to be held this month for discussing the value of forests, and for taking steps to cultivate and protect the same in the United States. The *Medical and Surgical Reporter* says: The combined scientific and sanitary bodies of this country should enter a protest against the constant destruction of our forests. Quite apart from the loss of the picturesque and attractive, the denudation of the soil has results of the most serious character on national health and national wealth. To refer to the latter first, a most conclusive instance of it on a gigantic scale is the desolation of millions of square miles in the Caspian basin, and Southern Europe. The increasing aridity has there been traced directly to the cutting away of the forests. When it comes to health, the evidence is very strong that a climate tempered by the presence of abundant foliage is every way desirable. The beneficial effect of groves on the diminution of malaria is so well known that in many localities in France, Italy and Northern Africa, they have been planted for this purpose alone. The Eucalyptus probably does as much through the rapidity of its growth as through any specific powers it may possess. Will the people of Canada take warning and act in time?

THE BRUSSELS SANITARY EXPOSITION.—On June 26th, the International Sanitary Exhibition opened at Brussels. An exchange says: To a thoughtful person the Exhibition is one of extraordinary interest for members of every grade of society will there find objects which touch them closely. Who is safe against shipwreck or fire, and who can fail to be interested in the means of averting or escaping from these terrible calamities? The variety of the objects shown is very remarkable, and one is astonished at the way in which the commonest things are considered as ministering to man's health and comfort, and as tending to prolong his life. The objects exhibited are arranged in ten classes. 1. Means of prevention, help and salvage in case of fire. 2. Means of lessening the dangers on water. 3. Means of preventing railway accidents. 4. Help to the wounded in times of war. 5. Public health. 6. Industrial hygiene and means of lessening the unwholesomeness of trades. 7. Domestic and private hygiene. 8. Medicine, surgery and pharmacy in relation to the preceding classes. 9. Institutions having for their object the amelioration of the condition of the working classes. 10. Hygiene and "sauvetage" in relation to agriculture.

THE sanitary legislation of different countries resolves itself chiefly into the broad principle of attempting to provide clear air, clean water, clean food, clean soil, clean houses.

UNSEXING OF WOMEN.—In an article on "Woman's Place in Nature and Society," by Mrs. Linn Lynton, recently published, in referring to "Women Doctors," after drawing attention to the hardship of "roughing" it in a country practice, the writer adds: "This craze of unsexed manliness is a false move; we can only hope that it will pass before it has done much vital damage, though assuredly it has done damage enough already! In substituting excitement for duty, individualism for love, freedom from natural restraint for the lovely unselfishness of maternity, personal ambition for wifely devotion, it has cut at the root of all the charms and virtues of womanhood."

AT THE EPIDEMILOGICAL Society's meeting in June, (*Med. Times & Gaz.*) very conclusive proof, was submitted by Dr. Squire, of the conveyance of measles from man to the dog. A dog licked the hand of a child in bed with the rash of measles at its height; the dog sickened on the twelfth day after, suffered from coryza two days, and died on the fourth day of illness with most characteristic congestion of the throat and air-passages.

AT THE WORSHIP-STREET POLICE COURT, recently, the Vestry Clerk of the Parish of St. Leonard, Shoreditch, attended to support summonses taken out against several dairymen and cowkeepers for having on their respective premises a foul well containing water in such a state as to be a nuisance and injurious to health.

SALICYLIC ACID AND CISTERN WATER.—It has been determined, says the *Scientific American*, that the addition of from 0·0005 to 0·001 part of salicylic acid to cistern water, clarifies the same in a remarkable manner, and that which ordinarily, in the space of a month, would become foul and unfit to drink, remains perfectly pure and limpid.

EFFECTS OF WORRY.—The *British Medical Journal*, Nov. 13, 1875, reports the sudden death of a health officer, from a serous effusion into the ventricles of the brain. No other cause for death than *worry* respecting a sanitary report could be ascertained.

THE SANITARY AUTHORITY at Oldham reported that the prevalence of typhoid fever in that town was in all probability largely due to the adulteration of the milk-supply with poisoned water.

THE MEDICAL MEN having seats in the Legislature—39 in the Chamber of Deputies and seven in the Senate—met at Versailles to form themselves into an extra-Parliamentary Committee to confer on all Bills affecting health and pauperism."

NOTES, QUERIES AND REPLIES.

G. B.—Dr. C. B. Fox says: Red Litmus paper, which has been dipped into a very dilute solution of Iodide of Potassium appears to be the only reliable *Ozone* test. The Potassium set free in conjunction with the Iodine, when this salt is decomposed by Ozone, combines with the Ozone to form Potash, and the amount of this alkali is judged of by the extent to which the Red Litmus is blued.

WEIGHT OF LIGHT.—The weight of the light of one candle at six inches distant is now said to be 0·00172 grains. The weight of sunlight at 32 grains per square foot, 57 tons per square mile, and 3,000,000,000 tons on the surface of the earth.

OLD SOL.—In Sun Baths the naked body is exposed to the direct rays of the sun. The baths are believed by many to be highly beneficial to the general health.

DEEP.—The water of artesian wells though free from organic matter, sometimes contains so much mineral matter—inorganic salts, that it cannot be used for drinking purposes.

Sir Wm. Temple said: "Soldiers seemed to have the most honour, lawyers the most money, and physicians the most learning."

IN THE WORDS OF A MONTREAL COTEMPORARY, we wish to say to all delinquents, to whom we again send a statement of amount due. "We believe that in many cases it is simply neglect, but we hope that now *we have fulfilled our part of the obligation* our Subscribers will *remember what is due us*, and send it to us promptly. We beg to assure them that *we actually need it*. MAY WE HOPE FOR A PROMPT REMITTANCE."

MICRO-PHOTOGRAPHS IN HISTOLOGY, normal and pathological, by Carl Seiler, M.D., Phila.; J. H. Coates & Co.

Number five of this admirable publication has reached us. The publishers certainly did not put out the best first; each number seems to be superior to its predecessor. The last is certainly exceedingly beautiful, and gives plates of kidney of a mouse, injected, chronic nephrites, exhibiting the appearance under the microscope in an inflamed kidney, malphighian bodies, injected, and crystals of urea, with descriptive texts.

No one has any authority to collect on account of this Journal.

IF CITY SUBSCRIBERS having boxes in the Post Office, would kindly send us the number of the same, they would confer a favour, and save us considerable in postage during the year.

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.)